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# *FAA APPROVED ROTORCRAFT FLIGHT MANUAL SUPPLEMENT*

## *STC SR01943SE*

## *Bell 407 Cargo Hook Kit with Hydraulic Release*

**R/N _____ S/N _____**

FAA Approved: _____ For

Digitally signed by ROBERT Y SCHLEIN
Date: 2022.01.14 09:15:33 -08'00'

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Federal Aviation Administration
Seattle, WA

Date: 14 Jan 2022

## Record of Revisions

| Rev. | Page(s) | Reason for Revision | FAA Approval |
|---|---|---|---|
| 0 | All | Initial Release. | Dec. 5, 2008 |
| 1 | All | Updated Types of Operation section. | Sept. 10, 2015 |
| 2 | All | Added cargo hook (P/N 528-028-02) with Surefire release and associated instructions. | Feb. 13, 2017 |
| 3 | All | Added C-40 Indicator (P/N 210-293-00) and associated instructions. Updated Limitations section per recent FAA guidance. |  Digitally signed by ROBERT Y SCHLEIN Date: 2022.01.14 09:15:09 -08'00' |

## INTRODUCTION

Attach this supplement to the Bell 407 FAA approved Rotorcraft Flight Manual when an Onboard Systems P/N 200-412-00, 200-412-10, 200-413-00, 200-413-01, 200-413-02, 200-413-10, 200-413-11, 200-413-12 cargo hook suspension system is installed in accordance with Supplemental Type Certificate (STC) No. SR01943SE, see section 6 for a description of these systems. The information contained herein supplements or supersedes the basic manual only in those areas listed herein. For limitations, procedures and performance information not contained in this supplement, consult the basic Rotorcraft Flight Manual.

# 1. LIMITATIONS

The limitations specified in the basic flight manual issued by Bell remain applicable and are supplemented by the following.

## 1-3 Types of Operation

With a load attached to the cargo hook, operation shall be conducted in accordance with the respective national operational requirements.

The cargo hook kit configurations (as installed per this STC SR01943SE) do not meet the 14 CFR part 27 certification requirements for Human External Cargo (HEC).

**NOTICE**

*The cargo hook kit certification approval does not constitute operational approval; operational approval for external load operations must be granted by the local Aviation Authority.*

For solo external load operations from the left crew seat: (1) the backup release system control must be installed on the left crew seat cyclic, (2) there must be provisions made to ensure that equipment originally intended to be operated by the pilot from the right crew seat is equally operable from the left crew seat with similar controls and (3) left crew seat pilot-in-command operation must be approved.

## 1. LIMITATIONS continued

### 1-6 Weight and Center of Gravity

Consult the basic flight manual for Gross Weight and Center of Gravity limits of the helicopter.

The external load limit is the lesser of 2,650 lbs (1202 kg) or as allowed by the basic flight manual.

### 1-7 Airspeed

$V_{NE}$ with a load attached to the cargo hook is 100 KIAS or placarded $V_{NE}$, whichever is less.

**⚠ CAUTION**

*Airspeed with an external load is limited by controllability. Caution should be exercised when carrying an external load, as handling characteristics may be affected by size, weight, and shape of the load.*

## 1. LIMITATIONS continued

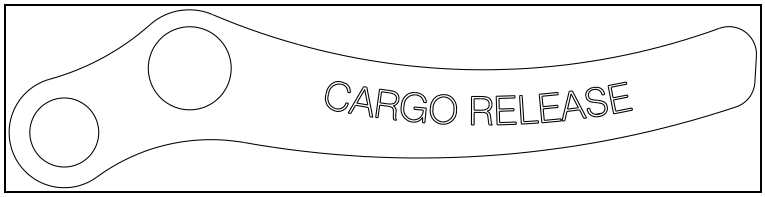
### 1-20 Placards

The following placards are included with kit P/Ns 200-412-00, 200-412-10, 200-413-00, 200-413-01, 200-413-10 and 200-413-11.

Mounted on suspension beam assembly:

EXTERNAL LOAD LIMIT
2650 LBS.
1202 KGS.

