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# STUDENT GUIDE

## FOR

### UH-60 LANDING GEAR



**THIS PACKAGE HAS BEEN DEVELOPED FOR USE BY:**

Black Hawk (UH-60) Helicopter Maintenance Test Pilot Training Program

**PROPONENT FOR THIS TSP IS:**

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LANDING GEAR  
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## SECTION I. - INTRODUCTION

TERMINAL LEARNING OBJECTIVE:

ACTION: Identify the characteristics of the UH-60 Landing Gear and Brake System.

CONDITIONS: As a UH-60 Test Pilot.

STANDARD: IAW TM-11-1520-237-23 -3.

SAFETY REQUIREMENTS:

Will be addressed as NOTES, CAUTIONS, and WARNINGS throughout the lesson outline.

RISK ASSESSMENT LEVEL: Low

ENVIRONMENTAL CONSIDERATIONS: There are no environmental concerns for this lesson.

EVALUATION: Evaluation will be accomplished with performance exam at the end of this module of instruction.

## SECTION II. - PRESENTATION

### A. ENABLING LEARNING OBJECTIVE ELO No. 1

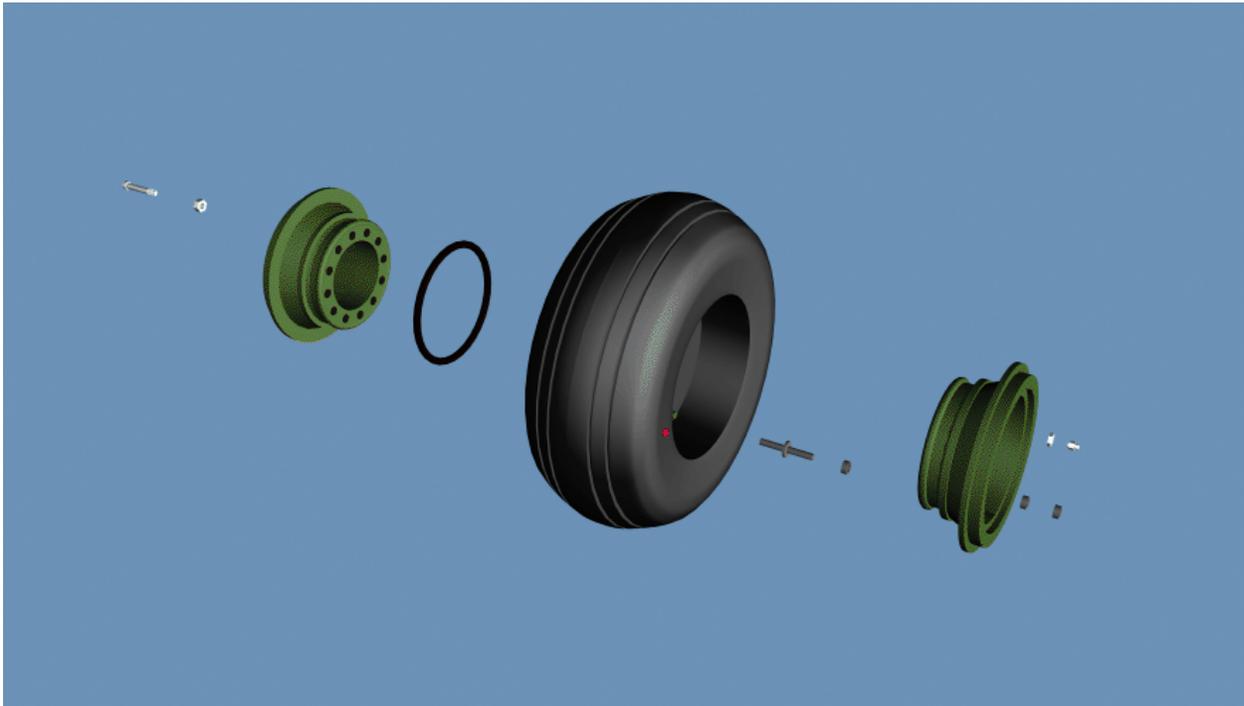
ACTION: Identify the function of the Wheel/Brake System.

CONDITIONS: Using TM 1-1520-237-23-3

STANDARD: IAW TM 1-1520-237-23-3

#### a. Wheel/Brake System

Frame #0025 (Main Landing Gear Wheel Assembly)



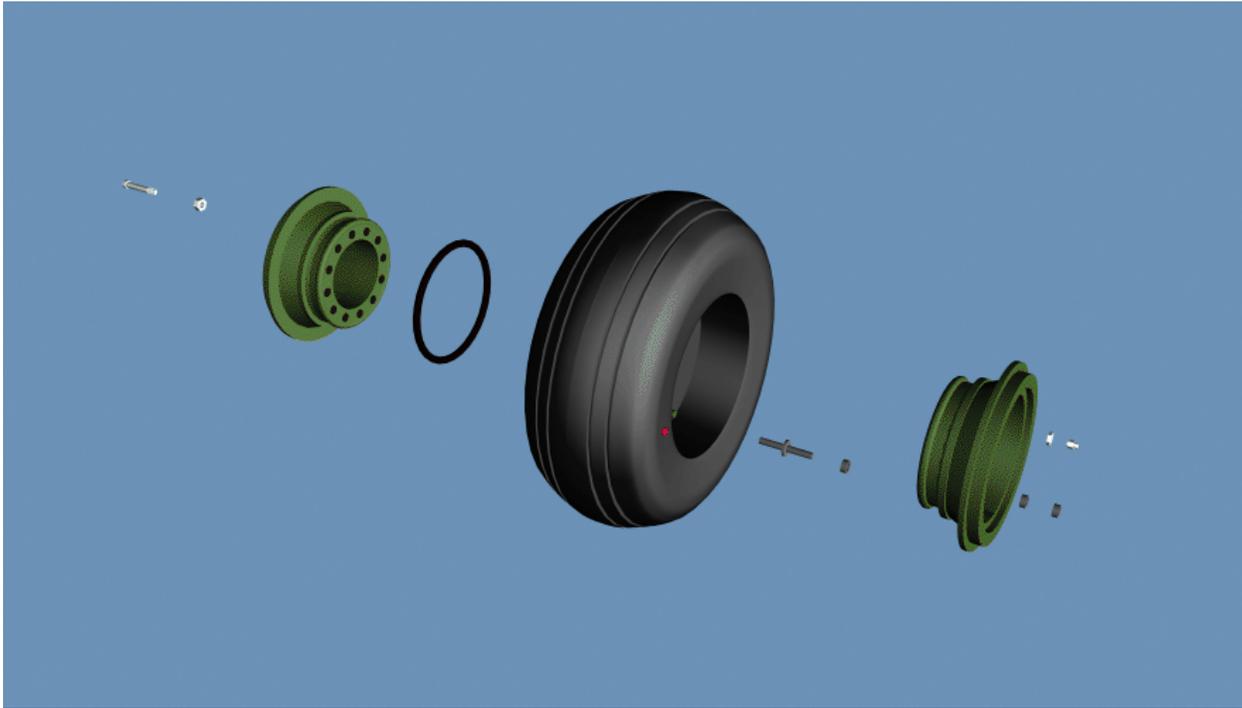
(1) Main Landing Gear Wheel and Tire Assembly

**WARNING:** The 7 lug wheel (5003889) may experience lug failure when operating at or above gross weights of 20,500 pounds. Lug failure may result in flying debris during ground handling and/or unexpected tire failure. The 14 lug wheel (040-25300) should be utilized when operating at or above gross weight of 20,500 pounds.

- (a) The UH-60 Black Hawk wheels (Main or Tail) consist of two split rim halves that are serial numbered matching sets.
- (b) The main landing gear tire is a tubeless tire design, serviced with nitrogen.
- (c) There are two types of tires: 10 ply and 12 ply are fully interchangeable.
- (d) P/N 500 wheel halves have to be fluorescent penetrant inspected, Non-Destructive metal Inspection (NDI).
- (e) Hardware on wheel halves P/N 889 must be replaced (nuts and bolts).

