

PART 133D LIVE HOIST OPERATIONS



Overview

1. History & Background
2. Safety Considerations for incorporating live hoist operations into an organization
3. Hoist equipment
4. Example of hoist procedures
5. Rules & regulations

History & Background

On November 29, 1945, a Sikorsky R-5 hovers over a grounded oil barge in Long Island Sound off Fairfield, CT, to perform the first helicopter hoist rescues in aviation history. The rescue site was a short flight from the Sikorsky factory in Connecticut. Joseph Pawlik, captain of the barge aground on Penfield Reef, off Fairfield, CT, is lowered to safety from a Sikorsky R-5 helicopter piloted by Jimmy Viner, the company chief pilot, assisted by Capt. Jack Beighle of the Army Air Force. The Nov. 29, 1945 hoist rescue was the precursor to many thousands of missions to come.

Throughout history and even today the most of what we see in terms of rescue equipped aircraft are military or owned/operated by public agencies. In the latter group are aircraft that are operated under contract to public use agencies. Privately owned aircraft can be exempted from FAR Part 133 requirements if they are contracted to a federal agency like the USFS or DOI. However, for state or local government contract, the aircraft must be on an exclusive use contract for a minimum of 90 days before it is considered public use. For an aircraft that is not in public use to perform Class D external loads, the company must have a Part 133 operating certificate and the aircraft and crew must meet the requirements under that FAR for Class D loads. The helicopter has to be certificated as Category A (twin engine, among other things) and meet the rest of paragraph 133.45(e). The most common types of civil operations that perform Class D hoist flying that do not have governmental contracts are those that bring harbor ship pilots to the ships that they are required to bring into port, and some EMS companies equipped for SAR missions. Outside of a federal contract, the only way a privately-owned, single-engine helicopter can do Class D loads is if it is under contract for 90 days.



PART 133D LIVE HOIST OPERATIONS

Safety Considerations for incorporating live hoist operations into an organization

Hoist operations bring about a list of concerns, question, requirements, training, standards & procedures. A operator is suggested to develop a hoist program and should assign the chief pilot for rotorcraft external-load operations in charge of this program. The program can be broken down into 2 sections; Operations & Maintenance. Operations entails: training, standards & procedures for the pilots and other crew members were as the maintenance function is responsible for maintaining the hoist equipment and aircraft.

Example of General Safety considerations-

1. Crewmember or passenger being hoisted-

- A. Strong downdrafts
 - i. Flying debris
 - ii. Loss of unsecured items
 - iii. Ocean spray
- B. Static electricity
 - i. Up to 200,000 volts at 50 microamperes have been measured from a helicopter
- C. Communication
 - i. A individual has a limited ability to communicate with the hoist operator or pilot
- D. Emergency situations
 - i. A individual is at the mercy of the hoist operator and pilot throughout the lifting operation.

2. Pilots-

- A. Training & Currency
 - i. Due to the nature of this task and the risk associated a training & currency system shall be in place
 - ii. Training should be preformed using a dummy or similar weighted item to replicate a typical load
- B. Flying
 - i. Loss of a visual reference or not having additional resources like a radar altimeter
 - ii. Pilots inability to hold a steady hover laterally during lowering and initial pick up
 - iii. Pilots inability to control assents or descents while in a hover while lowering or initial pick up
 - iv. Entanglement of hoist cable with the surrounding environment
- C. Communication-
 - i. Crew coordination is key and the simplest breakdown could have severe consequences
 - ii. Terminology and hand signals should be standardized

3. Hoist operator-

- A. Operating with doors open or off
 - i. With the doors open a crewmember could fallout of the aircraft
 - ii. Equipment and supplies could escape the cabin and impact the tail-rotor
- B. Emergency situations
 - i. In the event of an emergency during the hoisting operation the operator will not be in their assigned duty or assigned seating system and during impact the operator may sustain extensive injuries.
 - ii. Squib failure events should be trained
- C. Training & Currency
 - i. Due to the nature of this task and the risk associated a training & currency system shall be in place

PART 133D LIVE HOIST OPERATIONS

Hoist Equipment

Hoists come in two basic styles mounted in two different configurations and there are two U.S. manufactures of rescue hoists: Breeze Eastern and UTC (United Technologies Corporation), formerly Goodrich. Most hoists are DC electric, but there are hoists that are 115vAC or hydraulically powered. There are two basic types of cable wind systems. The “level wind” system which is most common and winds the cable like a fishing reel. The “translating drum” system is other and moves back and forth. The translating drum allows the cable to be drawn off or reeled on the drum at a single point, rather than moving the cable as it is reeled.