Engraved on the hydraulic release lever located on the cyclic:




When the Load Weigh System (included with kit P/N 200-413 series) is installed the following placards apply.

Mounted adjacent to the C-39 load weigh indicator in full view of pilot or co-pilot. This is not applicable to the C-40 load weigh indicator (P/N 210-293-00).

TURN THE WEIGHING SYSTEM OFF WHEN NAVIGATION EQUIPMENT IS IN USE. NO AIRCRAFT OPERATION SHOULD BE PREDICATED ON THE READING OF THE ONBOARD WEIGHING SYSTEM.

## 1. LIMITATIONS continued

### 1-20 Placards

The following placards are applicable to optional cargo hook P/N 528-028-02 which features Surefire Release.

- Adhered on the solenoid housing of cargo hook P/N 528-028-02.


- Adhered adjacent to the cockpit cargo release switch if Cargo Hook P/N 528-028-02 is installed:

## 2. NORMAL PROCEDURES continued

### 2-2 Flight Planning

Instruct ground crew to discharge the helicopter's static electricity (before attaching the load to the cargo hook) by touching the airframe with a ground wire or if a metal sling is used, the load ring can be struck against the cargo hook. Re-ground if contact is lost and if possible maintain contact until load attachment is completed.

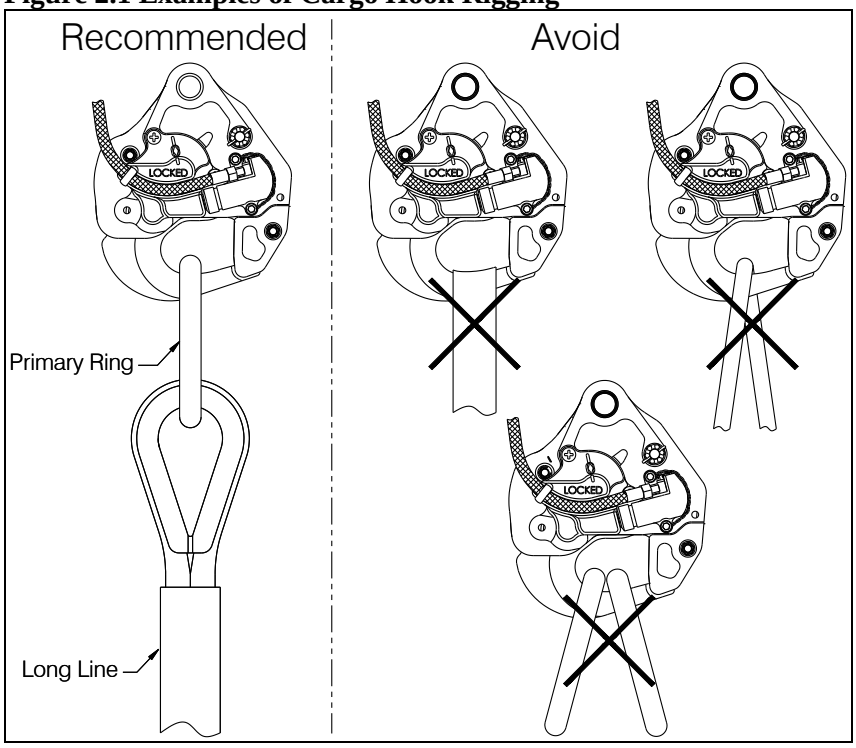
Exercise care when rigging a load to the Cargo Hook. Attaching the external load using a steel load ring on the Cargo Hook's load beam is the recommended rigging configuration to provide consistent release performance and resistance to fouling. Figure 2.1 shows the recommended rigging configuration and rigging to avoid, but is not intended to represent all possibilities. For each rigging configuration used, verify that the rigging will freely slide off the load beam when it is opened.