(2) Main Landing Gear Tire Build Up

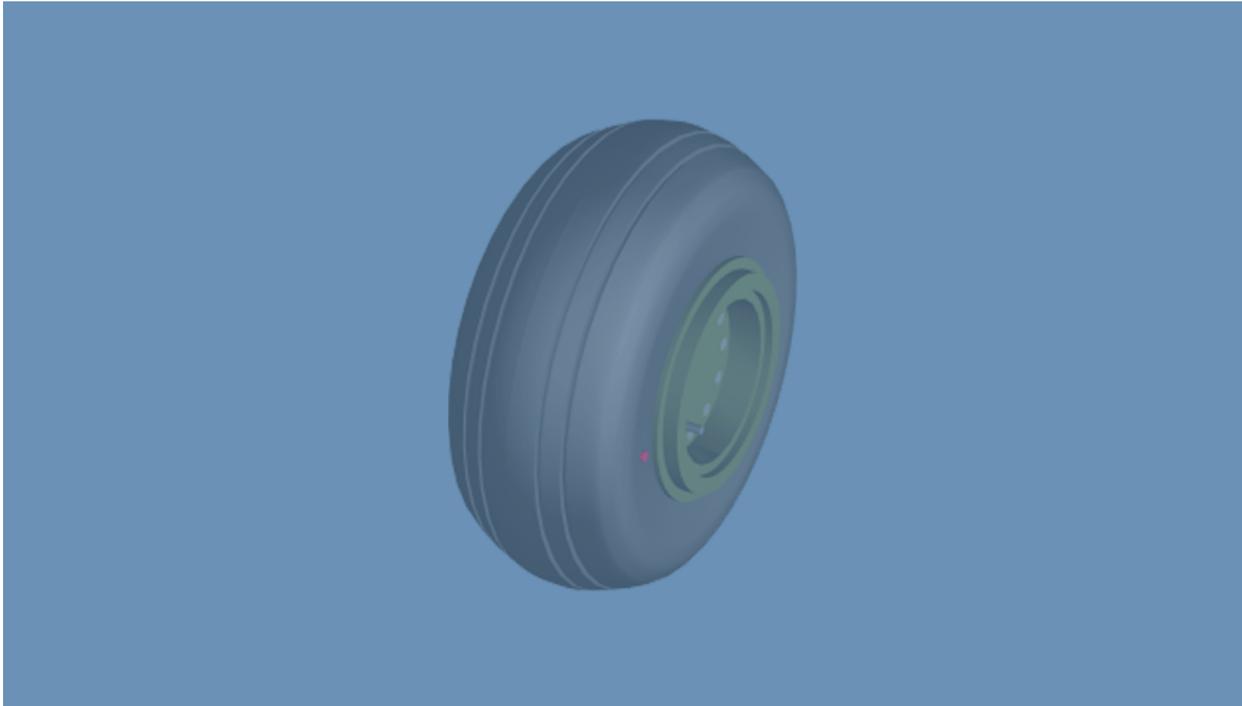
Frame #0030 (Main Landing Gear Tire Build Up FLASH)



- (a) Install the packing in the groove on the inner wheel half.
- (b) Install the mount bolts and tighten to the proper torque specifications.
- (c) Refer to the TM for updated procedures.
- (d) Service and perform a leak check IAW the TM.

(3) UH-60 Tire Leak Check

Frame #0035 (UH-60 Tire Leak Check)



**WARNING:** To prevent injury to personnel or damage to equipment, check tire inflator assembly to be sure that nitrogen source will be vented at 160 psi maximum. Do not inflate tire beyond its rated inflation pressure. Use a tire inflation safety cage when inflating tire.

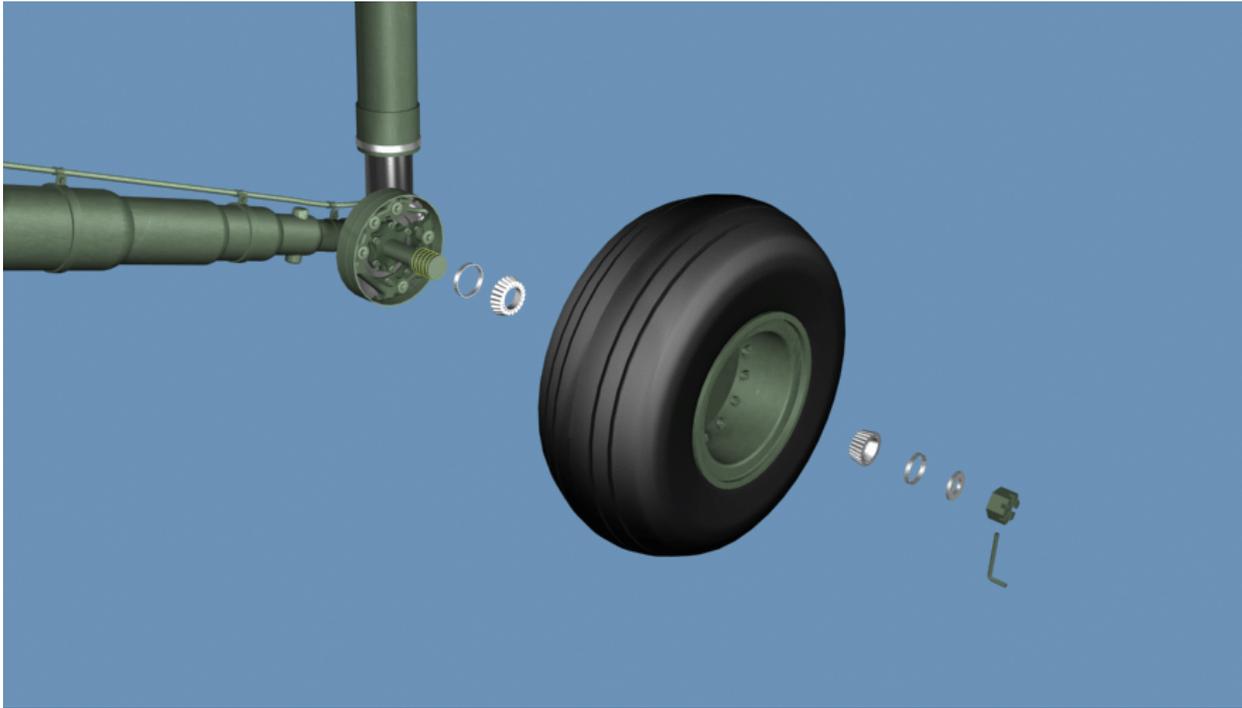
To prevent injury to personnel, do not use an unregulated pressure source to service tire, never stand facing sidewall of tire being serviced, and stand facing tire tread.

**NOTE:** The tire rim halves are normally built up at AVIM level due to the inspection requirements. Tire will be inflated to its rated inflation pressure after wheel is installed on helicopter.

- (a) After building up a main or tail landing gear tire, check for leaks.
- (b) Inflate the tire, wait 5 to 10 minutes, then recheck the tire pressure.
- (c) With a soapy water solution, moisten the air valve, around the tire beads, bolts and nuts.
- (d) If bubbles appear, deflate the tire, disassemble, and correct at point of leakage.
- (e) Retest the tire and when it passes the leak test, remove from the safety cage and install the valve stem cap, IAW TM.
- (f) Upon passing the leak check, reduce the tire pressure to 20 PSI for storage and tag the wheel with the starting PSI in the tire.

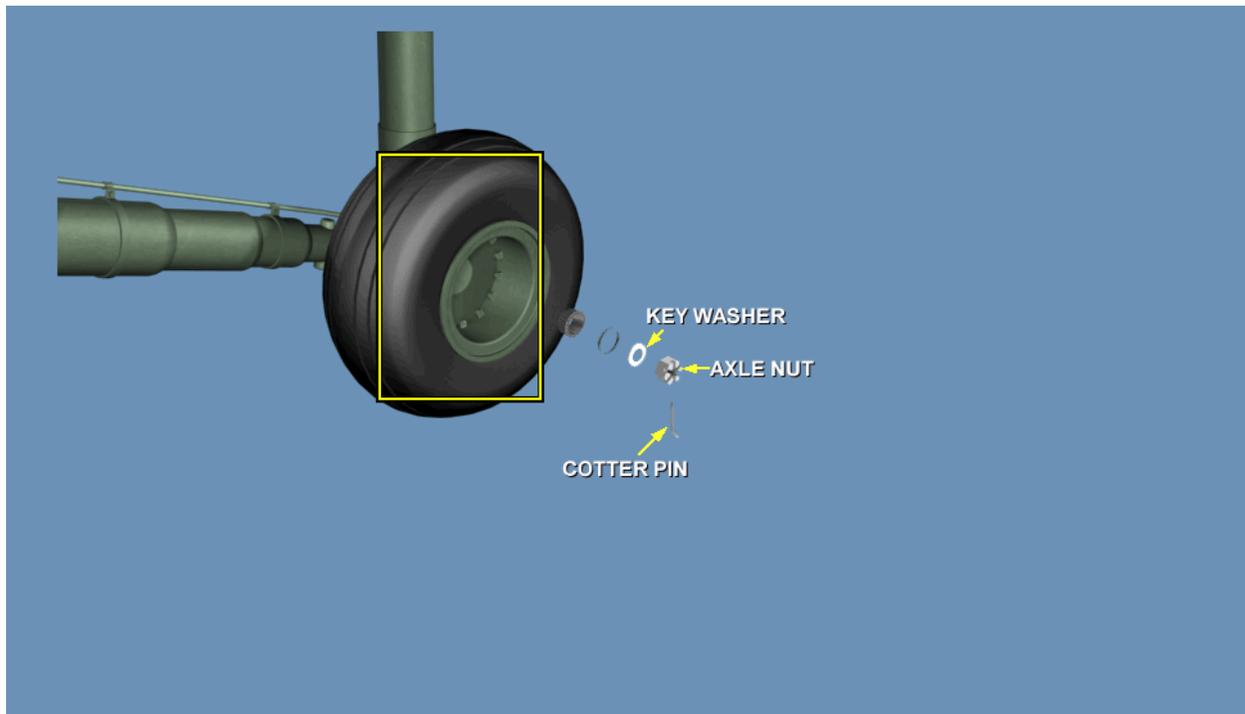
(4) Main Landing Gear Tire Subcomponents