Consideration and comparison of internal Vs. external hoist

Maintenance-

All hoists should follow their OEM maintenance schedule and at least one maintainer should attend the OEM care & maintenance course for a operators specific model. Hoists should have their own maintenance log books and their own regimented preventive maintenance and safety checks such as incorporating a hoist inspection into the daily aircraft maintenance checks, a pre-flight operational check prior to a planned hoist mission and a post check to reset the hoist as needed.

Internal mounted hoist considerations-

1. Easy to remove and install to help with weight restrictions and different mission sets.
2. Because the hoist can be boomed in and out this can help with moving heavy cargo in the helicopter.
3. UTC aerospace or formerly Goodrich is the only manufacture that makes an internal hoist.
4. Reduced cabin space with the hoist installed.
5. possible risk associated with improper installation during a quick installation for a mission.
6. The hoist is easily sent off to be repaired without grounding the airframe.

External hoist mounted considerations-

1. Permanently installed to the airframe.
2. No cabin space is lost.
3. Substantial weight is always present due to the installation process in installing a external hoist.
4. Weight is less comparing in a externally installed system vs. a internal mounted hoist.
5. Hoist operators position is usually more centered vs. being in the aft position of the airframe.

Other considerations-

1. A detailed program should be developed for PPE, restraints, and extraction equipment (Jungle penetrator, basket).
2. Spare components such as a spare hoist cable should be on hand in addition to any special tools, hoist stands, transport boxes and the proper lubricants specified by the OEM.

PART 133D LIVE HOIST OPERATIONS

Example of hoist MEDEVAC procedures

Step	Action
1.	The RS and helicopter crew shall prebrief this type maneuver before the RS exits the helicopter or the RS may signal the helicopter to DEPLOY RESCUE LITTER.
2.	Approach the survivor from the rear, establishing In Close In Control (ICIC).
3.	Evaluate the survivor's condition and signal the helicopter to DEPLOY RESCUE LITTER. Keep the survivor's airway clear and survivor's back into the prevailing seas/wind. Upon reaching rotor wash, position survivor's back towards helicopter.
<p>WARNING TO PREVENT SHOCK, ALLOW LITTER TO CONTACT WATER PRIOR TO BEING TOUCHED.</p>	
4.	The helicopter should deliver the litter within 5 to 10 feet of the RS.
5.	When the litter is in the water, the RS shall disconnect the litter from the locking hoist hook and give the FM the THUMBS UP signal to indicate that you have disconnected. Place the hoisting cables to the outside of the litter.
<p>NOTE The litter hoisting sling cables must be kept from interfering with the patient restraint straps, as they could become fouled under the survivor.</p>	
6.	The helicopter shall move back and left once the litter is disconnected.
7.	Keeping the survivor's airway clear and survivor's back into the prevailing seas/wind, the RS shall guide the survivor into the litter using the appropriate carry or tow.
<p>WARNING SURVIVORS WEARING A BUOYANT ANTI-EXPOSURE SUIT WILL AFFECT THE FLOTATION CHARACTERISTICS OF THE LITTER.</p>	
8.	Once the survivor is positioned in the litter, the RS shall connect the gray restraint strap under the survivor's arms and over chest.
9.	Continue connecting the remainder of the colored restraint straps as appropriate. The sequence of connection is at the discretion of the RS; however, the chest pad (black strap) shall be connected, restraining the survivor's arms under the strap. Upon completion, the RS should ensure that all restraint straps are connected and tightened as required.
<p>NOTE The RS may encounter some difficulty if the survivor has flotation; however, survivor flotation shall only be removed as a last resort to effect the rescue.</p>	

Note:

RS stands for Rescue Swimmer



References

Coast Guard Rescue swimmer manual CMI-3710-4C

PART 133D LIVE HOIST OPERATIONS

Example of hoist MEDEVAC procedures

Note:

RS stands for Rescue Swimmer

10.	Signal the helicopter READY FOR PICKUP.
<p>WARNING TO PREVENT SHOCK, ALLOW THE LOCKING HOIST HOOK TO CONTACT WATER PRIOR TO BEING TOUCHED.</p> <p>WARNING THE LOCKING HOIST HOOK SHALL BE IN THE LOCKED POSITION FOR ALL LITTER RECOVERIES.</p>	
<p>NOTE Prior to signaling READY FOR PICKUP the RS shall ensure all restraint straps are connected and tight, the litter hoisting cables are free and clear, and the folding couplers are tightened.</p>	
Step	Action
11.	The helicopter will move in over the RS and survivor and lower the locking hoist hook. Upon reaching rotor wash, rotate litter so that the survivor's back is positioned towards helicopter. The RS shall simultaneously attach both sides of the litter hoisting sling cables to the locking hoist hook.
12.	The RS shall simultaneously attach both sides of the litter hoisting sling cables to the locking hoist hook and place the locking hoist hook in the locked position.
13.	The RS shall maintain control of the litter until the litter is plumb underneath the helicopter.
14.	RS maintains visual contact with litter and aircraft as litter is being recovered to aircraft.