*It is the responsibility of the operator to ensure the hook will function properly with the rigging.*

## 2. NORMAL PROCEDURES continued

### 2-2 Flight Planning continued

**Figure 2.1 Examples of Cargo Hook Rigging**



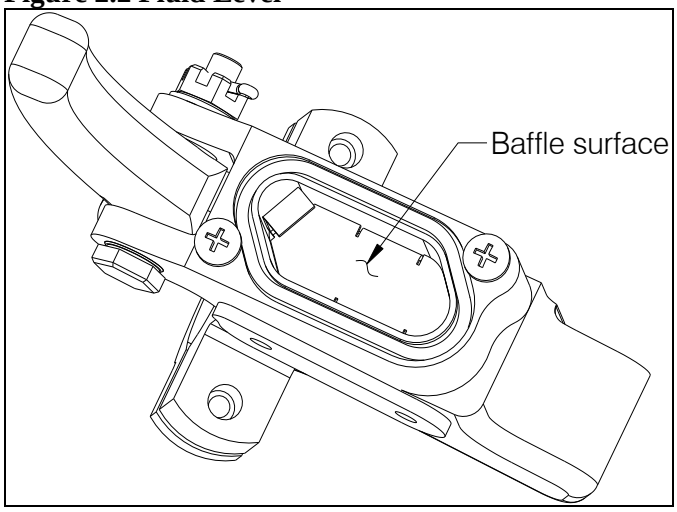
## 2. NORMAL PROCEDURES continued

### 2-3 Pre-flight Check

Before a flight involving external load operations perform the following procedures.

1. Visually check all cargo hook fasteners to ensure that they are tight.
2. Visually check the electrical connectors for damage and security.
3. Visually check the hydraulic hose and its connections for damage and security.
4. Check the fluid level in the master cylinder reservoir on the cyclic. The master cylinder reservoir features a transparent lid through which the fluid level can be checked. Hydraulic fluid should be visible over the baffle surface.

**Figure 2.2 Fluid Level**

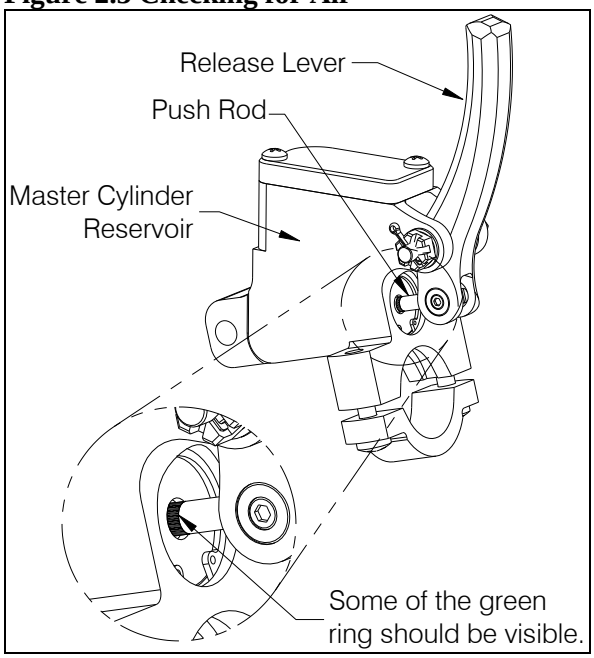


## 2. NORMAL PROCEDURES continued

### 2-3 Pre-flight Check continued

5. Check the hydraulic release system for excess air in the lines by firmly pulling the release lever located on the cyclic until it comes to a stop. Check the piston position (see Figure 2.3). If some of the green ring on the push rod is visible, the system is ready for use. If none of the green ring is visible, the system needs to be bled. Refer to applicable ICA for bleed instructions.