Frame #0040 (Main Landing Gear Tire Subcomponents)



- (a) Prior to sliding the wheel onto the axle, position both sets of wheel bearings and bearing seals on the wheel.

Frame #0040 (Main Landing Gear Tire Inside Bearings Installed)



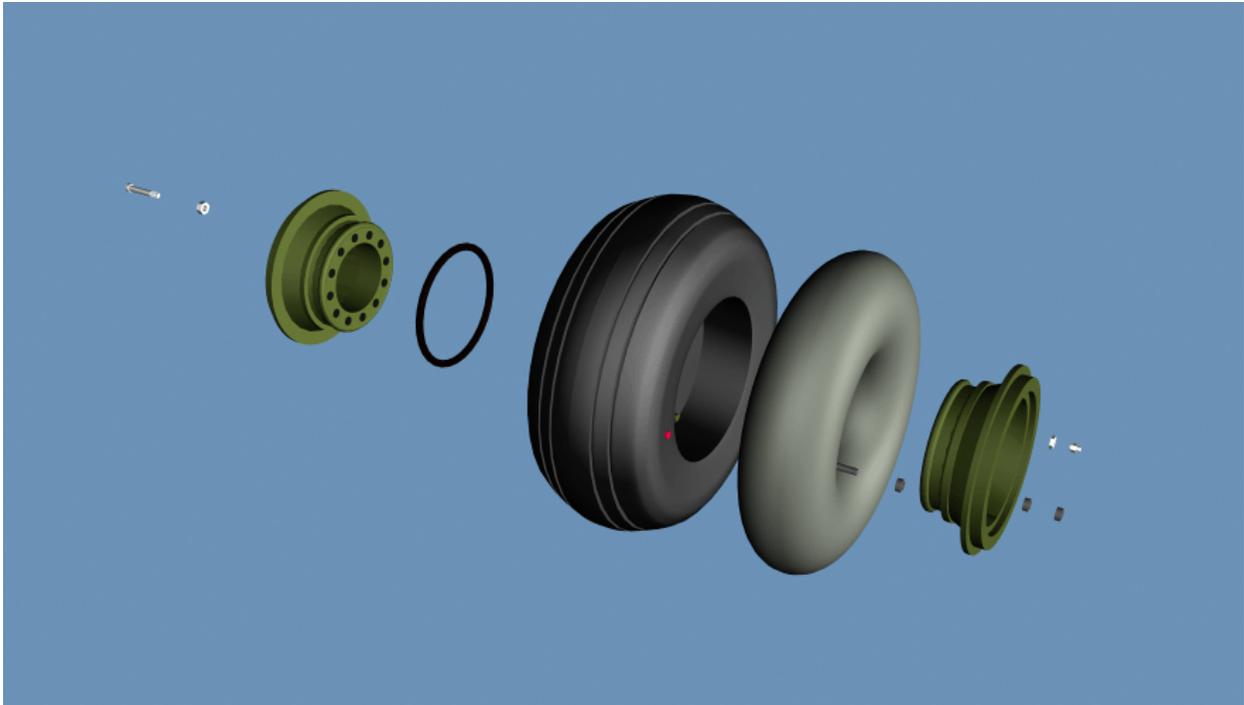
- (b) Carefully slide wheel and tire assembly on axle.
- (c) Make sure wheel disc lugs are through brake discs, and inner bearing is properly seated.
- (d) Position the key washer and install the axle nut.
- (e) While continuously turning the wheel, tighten the axle nut to the proper torque IAW the TM, then back off to next castellation, and install the cotter pin.

Frame #0040 (Main Landing Gear Tire Complete)



(5) Tail Landing Gear Wheel and Tire Assembly

Frame #0045 (Tail Landing Gear Wheel and Tire Assembly FLASH)



(a) Before inserting the inner tube in the tire, dust tire generously with inner tube lubricant.

- (b) Clean the wheel flanges and tire beads to remove any compound that may settle on the beads.
  - (c) Refer to the TM for updated procedures.
  - (d) Service the tire and perform a leak check IAW the TM.
- (6) Tail landing gear wheel and tire replacement

Frame #0050 (Tail Landing Gear Wheel Removal/Replacement)

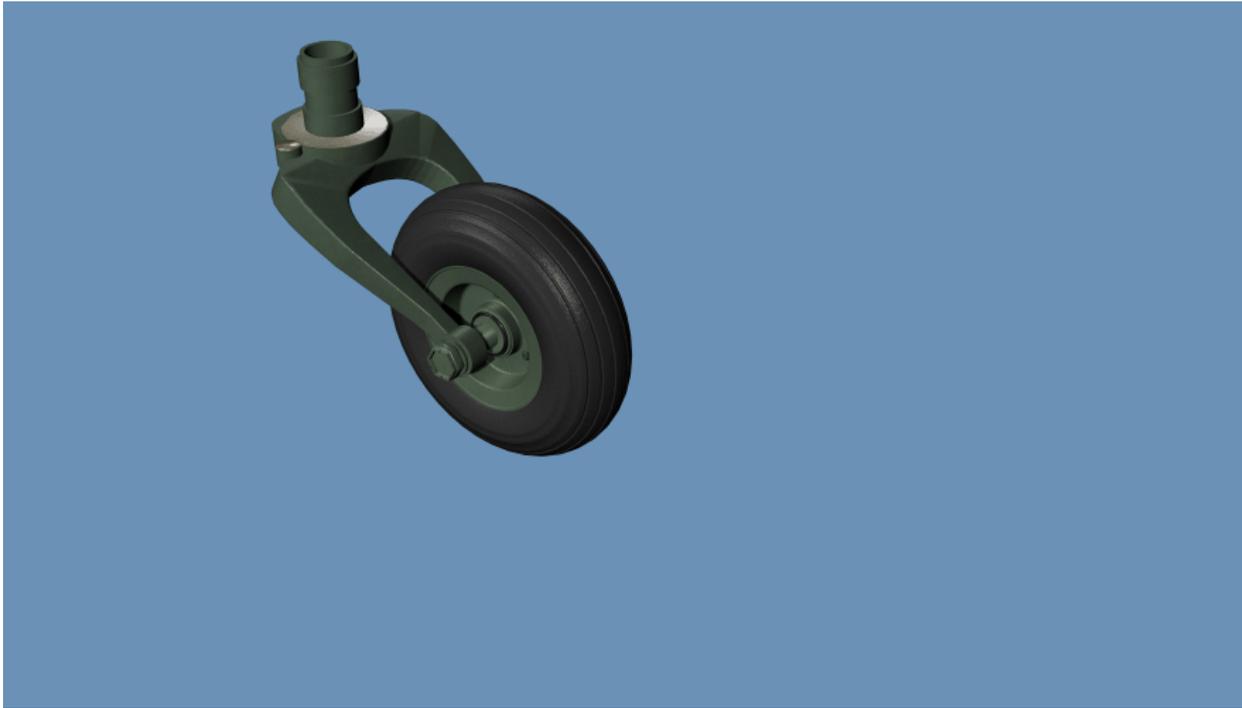


**WARNING:** To prevent injury to personnel, completely release pressure from tire before removing valve core from valve stem. Do not remove valve core from valve stem to shorten time required to deflate tire.