References

Coast Guard Rescue swimmer manual CMI-3710-4C

PART 133D LIVE HOIST OPERATIONS

Sample U.S. Army Rescue Hoist Training Standards

1. Rated

- a. Perform rescue hoist procedures per the appropriate aircraft operator's manual/CL, FM 4-02.2, FM 3-04.203, and the unit standing operating procedure (SOP).
- b. Maintain appropriate hover altitude ± 5 feet.
- c. Do not allow drift to exceed ± 5 feet.
- d. Perform post flight procedures per the appropriate aircraft operator's manual/CL.

2. Nonrated

- a. Prepare the appropriate hoisting equipment for the required mission (overwater, rapid river, jungle, mountain, or desert operations).
- b. Operate the rescue hoist pendant per the appropriate technical manual.
- c. Prepare patient for recovery.
- d. Secure the patient and equipment for departure.
- e. Perform post flight procedures per the appropriate aircraft operator's manual/CL.

3. Description- Crew actions.

- a. The pilot in command (PC) will conduct a thorough crew briefing and ensure all crewmembers are familiar with rescue hoist operations, emergency procedures, communication procedures, lowering the flight medic, and lifting the patient off the ground using the hoist or aircraft. The PC will also ensure that all crewmembers understand "CUT CABLE" procedures.
- b. The pilot on the controls (P*) will remain focused primarily outside the aircraft throughout the maneuver for aircraft control and obstacle avoidance. The P* will announce the intended point of hover and remain centered over the target with corrections from the nonrated crewmember (NCM).
- c. The pilot not on the controls (P) and NCM will assist in clearing the aircraft and will provide adequate warning of obstacles. They will also assist the P* in maintaining a stable hover by providing the P* with information regarding the drift of the aircraft. The P will also monitor cockpit indications. The P will be able to operate the control panel for the rescue hoist (if necessary).
- d. The NCM will ensure that the hoist is configured and will also ensure that all lifting devices (such as jungle penetrator, sked/stokes litter, and survivor's slings) are secured in the aircraft before takeoff.
- e. The NCM will conduct the hoist operation per FM 4-02.2, TC 1-201, the appropriate aircraft operator's manual/CL, and the unit SOP. The P* will perform the appropriate steps for the pilot on the controls per the appropriate aircraft

References

TC 3-04.33 (H-60 ATM)

PART 133D LIVE HOIST OPERATIONS

Sample U.S. Army Rescue Hoist Standards, Continued-

4. Procedures

a. General recovery procedures over land. Crewmembers should be alerted approximately 5 minutes before arriving at pickup site. Crewmembers complete all required checks (such as rescue hoist control panel switches set, hoist circuit breakers set, intercommunication system (ICS) selector switches set, and crewmembers reposition for hoist operations). Make the approach into the wind if possible and plan to terminate the approach at an altitude that will clear the highest obstacle. Select an appropriate reference point to maintain heading and position over the ground. Once stabilized over pickup site, perform hoist operations according to FM 4-02.2, TC 1-201, the appropriate aircraft operator's manual/CL, and the unit SOP.

b. Inert patient recovery. General format is the same as over land, except the medical officer (MO) is lowered on the hoist and secures the patient to the recovery device. Prior to deploying, all crewmembers will be briefed on method of recovery (simultaneous or singular recovery of the patient and MO), and a radio communications check should be made between the pilot and MO.

c. General recovery procedures overwater. General format is the same as over land, except a smoke device may be used to determine wind direction and velocity. Terminate the approach at a 100-foot hover—20 feet before reaching the patient. Deploy the recovery device and allow it to contact the water before reaching the patient. All crewmembers will wear floatation devices. Operations become increasingly more hazardous as references are reduced (open water versus a small lake or ship versus small boat), sea state increases (calm to chop to breaking condition with increasing wave height), and visibility decreases (horizon becomes same color as water, water spray or rain on windshield, sunny midday versus twilight).

NOTE:

The non-rated member (Crew Chief) will advise the Pilot when the person/equipment is in position on the jungle penetrator. The NCM (Crew Chief) will perform hoist operations using the standard words and phrases according to the unit SOP. The NCM will secure jungle penetrator or stokes litter upon completion of the hoisting operation. Should difficulty in maintaining a stable hover occur, the NCM will extend additional cable as "slack" to preclude inadvertent jerking the cable.