**Figure 2.3 Checking for Air**



## 2. NORMAL PROCEDURES continued

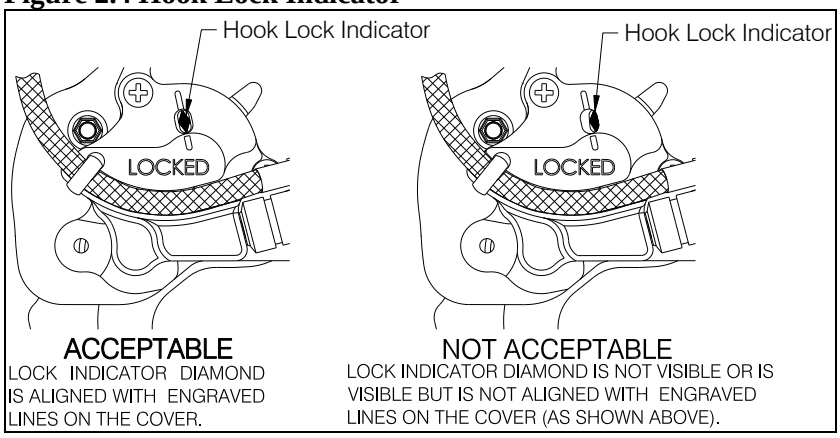
### 2-3 Pre-flight Check continued

6. Cycle the manual release system to ensure proper operation. Pull the release lever located on the cyclic (see Figure 2.6). With no load on it, the cargo hook's load beam should open. The cargo hook may be returned to the locked position by manually pushing up on the load beam. The load beam should snap shut.

**⚠ CAUTION**

*Verify that the hook lock indicator on the side of the hook returns to the fully locked position. In the fully locked position the hook lock indicator should align with the lines on the cover (see Figure 2.4).*

**Figure 2.4 Hook Lock Indicator**



## 2. NORMAL PROCEDURES continued

### 2-3 Pre-flight Check continued

7. Check the operation of the cargo hook's electrical release system to ensure proper operation. The following instructions are applicable to cargo hook P/N 528-028-00.

**NOTICE**

*If Cargo Hook with Surefire Release (P/N 528-028-02) is installed, the electrical release includes a ½ second time delay. See specific procedures in this step for this model.*

- Press the electrical release switch on the cyclic; the cargo hook load beam should fall to the open position.
- Push up on the load beam and verify that it latches and the hook lock indicator is aligned with the engraved line on the manual release cover (see Figure 2.4).

**NOTICE**

*The cargo hook system interfaces with the rotorcraft's CARGO RELEASE switch on the cyclic as supplied by Bell.*

## 2. NORMAL PROCEDURES continued

### 2-3 Pre-flight Check continued

The following instructions are applicable to the cargo hook P/N 528-028-02. In addition to the P/N, this cargo hook can also be identified by its gold color solenoid cover (see Figure 2.5).

- *Very* briefly press the Cargo Release switch, the cargo hook should not actuate and the load beam should remain closed.
- Press and hold the Cargo Release switch for several seconds, the load beam should fall to the open position and the cargo hook solenoid should continue to cycle repeatedly.
- Push up on the load beam and verify that it latches and the hook lock indicator is aligned with the engraved line on the manual release cover (see Figure 2.4)

**NOTICE**

*By design (to help protect against inadvertent load release) cargo hook P/N 528-028-02 requires that the Cargo Release switch on the cyclic be held for at least ½ second to release the load.*

**Figure 2.5 Surefire Configuration Identification**

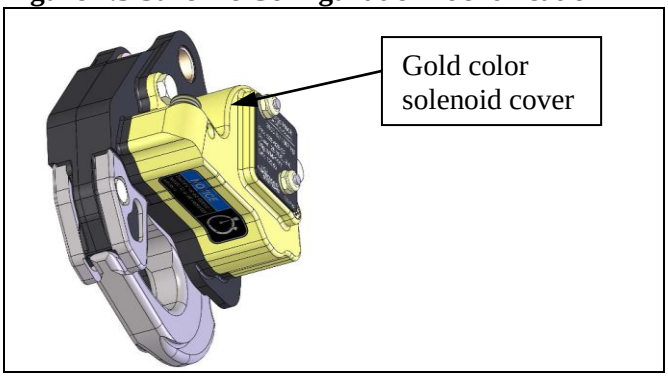
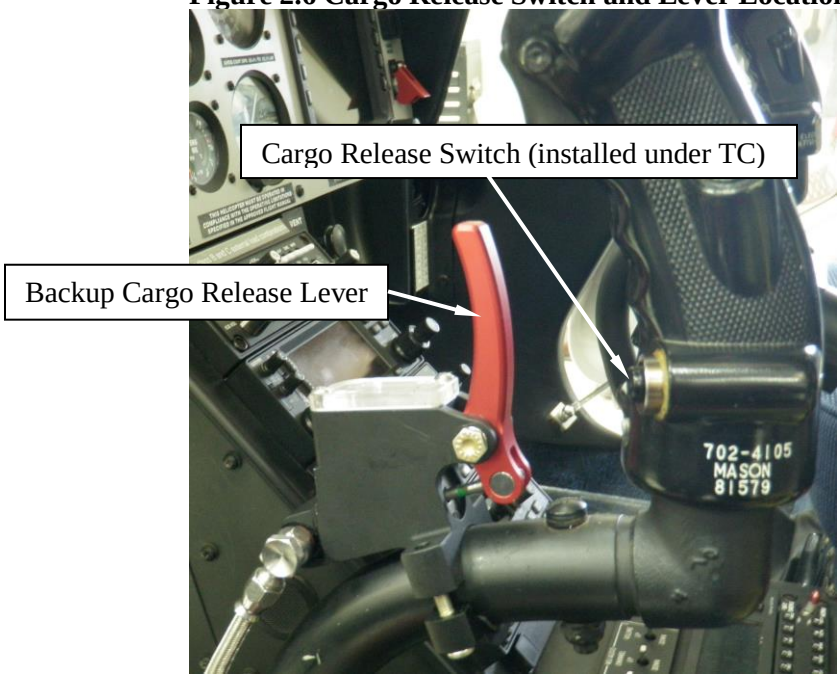