**NOTE:** Do not use a hammer to remove the axle. Damage to spacers, bearing seals, and bearings will result if dropped when removing axle. Spacers, bearing seals, and bearings will drop free when axle is removed. Catch bearings as axle is removed to avoid damaging cones. Reuse lock-washer for no more than 3 times.

(7) Tail landing gear wheel and tire replacement

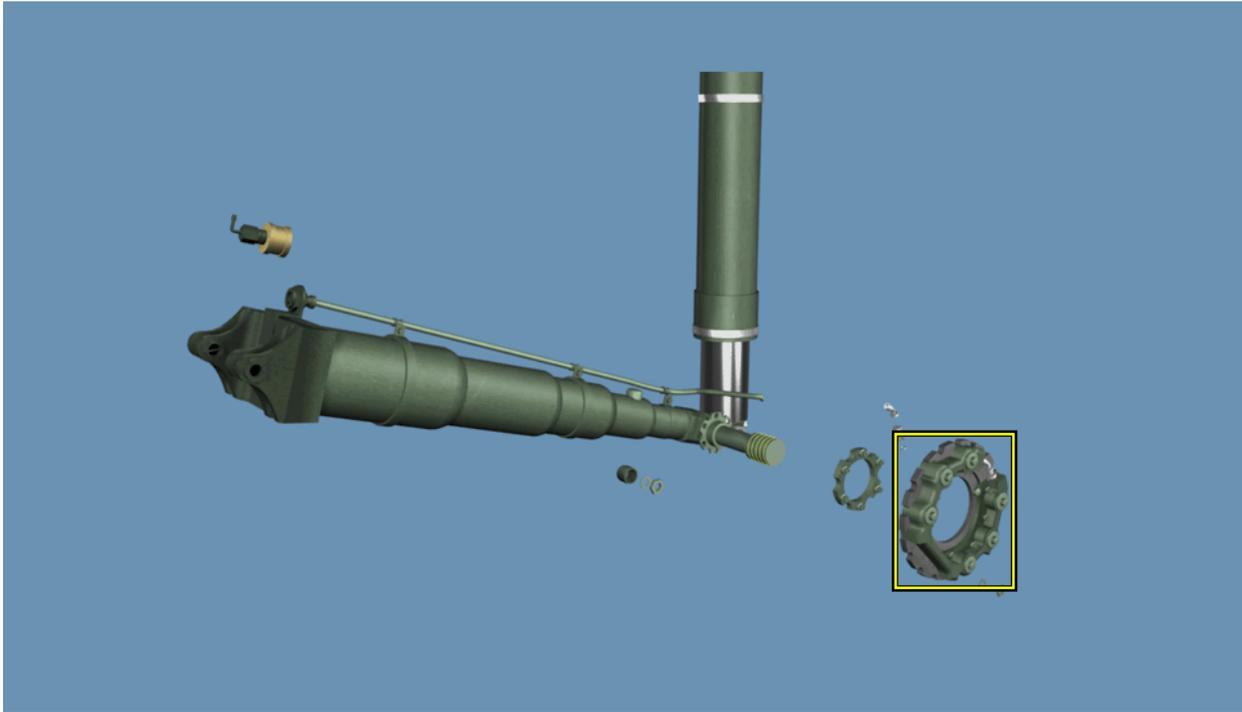
Frame #0055 (Tail Landing Gear Wheel and Tire Removal FLASH)



- (a) To prepare the wheel assembly for removal from the tail landing gear, remove the retainer nut and lock washer from the axle.
- (b) Upon removal of the axle, remove the spacer, seal, and bearings from both sides of the wheel assembly.
- (c) The reinstallation of the wheel and tire is done in the reverse order.

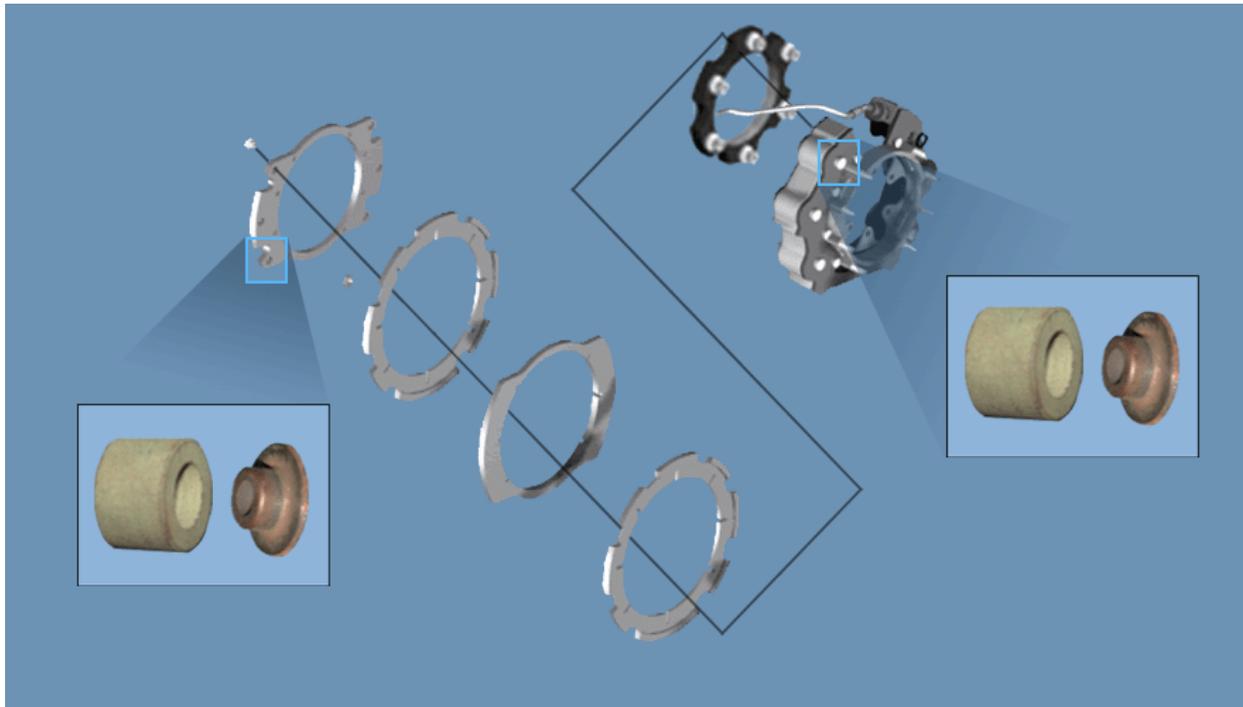
(8) Wheel Brake Description

Frame #0060 (Wheel Brake Description)



- (a) Both main wheels have a self-adjusting, double disc, three cavity brake assembly, which includes a visual brake lining wear indicator.

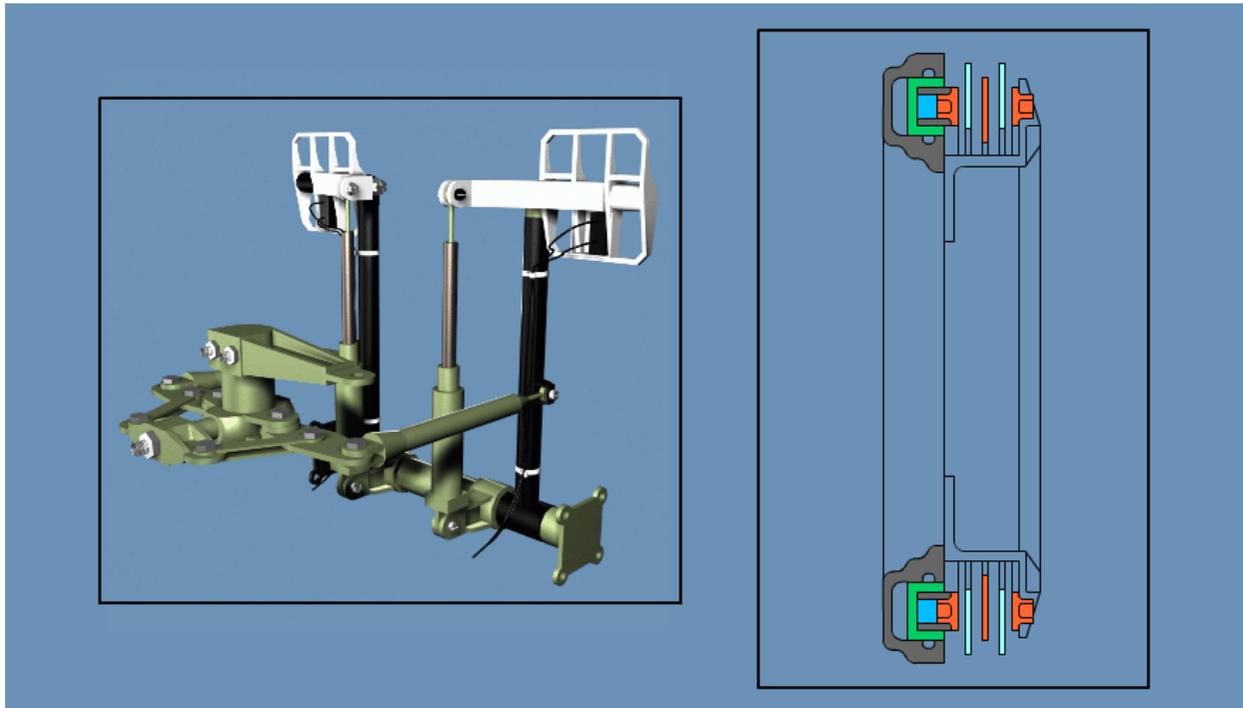
Frame #0060 (Wheel Brake Disassembled)