**References**

TC 3-04.33 (H-60 ATM)

PART 133D LIVE HOIST OPERATIONS

FAA Figure AC 29.865B-1

Figure AC 29.865B-1

**U.S. OPERATIONAL (PART 133) ROTORCRAFT-LOAD COMBINATION
VERSUS APPLICABLE CARGO TYPE DATA AND DEFINITION SUMMARY**

Possible RLCs and Cargo Types	Category "A" Rating and One Engine Inoperative (OEI) Hover Capability	Notes	Direct 2-Way Voice Communications Required See Paragraph d(10)
HEC RLC A,	No	Note 2	No
NHEC RLC A,	No		N/A
HEC RLC B,	No	Note 2	No
NHEC RLC B,	No		N/A
HEC RLC C,	No	Note 2	No
NHEC RLC C,	No		N/A
HEC RLC D,	Yes, See Paragraph d(12)	Note 1, 3, 4	Yes

NOTES:

1. A person(s), being carried or transported for compensation outside the rotorcraft can only be carried as a Class D RLC.
2. A person who is not being carried or transported for compensation, is knowledgeable of the risks involved, and at some point is required to be outside of the rotorcraft in order to fulfill the mission. These persons are considered as RLC Class A, B, or C HEC as appropriate to the operation.
3. The rotorcraft is approved to the Category A engine isolation requirements of Part 29 and have One Engine Inoperative/Out of Ground Effect (OEI/OGE) hover performance capability, for the requested operating and weight envelopes, to be eligible for certification to the Class D RLC. (Reference Paragraph d(12))
4. A Class D RLC operation may be conducted with an external cargo design having a physical configuration that meets the definitions of § 1.1 for RLC Class A, B, or C.

References

FAA Advisory Circular 29-2C-Chg 3

PART 133D LIVE HOIST OPERATIONS

FAR PART 27.865

27.865 External loads.

(a) It must be shown by analysis, test, or both, that the rotorcraft external load attaching means for rotorcraft-load combinations to be used for nonhuman external cargo applications can withstand a limit static load equal to 2.5, or some lower load factor approved under §27.337 through 27.341, multiplied by the maximum external load for which authorization is requested. It must be shown by analysis, test, or both that the rotorcraft external load attaching means and corresponding personnel carrying device system for rotorcraft-load combinations to be used for human external cargo applications can withstand a limit static load equal to 3.5 or some lower load factor, not less than 2.5, approved under §§ 27.337 through 27.341, multiplied by the maximum external load for which authorization is requested. The load for any rotorcraft-load combination class, for any external cargo type, must be applied in the vertical direction. For jettisonable external loads of any applicable external cargo type, the load must also be applied in any direction making the maximum angle with the vertical that can be achieved in service but not less than 30°. However, the 30° angle may be reduced to a lesser angle if—

- (1) An operating limitation is established limiting external load operations to such angles for which compliance with this paragraph has been shown; or
- (2) It is shown that the lesser angle can not be exceeded in service.

(b) The external load attaching means, for jettisonable rotorcraft-load combinations, must include a quick-release system to enable the pilot to release the external load quickly during flight. The quick-release system must consist of a primary quick release subsystem and a backup quick release subsystem that are isolated from one another. The quick-release system, and the means by which it is controlled, must comply with the following:

- (1) A control for the primary quick release subsystem must be installed either on one of the pilot's primary controls or in an equivalently accessible location and must be designed and located so that it may be operated by either the pilot or a crewmember without hazardously limiting the ability to control the rotorcraft during an emergency situation.
- (2) A control for the backup quick release subsystem, readily accessible to either the pilot or another crew member, must be provided.
- (3) Both the primary and backup quick release subsystems must—
 - (i) Be reliable, durable, and function properly with all external loads up to and including the maximum external limit load for which authorization is requested.
 - (ii) Be protected against electromagnetic interference (EMI) from external and internal sources and against lightning to prevent inadvertent load release.

PART 133D LIVE HOIST OPERATIONS

FAR PART 27.865

27.865 External loads. Continued-

(ii) Be protected against electromagnetic interference (EMI) from external and internal sources and against lightning to prevent inadvertent load release.

(A) The minimum level of protection required for jettisonable rotorcraft-load combinations used for nonhuman external cargo is a radio frequency field strength of 20 volts per meter.

(B) The minimum level of protection required for jettisonable rotorcraft-load combinations used for human external cargo is a radio frequency field strength of 200 volts per meter.

(iii) Be protected against any failure that could be induced by a failure mode of any other electrical or mechanical rotorcraft system.