**Figure 2.6 Cargo Release Switch and Lever Locations**




8. Move the cargo hook and the suspension beam throughout their full ranges of motion to ensure the hydraulic hose and electrical harnesses have enough slack. The hydraulic hose or electrical harnesses should not be the stops that prevent the cargo hook or suspension beam from moving freely in all directions.

## 2. NORMAL PROCEDURES continued

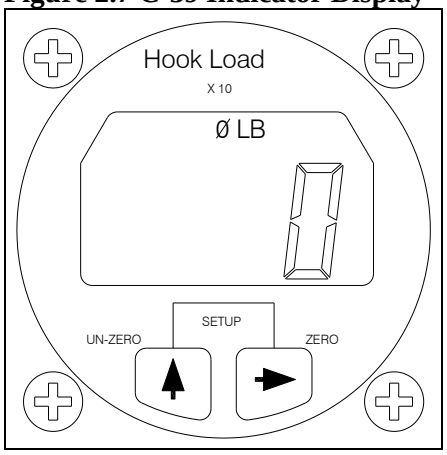
### 2-3 Pre-flight Check continued

If the Load Weigh System is installed, perform the following additional procedures (depending on the Indicator model):

For the C-39 Indicator (P/N 210-095-00 or 210-095-02):

On power up, after a brief self-diagnostic routine is complete, verify the indicator display indicates “0” as shown below (with no load on the cargo hook):