- (b) The brake consists of two steel rotating discs, brake linings, and a housing that contains the pistons.
- (c) The discs are key-slotted to engage the drive keys of the main wheel.
- (d) The disc turns through the throat between the brake housing.
- (e) Brake linings are fitted into recesses in the housing and pistons.
- (f) The pistons produce braking action by clamping the discs between the brake linings.

(9) Brake Assembly Function

Frame #0065 (Brake Assembly Function FLASH)



- (a) When the brakes are applied, hydraulic fluid forces the six outboard wear pads against the other brake components together to stop the movement of the aircraft.

(10) Brake Wear Check

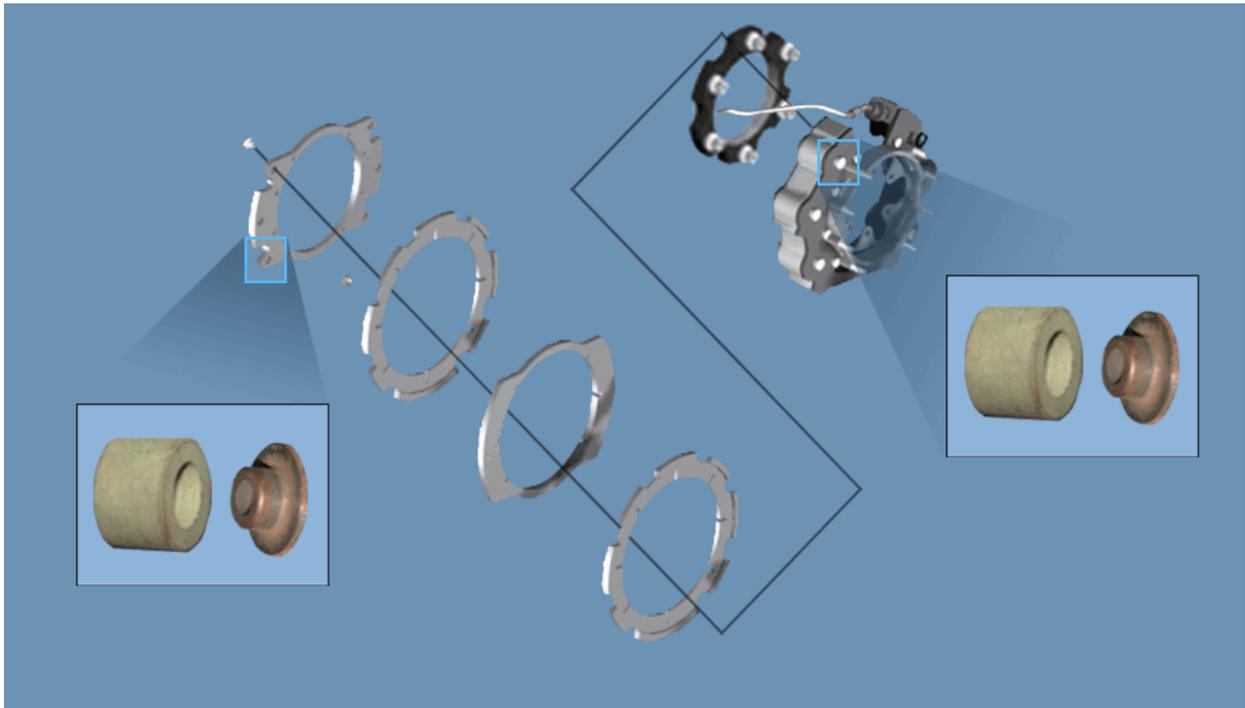
Frame #0070 (Brake Inspection)



- (a) The wear pin is spring loaded and measures the wear of the rotating disk and wear pads.
- (b) To check the discs for wear, apply the parking brake and press on the spring loaded wear pin located on the housing nut.
- (c) The wear pin measures the wear of the rotating disk and wear pads.
- (d) If the wear pin protrudes above the housing nut, the brakes are serviceable, but if the wear pin is flush with the housing nut replace the brake.

(11) Brake Inspection

Frame #0075 (Brake Wear Check FLASH)



**CAUTION:** Damage to brake will result if new wear pads are mixed with used pads.

- (a) When inspecting the brake assembly, check for leaks and the wear pin for brake wear.
- (b) If one or more pads are worn to within 0.380 of an inch thick or less, change all six pads.

(12) Brake System Component Location Menu

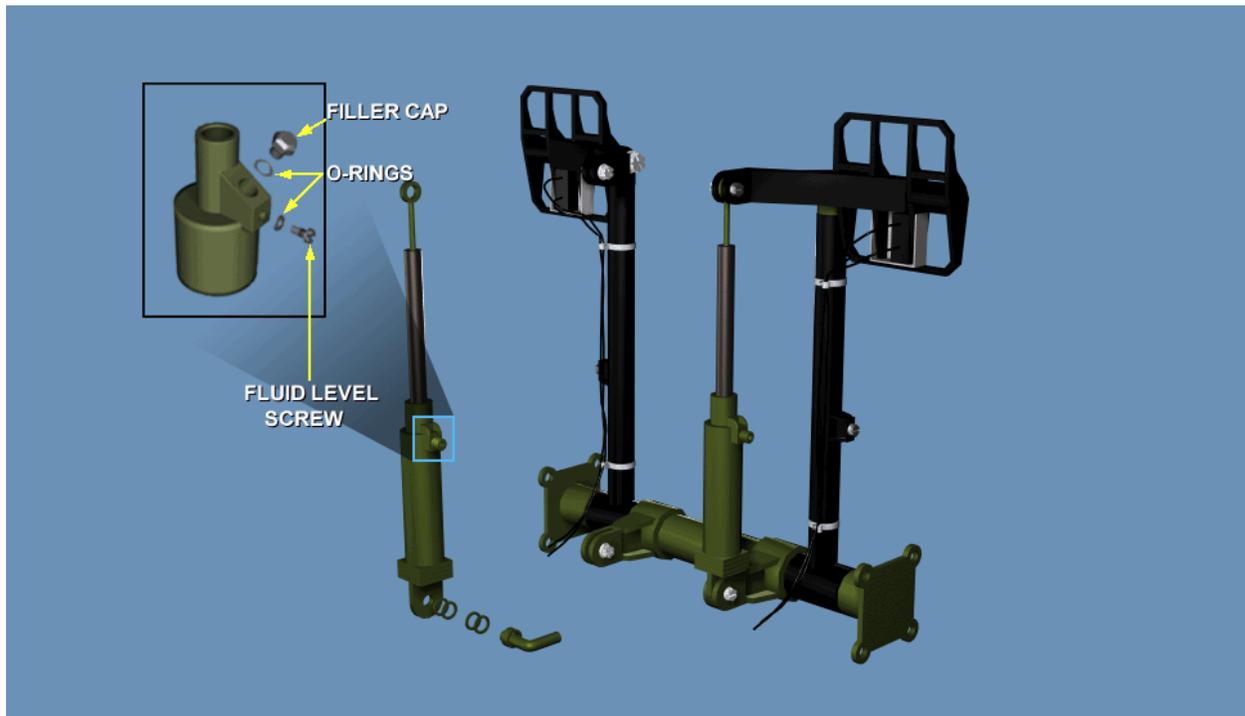
Frame #0080 (Brake System Component Location/Function Menu)



- (a) Brake Master Cylinder
- (a) Slave Mixer Valve
- (b) Parking Brake Valve
- (c) Parking brake T-Handle