(c) For rotorcraft-load combinations to be used for human external cargo applications, the rotorcraft must—

(1) For jettisonable external loads, have a quick-release system that meets the requirements of paragraph (b) of this section and that—

(i) Provides a dual actuation device for the primary quick release subsystem, and

(ii) Provides a separate dual actuation device for the backup quick release subsystem;

(2) Have a reliable, approved personnel carrying device system that has the structural capability and personnel safety features essential for external occupant safety;

(3) Have placards and markings at all appropriate locations that clearly state the essential system operating instructions and, for the personnel carrying device system, the ingress and egress instructions;

(4) Have equipment to allow direct intercommunication among required crewmembers and external occupants; and

(5) Have the appropriate limitations and procedures incorporated in the flight manual for conducting human external cargo operations.

(d) The critically configured jettisonable external loads must be shown by a combination of analysis, ground tests, and flight tests to be both transportable and releasable throughout the approved operational envelope without hazard to the rotorcraft during normal flight conditions. In addition, these external loads must be shown to be releasable without hazard to the rotorcraft during emergency flight conditions.

(e) A placard or marking must be installed next to the external-load attaching means clearly stating any operational limitations and the maximum authorized external load as demonstrated under § 27.25 and this section.

(f) The fatigue evaluation of § 27.571 of this part does not apply to rotorcraft-load combinations to be used for nonhuman external cargo except for the failure of critical structural elements that would result in a hazard to the rotorcraft. For rotorcraft-load combinations to be used for human external cargo, the fatigue evaluation of § 27.571 of this part applies to the entire quick release and personnel carrying device structural systems and their attachments.

PART 133D LIVE HOIST OPERATIONS

FAR PART 133-ROTORCRAFT EXTERNAL LOAD OPERATIONS

133.11 Certificate required.

(a) No person subject to this part may conduct rotorcraft external-load operations within the United States without, or in violation of the terms of, a Rotorcraft External-Load Operator Certificate issued by the Administrator under § 133.17.

(b) No person holding a Rotorcraft External-Load Operator Certificate may conduct rotorcraft external-load operations subject to this part under a business name that is not on that certificate.

133.13 Duration of certificate.

Unless sooner surrendered, suspended, or revoked, a Rotorcraft External-Load Operator Certificate expires at the end of the twenty-fourth month after the month in which it is issued or renewed.

133.19 Rotorcraft.

(a) The applicant must have the exclusive use of at least one rotorcraft that—

- (1) Was type certificated under, and meets the requirements of, part 27 or 29 of this chapter (but not necessarily with external-load-carrying attaching means installed) or of § 21.25 of this chapter for the special purpose of rotorcraft external-load operations;
- (2) Complies with the certification provisions in subpart D of this part that apply to the rotorcraft-load combinations for which authorization is requested; and
- (3) Has a valid standard or restricted category airworthiness certificate.

(b) For the purposes of paragraph (a) of this section, a person has exclusive use of a rotorcraft if he has the sole possession, control, and use of it for flight, as owner, or has a written agreement (including arrangements for the performance of required maintenance) giving him that possession, control, and use for at least six consecutive months.

133.21 Personnel.

(a) The applicant must hold, or have available the services of at least one person who holds, a current commercial or airline transport pilot certificate, with a rating appropriate for the rotorcraft prescribed in § 133.19, issued by the Administrator.

(b) The applicant must designate one pilot, who may be the applicant, as chief pilot for rotorcraft external-load operations. The applicant also may designate qualified pilots as assistant chief pilots to perform the functions of the chief pilot when the chief pilot is not readily available. The chief pilot and assistant chief pilots must be acceptable to the Administrator and each must hold a current Commercial or Airline Transport Pilot Certificate, with a rating appropriate for the rotorcraft prescribed in § 133.19.

(c) The holder of a Rotorcraft External-Load Operator Certificate shall report any change in designation of chief pilot or assistant chief pilot immediately to the FAA certificate-holding office. The new chief pilot must be designated and must comply with § 133.23 within 30 days or the operator may not conduct further operations under the Rotorcraft External-Load Operator Certificate unless otherwise authorized by the FAA certificate-holding office.

PART 133D LIVE HOIST OPERATIONS**FAR PART 133-ROTORCRAFT EXTERNAL LOAD OPERATIONS****133.23 Knowledge and skill.**

(a) Except as provided in paragraph (d) of this section, the applicant, or the chief pilot designated in accordance with § 133.21(b), must demonstrate to the Administrator satisfactory knowledge and skill regarding rotorcraft external-load operations as set forth in paragraphs (b) and (c) of this section.

(b) The test of knowledge (which may be oral or written, at the option of the applicant) covers the following subjects:

- (1) Steps to be taken before starting operations, including a survey of the flight area.
- (2) Proper method of loading, rigging, or attaching the external load.
- (3) Performance capabilities, under approved operating procedures and limitations, of the rotorcraft to be used.
- (4) Proper instructions of flight crew and ground workers.
- (5) Appropriate rotorcraft-load combination flight manual.