**Figure 2.7 C-39 Indicator Display**



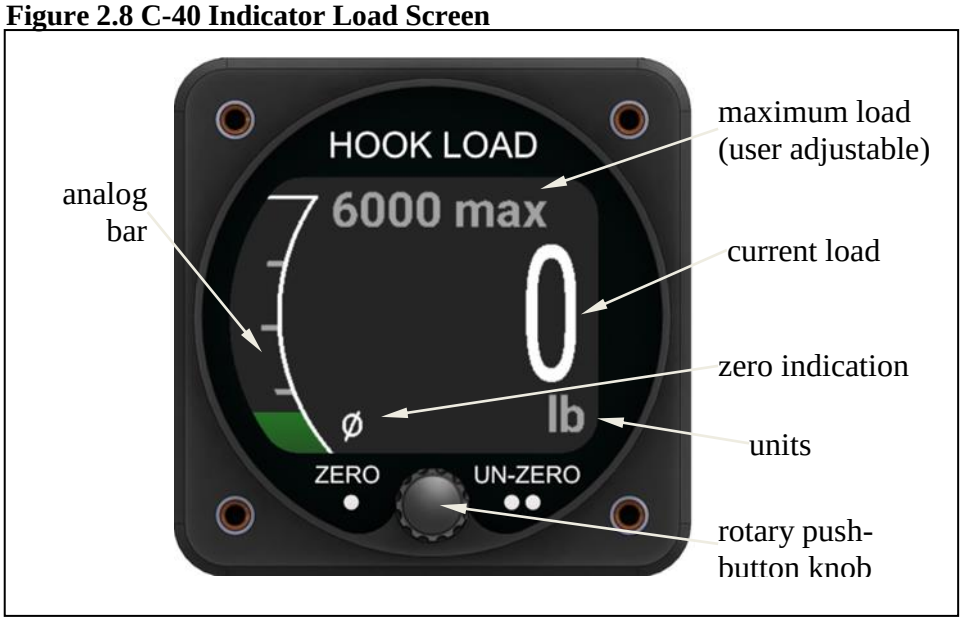

**NOTICE**

*Refer to Owner’s Manual 120-039-00 for setup instructions including changing the units, changing the calibration code, zeroing the display, changing the dampening level, etc.*

**Pre-Flight Check** continued

For the C-40 model (P/N 210-293-00): on power up an Information screen will display the Hook Hours, software version, and serial number (S/N) and then the indicator should display the Load screen. The Load screen of the C-40 model is shown below.

**Figure 2.8 C-40 Indicator Load Screen**




**NOTICE**

*For the C-40 model refer to Owner's Manual 120-152-00 for detailed setup instructions including changing the units, changing the brightness of the display, etc. and additional operation instructions.*

**Pre-Flight Check** continued

The C-40 model includes a Maximum Load setting, this setting provides the option to select a maximum load for each flight involving external load operations based on flight conditions (temperature, altitude, fuel, etc.) or it can be set to the maximum external load rating for the helicopter. To set the maximum load:

- From the Load screen press and hold the rotary push button knob until the Maximum Load screen appears. Release the knob.

**Figure 2.9 Maximum Load Screen**


- Rotate the knob to the left or right to decrease or increase the value to the desired setting.
- Press the knob to set this value.

## NORMAL PROCEDURES continued

**Pre-Flight Check** continued

To zero (or tare) the weight of the long line, net, remote hook, etc. from the displayed load, apply that weight to the cargo hook and press the knob once and the display should zero out. Press the knob twice to un-zero (un-tare) the display and add this weight back in.

**NOTICE**

*The analog bar always displays the un-zeroed load. If there is a discrepancy between the analog bar and the displayed load, a large amount of load has likely been zeroed.*

## 2. NORMAL PROCEDURES continued

### 2-8 Takeoff

1. Hover at sufficient height to allow a ground crew member to discharge static electricity and attach the load to the cargo hook.
2. Ascend vertically, directly over the load, and then slowly lift the load from the ground.
3. Check for adequate directional control.
4. Check torque required to hover with the load.
5. Take-off into wind, if possible, and ensure the load has clearance over obstacles.

### 2-9 In-Flight Operations

Make all control movements gently with gradual acceleration and deceleration and only slightly banked turns.

**⚠ CAUTION**

*Control movements should be made smoothly and kept to a minimum to minimize oscillation of the external load.*

**⚠ WARNING**

*The suspension is designed to allow the cargo hook to pivot and align with the external load in all directions with limits to protect the cargo hook and its electrical cable and hydraulic hose from damage. Take precautions to prevent external load angles which exceed the limits of rotation provided by the suspension as the load may not be releasable in this position.*

## 2. NORMAL PROCEDURES continued

### 2-10 Descent and Landing

1. Perform the approach at minimum rate of descent.
2. Execute the approach to hover with sufficient height to prevent the load from hitting obstacles on or being dragged along the ground and then slowly descend vertically to set the load on the ground.
3. Press the CARGO RELEASE switch on the cyclic to release the load from the cargo hook.

   The manual release lever is intended as a backup release in the event of an inability to release the load electrically but may be used to release the load in normal circumstances.
4. Visually check to ensure that the load has been released.


*Verify that the external load and long line has dropped free from the rotorcraft before departing the drop-site.*

## 3. EMERGENCY PROCEDURES

In the event that the cargo hook will not release the load when the Cargo Release switch on the cyclic is pressed, proceed as follows.