(13) Brake Master Cylinder Location/Function

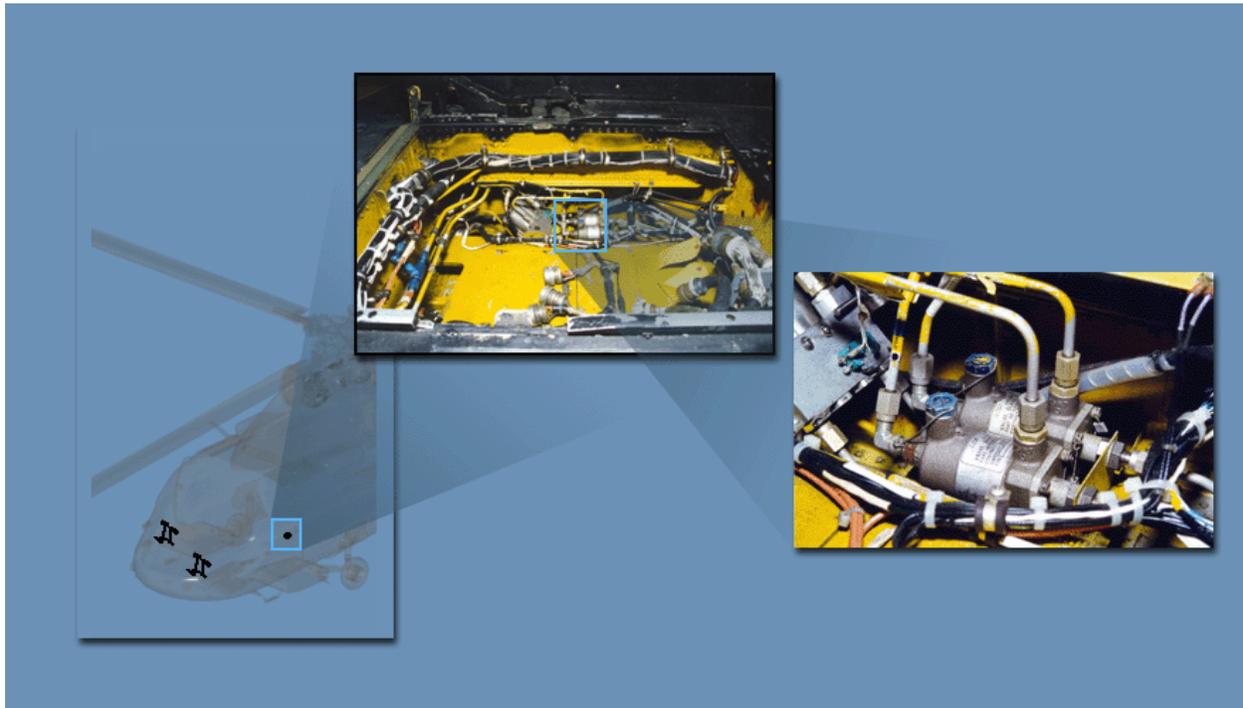
Frame #0085 (Brake Master Cylinder Location/Function)



- (a) There is one brake master cylinder on each of the pilot and copilot pedals.
- (b) Each master cylinder has a filler cap, fluid level screw, and a weep holes that allows for thermal expansion.
- (c) The master cylinder consists of a cylinder containing a large capacity reservoir, which is serviced with Mil-H-5606 hydraulic fluid.
- (d) The brake master cylinder has two pistons that operate manually in series and in two separate stages.

(14) Slave Mixer Valve

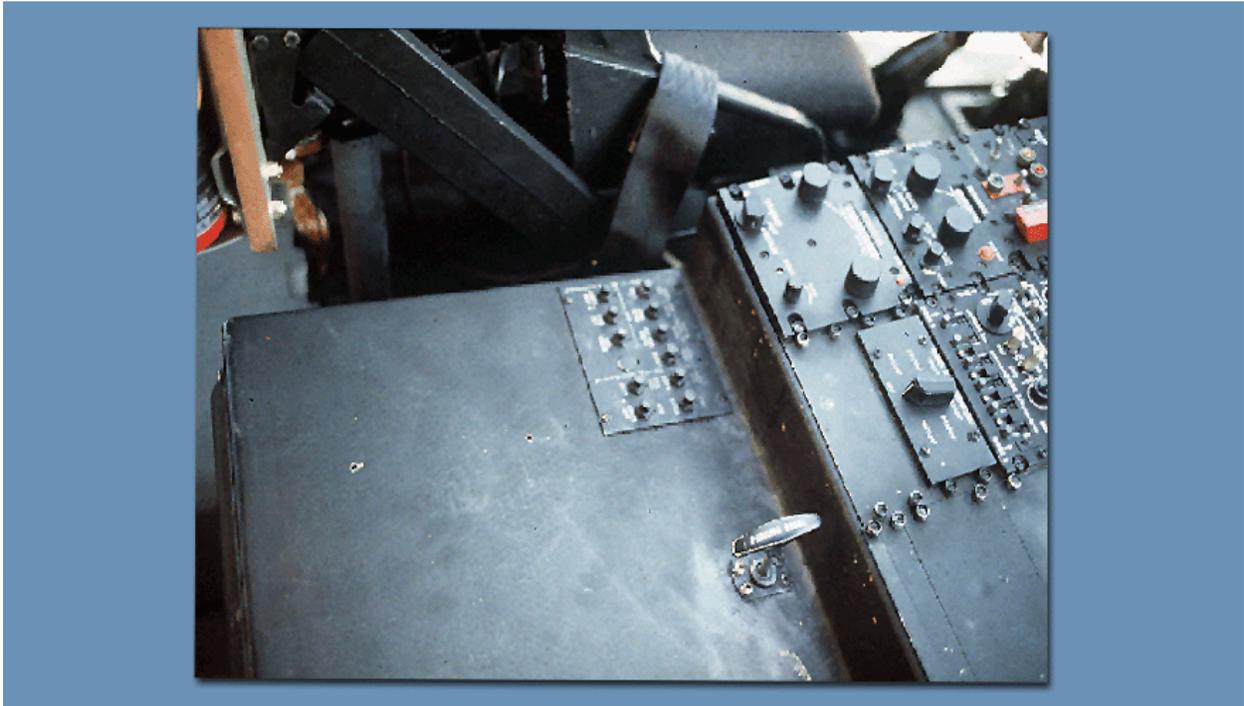
Frame #0090 (Slave Mixer Valves Location/Function)



- (a) There are two slave mixer valves, one for each set of pedals.
- (b) The slave mixer valves are located under the pilot seat floor panel.
- (c) The slave mixer valve isolates the pilot and copilot brake line circuits from each other.
- (d) The valve contains a piston and spring-loaded pin.
- (e) A bleed plug on the valve allows air to be bled from the brake lines.

(15) Parking Brake Caution Advisory Capsule

Frame #0095 (Brake T-Handle)



- (a) The parking brake T-handle is located on the pilot side of the center console.

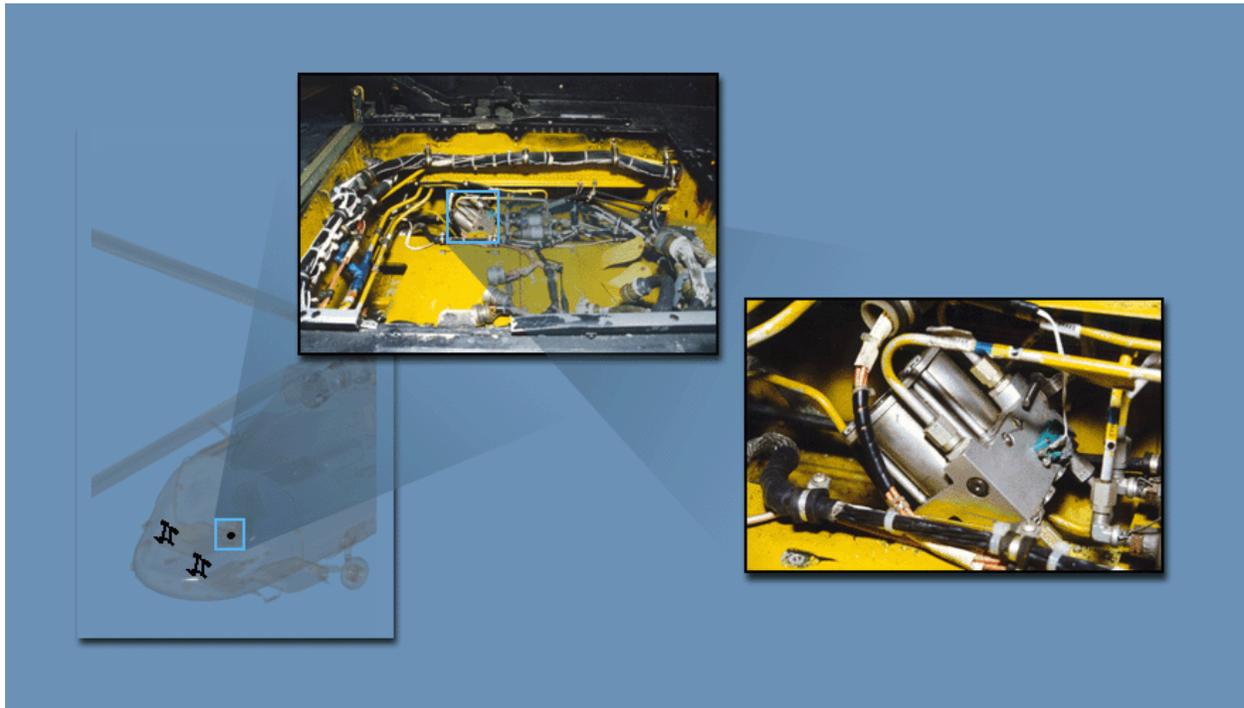
Frame #0095 (Caution Advisory Panel)