(c) The test of skill requires appropriate maneuvers for each class requested. The appropriate maneuvers for each load class must be demonstrated in the rotorcraft prescribed in § 133.19.

- (1) Takeoffs and landings.
- (2) Demonstration of directional control while hovering.
- (3) Acceleration from a hover.
- (4) Flight at operational airspeeds.
- (5) Approaches to landing or working area.
- (6) Maneuvering the external load into the release position.
- (7) Demonstration of winch operation, if a winch is installed to hoist the external load.

(d) Compliance with paragraphs (b) and (c) of this section need not be shown if the Administrator finds, on the basis of the applicant's (or his designated chief pilot's) previous experience and safety record in rotorcraft external-load operations, that his knowledge and skill are adequate.

PART 133D LIVE HOIST OPERATIONS**FAR PART 133-ROTORCRAFT EXTERNAL LOAD OPERATIONS****133.27 Availability, transfer, and surrender of certificate.**

(a) Each holder of a rotorcraft external-load operator certificate shall keep that certificate and a list of authorized rotorcraft at the home base of operations and shall make it available for inspection by the Administrator upon request.

(b) Each person conducting a rotorcraft external-load operation shall carry a facsimile of the Rotorcraft External-Load Operator Certificate in each rotorcraft used in the operation.

(c) If the Administrator suspends or revokes a Rotorcraft External-Load Operator Certificate, the holder of that certificate shall return it to the Administrator. If the certificate holder, for any other reason, discontinues operations under his certificate, and does not resume operations within two years, he shall return the certificate to the FAA Flight Standards District Office having jurisdiction over the area in which his home base of operations is located.

133.31 Emergency operations.

(a) In an emergency involving the safety of persons or property, the certificate holder may deviate from the rules of this part to the extent required to meet that emergency.

(b) Each person who, under the authority of this section, deviates from a rule of this part shall notify the Administrator within 10 days after the deviation. Upon the request of the Administrator, that person shall provide the certificate-holding FAA Flight Standards District Office a complete report of the aircraft operation involved, including a description of the deviation and reasons for it.

PART 133D LIVE HOIST OPERATIONS

FAR PART 133-ROTORCRAFT EXTERNAL LOAD OPERATIONS

133.33 Operating rules.

- (a) No person may conduct a rotorcraft external-load operation without, or contrary to, the Rotorcraft-Load Combination Flight Manual prescribed in § 133.47.
- (b) No person may conduct a rotorcraft external-load operation unless—
- (1) The rotorcraft complies with § 133.19; and
 - (2) The rotorcraft and rotorcraft-load combination is authorized under the Rotorcraft External-Load Operator Certificate.
- (c) Before a person may operate a rotorcraft with an external-load configuration that differs substantially from any that person has previously carried with that type of rotorcraft (whether or not the rotorcraft-load combination is of the same class), that person must conduct, in a manner that will not endanger persons or property on the surface, such of the following flight-operational checks as the Administrator determines are appropriate to the rotorcraft-load combination:
- (1) A determination that the weight of the rotorcraft-load combination and the location of its center of gravity are within approved limits, that the external load is securely fastened, and that the external load does not interfere with devices provided for its emergency release.
 - (2) Make an initial liftoff and verify that controllability is satisfactory.
 - (3) While hovering, verify that directional control is adequate.
 - (4) Accelerate into forward flight to verify that no attitude (whether of the rotorcraft or of the external load) is encountered in which the rotorcraft is uncontrollable or which is otherwise hazardous.
 - (5) In forward flight, check for hazardous oscillations of the external load, but if the external load is not visible to the pilot, other crewmembers or ground personnel may make this check and signal the pilot.
 - (6) Increase the forward airspeed and determine an operational airspeed at which no hazardous oscillation or hazardous aerodynamic turbulence is encountered.
- (d) Notwithstanding the provisions of part 91 of this chapter, the holder of a Rotorcraft External-Load Operator Certificate may conduct (in rotorcraft type certificated under and meeting the requirements of part 27 or 29 of this chapter, including the external-load attaching means) rotorcraft external-load operations over congested areas if those operations are conducted without hazard to persons or property on the surface and comply with the following:

PART 133D LIVE HOIST OPERATIONS

FAR PART 133-ROTORCRAFT EXTERNAL LOAD OPERATIONS

133.33 Operating rules, Continued-

(1) The operator must develop a plan for each complete operation, coordinate this plan with the FAA Flight Standards District Office having jurisdiction over the area in which the operation will be conducted, and obtain approval for the operation from that district office. The plan must include an agreement with the appropriate political subdivision that local officials will exclude unauthorized persons from the area in which the operation will be conducted, coordination with air traffic control, if necessary, and a detailed chart depicting the flight routes and altitudes.