1. Maintain tension on the sling.
2. Pull the Cargo Release lever on the cyclic to release the load.

**⚠ WARNING**

*In an emergency with a snagged load, pulling the Cargo Release lever should be the first option for release of the external load as the manual release system provides greater load release authority in an overload condition. If pulling the lever fails, NEXT press the switch on the cyclic.*

## 4. PERFORMANCE

Consult the basic flight manual issued by Bell for out of ground effect hover performance.

**NOTICE**

*The Load Weigh System is intended as a means of MONITORING the weight of the load suspended from the Cargo Hook.*

Before lifting a load, it is recommended that the load weight be estimated, the shape/size is considered and, upon lifting the load, monitor the load indicator and compare the actual engine torque value vs. the expected value for a given weight to verify sufficient performance.

# 5 WEIGHT AND BALANCE

## 5-2 Empty Weight Center of Gravity

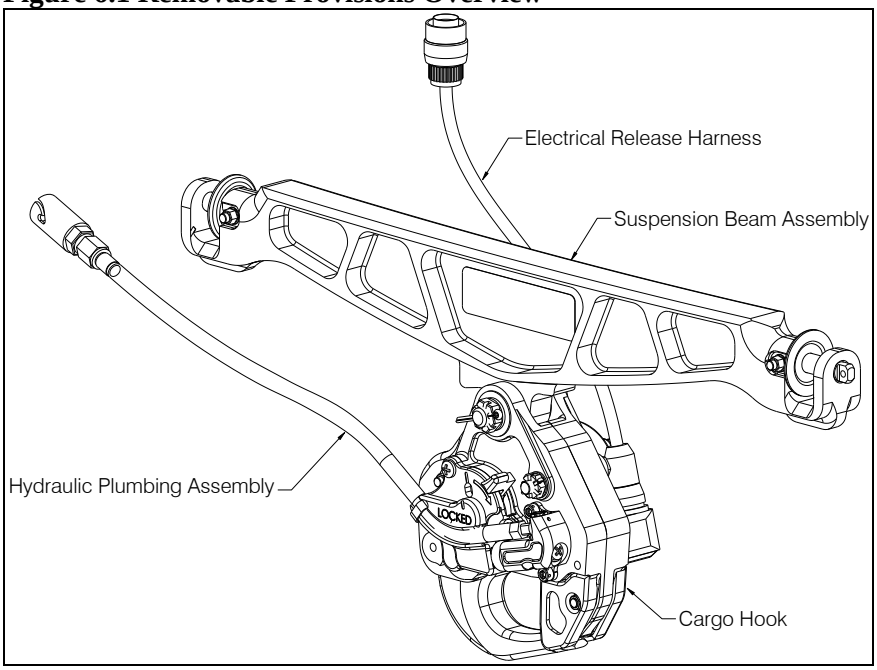
The cargo hook is located at FS 121.0 (3073 mm).

# 6 SYSTEM DESCRIPTION

The cargo hook suspension kits include fixed provisions and removable provisions. The fixed provisions include the internal electrical release harnesses, the internal hydraulic backup release system including the release lever on the cyclic, miscellaneous supporting brackets, and pillow blocks. The pillow blocks support each end of the suspension beam assembly and attach to the rotorcraft's hard points.

The removable provisions include the cargo hook, suspension beam assembly, external hydraulic plumbing assembly, and external electrical release harness (see Figure 6.1). The suspension beam assembly supports the cargo hook and allows it to align itself with the external load. These items interface with the fixed provisions kit to form a complete external load carrying system.

**Figure 6.1 Removable Provisions Overview**




The P/N 200-413 series kits include a load weigh system. The load weigh system consists of a cockpit-mounted indicator, a load cell above the cargo hook, and the interconnecting wiring harness.

Kit P/Ns 200-412-10, 200-413-10, 200-413-11, and 200-413-12 include a cargo hook (P/N 528-028-02) with a delay circuit to help protect against inadvertent load release as a result of accidental contact with the Cargo Release switch or inadvertently pressing this switch. This delay circuit requires that the release switch be held for approximately ½ second in order to release the cargo hook load. This feature is referred to as Surefire Release.