- (b) When you pull up on the parking brake T-handle to set the parking brakes, a signal is sent to the caution/advisory panel by the parking valve switch to illuminate the PARKING BRAKE ON light.

(16) Parking Brake Valve Location/Function

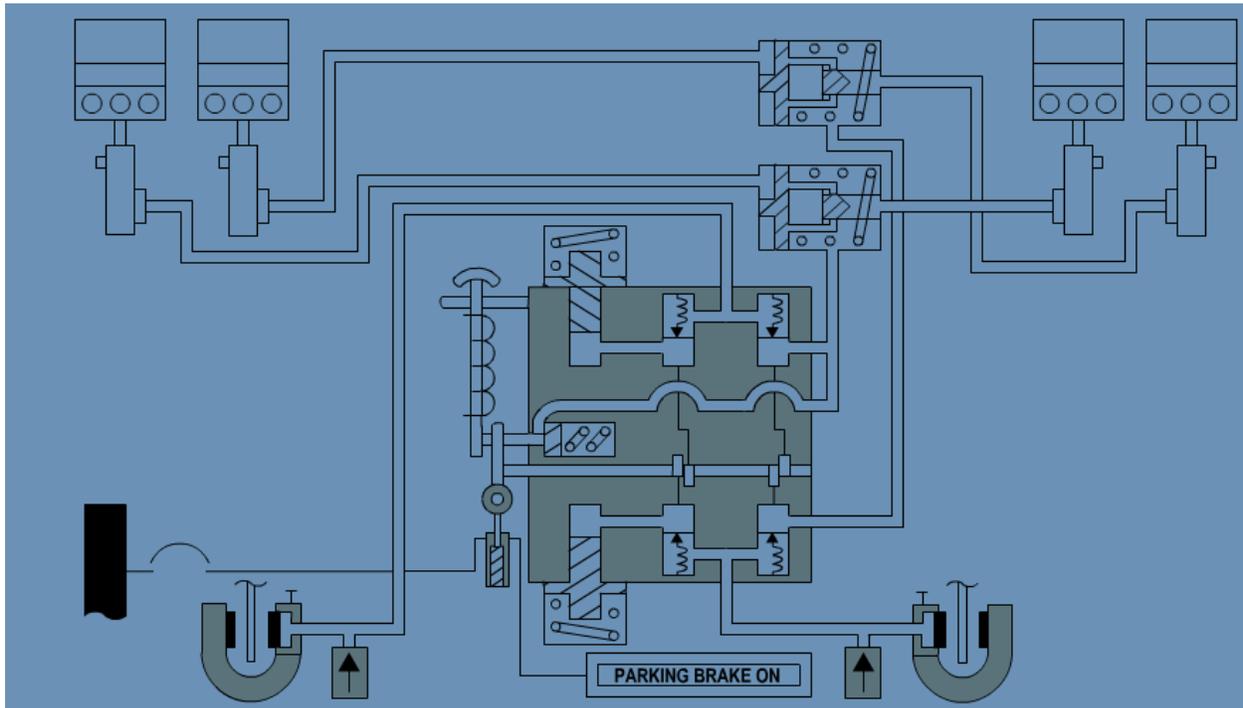
Frame #0100 (Parking Brake Valve Location/Function)



- (a) The parking brake valves are located under the pilot seat floor panel.
- (b) When you pull the parking brake T-handle and hold the left brake pedal down to apply the parking brakes, two things happen.
  - 1) Pressure in the valve builds up, which holds the hydraulic pressure on the brake system.
  - 2) A signal is sent to the caution/advisory panel by the Parking valve switch to illuminate the PARKING BRAKE ON light.

(17) Right Brake Applied

Frame #0105 (Brake System Hydraulic Flow FLASH)



(a) When the pilot right brake pedal is applied, hydraulic fluid goes through the slave mixer valve and applies pressure to the right brake only.

(18) Left Brake Applied

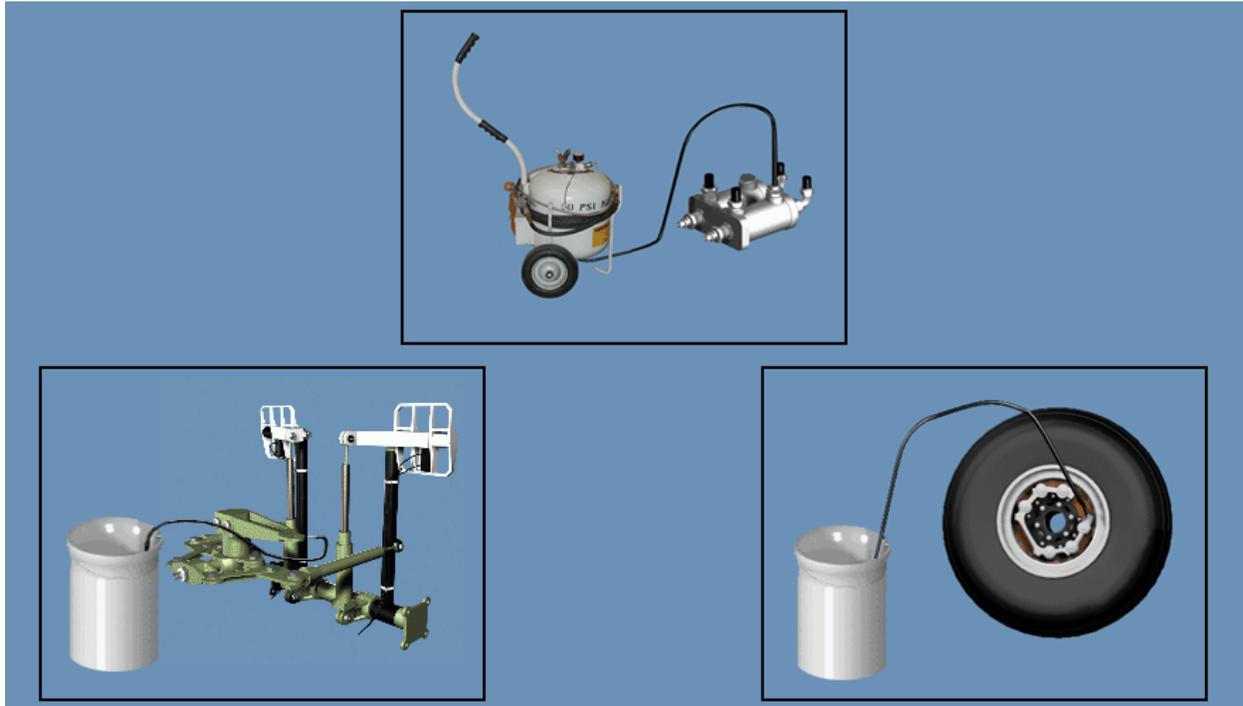
(a) When the left brake is applied, hydraulic fluid goes through the slave mixer valve and applies pressure to the left brake only.

(19) Parking Brake Applied

- (a) The parking brake valve is actuated by a parking brake tee handle on the pilot's side of center console.
- (b) The valve then traps fluid pressure to the brakes and closes a microswitch, lighting the PARKING BRAKE ON advisory light on the caution/advisory panel.
- (c) Pressing the brake pedals produces pressure in the master cylinder to actuate the parking brake valve release mechanism and release the parking brake.
- (d) Thermal compensation is provided in the parking brake valve when the brakes are at PARK, and in the master cylinders when the brakes are OFF.