(2) Each flight must be conducted at an altitude, and on a route, that will allow a jettisonable external load to be released, and the rotorcraft landed, in an emergency without hazard to persons or property on the surface.

(e) Notwithstanding the provisions of part 91 of this chapter, and except as provided in § 133.45(d), the holder of a Rotorcraft External-Load Operator Certificate may conduct external-load operations, including approaches, departures, and load positioning maneuvers necessary for the operation, below 500 feet above the surface and closer than 500 feet to persons, vessels, vehicles, and structures, if the operations are conducted without creating a hazard to persons or property on the surface.

(f) No person may conduct rotorcraft external-load operations under IFR unless specifically approved by the Administrator. However, under no circumstances may a person be carried as part of the external-load under IFR.

133.35 Carriage of persons.

(a) No certificate holder may allow a person to be carried during rotorcraft external-load operations unless that person—

- (1) Is a flight crewmember;
- (2) Is a flight crewmember trainee;
- (3) Performs an essential function in connection with the external-load operation; or
- (4) Is necessary to accomplish the work activity directly associated with that operation.

(b) The pilot in command shall ensure that all persons are briefed before takeoff on all pertinent procedures to be followed (including normal, abnormal, and emergency procedures) and equipment to be used during the external-load operation.

PART 133D LIVE HOIST OPERATIONS

FAR PART 133-ROTORCRAFT EXTERNAL LOAD OPERATIONS

133.37 Crewmember training, currency, and testing requirements.

(a) No certificate holder may use, nor may any person serve, as a pilot in operations conducted under this part unless that person—

(1) Has successfully demonstrated, to the Administrator knowledge and skill with respect to the rotorcraft-load combination in accordance with § 133.23 (in the case of a pilot other than the chief pilot or an assistant chief pilot who has been designated in accordance with § 133.21(b), this demonstration may be made to the chief pilot or assistant chief pilot); and

(2) Has in his or her personal possession a letter of competency or an appropriate logbook entry indicating compliance with paragraph (a)(1) of this section.

(b) No certificate holder may use, nor may any person serve as, a crewmember or other operations personnel in Class D operations conducted under this part unless, within the preceding 12 calendar months, that person has successfully completed either an approved initial or a recurrent training program.

(c) Notwithstanding the provisions of paragraph (b) of this section, a person who has performed a rotorcraft external-load operation of the same class and in an aircraft of the same type within the past 12 calendar months need not undergo recurrent training.

133.39 Inspection authority.

Each person conducting an operation under this part shall allow the Administrator to make any inspections or tests that he considers necessary to determine compliance with the Federal Aviation Regulations and the Rotorcraft External-Load Operator Certificate.

PART 133D LIVE HOIST OPERATIONS

FAR PART 133-ROTORCRAFT EXTERNAL LOAD OPERATIONS Subpart D-

133.41 Flight characteristics requirements.

(a) The applicant must demonstrate to the Administrator, by performing the operational flight checks prescribed in paragraphs (b), (c), and (d) of this section, as applicable, that the rotorcraft-load combination has satisfactory flight characteristics, unless these operational flight checks have been demonstrated previously and the rotorcraft-load combination flight characteristics were satisfactory. For the purposes of this demonstration, the external-load weight (including the external-load attaching means) is the maximum weight for which authorization is requested.

(b) Class A rotorcraft-load combinations: The operational flight check must consist of at least the following maneuvers:

- (1) Take off and landing.
- (2) Demonstration of adequate directional control while hovering.
- (3) Acceleration from a hover.
- (4) Horizontal flight at airspeeds up to the maximum airspeed for which authorization is requested.

(c) *Class B and D rotorcraft-load combinations:* The operational flight check must consist of at least the following maneuvers:

- (1) Pickup of the external load.
- (2) Demonstration of adequate directional control while hovering.
- (3) Acceleration from a hover.
- (4) Horizontal flight at airspeeds up to the maximum airspeed for which authorization is requested.

(5) Demonstrating appropriate lifting device operation.

(6) Maneuvering of the external load into release position and its release, under probable flight operation conditions, by means of each of the quick-release controls installed on the rotorcraft.

(d) Class C rotorcraft-load combinations: For Class C rotorcraft-load combinations used in wire-stringing, cable-laying, or similar operations, the operational flight check must consist of the maneuvers, as applicable, prescribed in paragraph (c) of this section.

PART 133D LIVE HOIST OPERATIONS

FAR PART 133-ROTORCRAFT EXTERNAL LOAD OPERATIONS Subpart D-

133.43 Structures and design.

(a) *External-load attaching means.* Each external-load attaching means must have been approved under—

- (1) Part 8 of the Civil Air Regulations on or before January 17, 1964;
- (2) Part 133, before February 1, 1977;
- (3) Part 27 or 29 of this chapter, as applicable, irrespective of the date of approval; or
- (4) Section 21.25 of this chapter.

(b) *Quick release devices.* Each quick release device must have been approved under—

- (1) Part 27 or 29 of this chapter, as applicable;
- (2) Part 133, before February 1, 1977; or
- (3) Section 21.25 of this chapter, except the device must comply with §§ 27.865(b) and 29.865(b), as applicable, of this chapter.

(c) *Weight and center of gravity—*

(1) *Weight.* The total weight of the rotorcraft-load combination must not exceed the total weight approved for the rotorcraft during its type certification.

(2) *Center of gravity.* The location of the center of gravity must, for all loading conditions, be within the range established for the rotorcraft during its type certification. For Class C rotorcraft-load combinations, 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.

PART 133D LIVE HOIST OPERATIONS**FAR PART 133-ROTORCRAFT EXTERNAL LOAD OPERATIONS Subpart D-****133.45 Operating limitations.**

In addition to the operating limitations set forth in the approved Rotorcraft Flight Manual, and to any other limitations the Administrator may prescribe, the operator shall establish at least the following limitations and set them forth in the Rotorcraft-Load Combination Flight Manual for rotorcraft-load combination operations:

(a) The rotorcraft-load combination may be operated only within the weight and center of gravity limitations established in accordance with § 133.43(c).

(b) The rotorcraft-load combination may not be operated with an external load weight exceeding that used in showing compliance with §§ 133.41 and 133.43.

(c) The rotorcraft-load combination may not be operated at airspeeds greater than those established in accordance with § 133.41 (b), (c), and (d).

(d) No person may conduct an external-load operation under this part with a rotorcraft type certificated in the restricted category under § 21.25 of this chapter over a densely populated area, in a congested airway, or near a busy airport where passenger transport operations are conducted.

(e) The rotorcraft-load combination of Class D may be conducted only in accordance with the following:

(1) The rotorcraft to be used must have been type certificated under transport Category A for the operating weight and provide hover capability with one engine inoperative at that operating weight and altitude.

(2) The rotorcraft must be equipped to allow direct radio intercommunication among required crewmembers.

(3) The personnel lifting device must be FAA approved.

(4) The lifting device must have an emergency release requiring two distinct actions.

PART 133D LIVE HOIST OPERATIONS**FAR PART 133-ROTORCRAFT EXTERNAL LOAD OPERATIONS Subpart D-****133.47 Rotorcraft-load combination flight manual.**

The applicant must prepare a Rotorcraft-Load Combination Flight Manual and submit it for approval by the Administrator. The manual must be prepared in accordance with the rotorcraft flight manual provisions of subpart G of part 27 or 29 of this chapter, whichever is applicable. The limiting height-speed envelope data need not be listed as operating limitations. The manual must set forth—

(a) Operating limitations, procedures (normal and emergency), performance, and other information established under this subpart;

(b) The class of rotorcraft-load combinations for which the airworthiness of the rotorcraft has been demonstrated in accordance with §§ 133.41 and 133.43; and

(c) In the information section of the Rotorcraft-Load Combination Flight Manual—

(1) Information on any peculiarities discovered when operating particular rotorcraft-load combinations;

(2) Precautionary advice regarding static electricity discharges for Class B, Class C, and Class D rotorcraft-load combinations; and

(3) Any other information essential for safe operation with external loads.

133.49 Markings and placards.

The following markings and placards must be displayed conspicuously and must be such that they cannot be easily erased, disfigured, or obscured:

(a) A placard (displayed in the cockpit or cabin) stating the class of rotorcraft-load combination for which the rotorcraft has been approved and the occupancy limitation prescribed in § 133.45(a).

(b) A placard, marking, or instruction (displayed next to the external-load attaching means) stating the maximum external load prescribed as an operating limitation in § 133.45(c).

133.51 Airworthiness certification.

A Rotorcraft External-Load Operator Certificate is a current and valid airworthiness certificate for each rotorcraft type certificated under part 27 or 29 of this chapter (or their predecessor parts) and listed by registration number on a list attached to the certificate, when the rotorcraft is being used in operations conducted under this part.

PART 133D LIVE HOIST OPERATIONS

List of References

- ◆ FAR Part: 28.675
- ◆ FAR Part: 133
- ◆ Advisory Circular 29-2C change 3
- ◆ OGP Appendix 9
- ◆ Coast Guard Rescue swimmer manual: CIM-3710-4C
- ◆ UH60 Air Crew Training Manual: TC 3.04.33
- ◆ High performance hoist in medical evacuation operations: FM 8-10-6