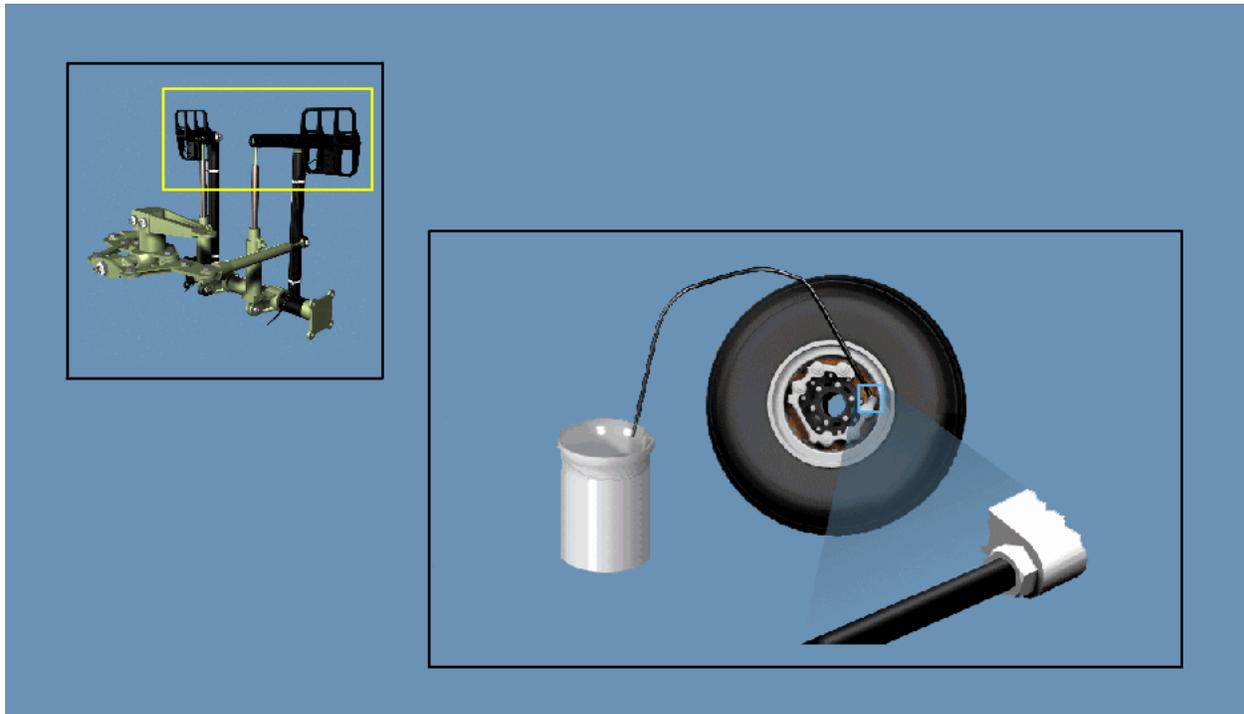
(20) Brake Bleeding Techniques

Frame #0110 (Brake Bleeding Techniques)



- (a) Method A – Attach the hydraulic servicing unit to the slave mixer valve and bleed the system out to the brakes and master cylinders.

Frame #0115 (Brake Bleed Method B FLASH)



- (b) Method B – Fill the master cylinder full of hydraulic fluid.
- 1) Pump the pedals to pressurize the brakes.
  - 2) Hold the pedals down, open the bleed valve on the wheel brake, and allow the fluid to flow freely until there are no signs of air in the system.
  - 3) Keep the master cylinder full by using a syringe or squirt can.

## **CHECK ON LEARNING**

1. What type of wheel is used on the UH-60?
2. What do you service the UH-60 tires with?
3. Where do you perform a leak check on new tires?
4. Where are the slave mixer valves located?
5. Where is the PARKING BRAKE ON light located?
6. How do you set the parking brakes?

### SECTION III. -SUMMARY

#### 1. REVIEW/SUMMARIZE:

You have completed the UH-60 Wheel/Brake System Lesson.

The key points to remember are:

- The main components of the wheel brake is the brake housing, stationary disc, rotating disc, wear pads, pistons, backing plate, and torque tube.
- Wear pads are changed as a set.
- The brake inspection criteria are for checking the wear pads and rotating disc.
- There are two methods for bleeding the brakes.
- The brake master cylinders are located on each of the directional/brake pedals.
- The slave mixer valve is located under the pilot seat floor panel and routes fluid to the brakes.
- The parking brake valve is located under the pilot seat floor panel and assist the hydraulic system to hold the brakes.
- The parking brake T-handle is located on the center console and is used to apply the parking brakes.
- The main parts of a UH-60 wheel and tire assembly are the split rim wheel, and a tubeless tire for the main and tube type tire for the tail.
- The UH-60 Wheel sub assembly parts are the Lock Washer, Grease Seal, and Bearing Set.
- Deflate the tire prior to removal and always leak check the tire in a safety cage.

B. ENABLING LEARNING OBJECTIVE ELO No. 2

ACTION: Identify the functions of the Landing Gear Struts.

CONDITIONS: Using TM 1-1520-237-23-3 and TM 1-1520-237-23-1

STANDARD: IAW TM 1-1520-237-23-3 and TM 1-1520-237-23-1.

a. Landing Gear Location and Function

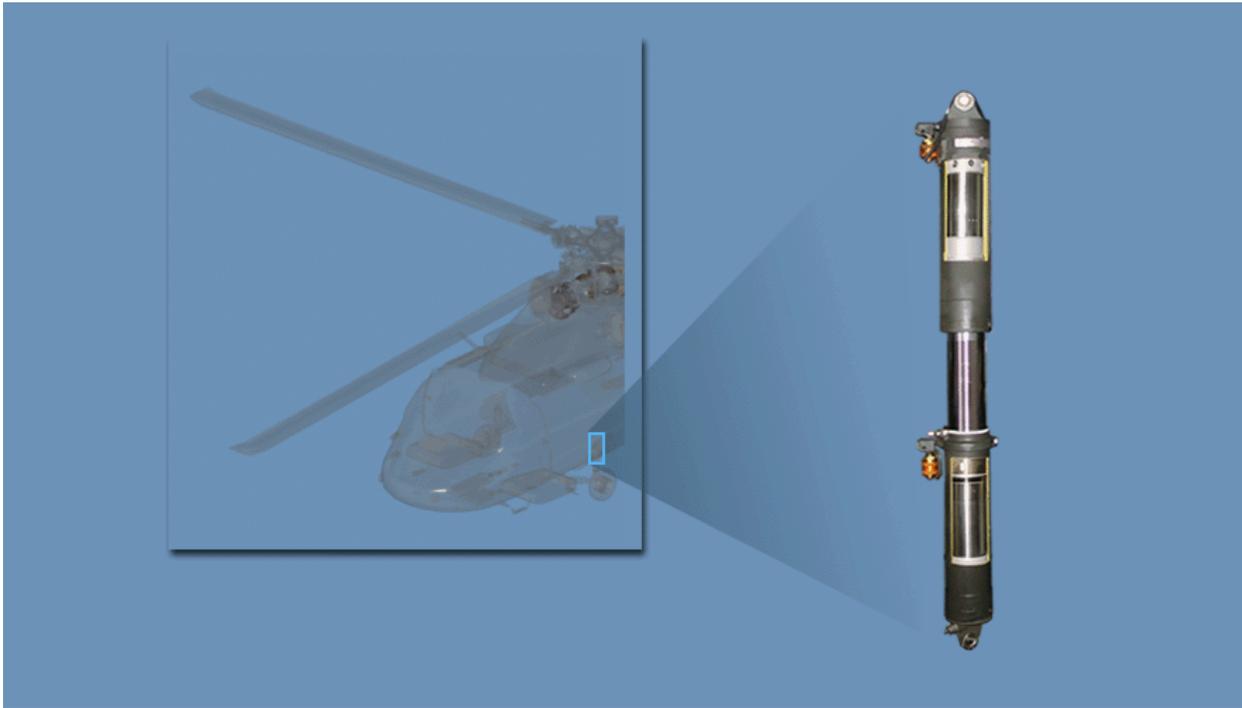
Frame #0205 (Landing Gear Location and Function)



- (1) There are two fixed main landing gear; one on each side of the helicopter fuselage midsection.
- (2) Their function is to support the helicopter on the ground, absorb impact loads when landing, permits the helicopter takeoff and landings on a slope, and can be raised or lowered for air transportability.

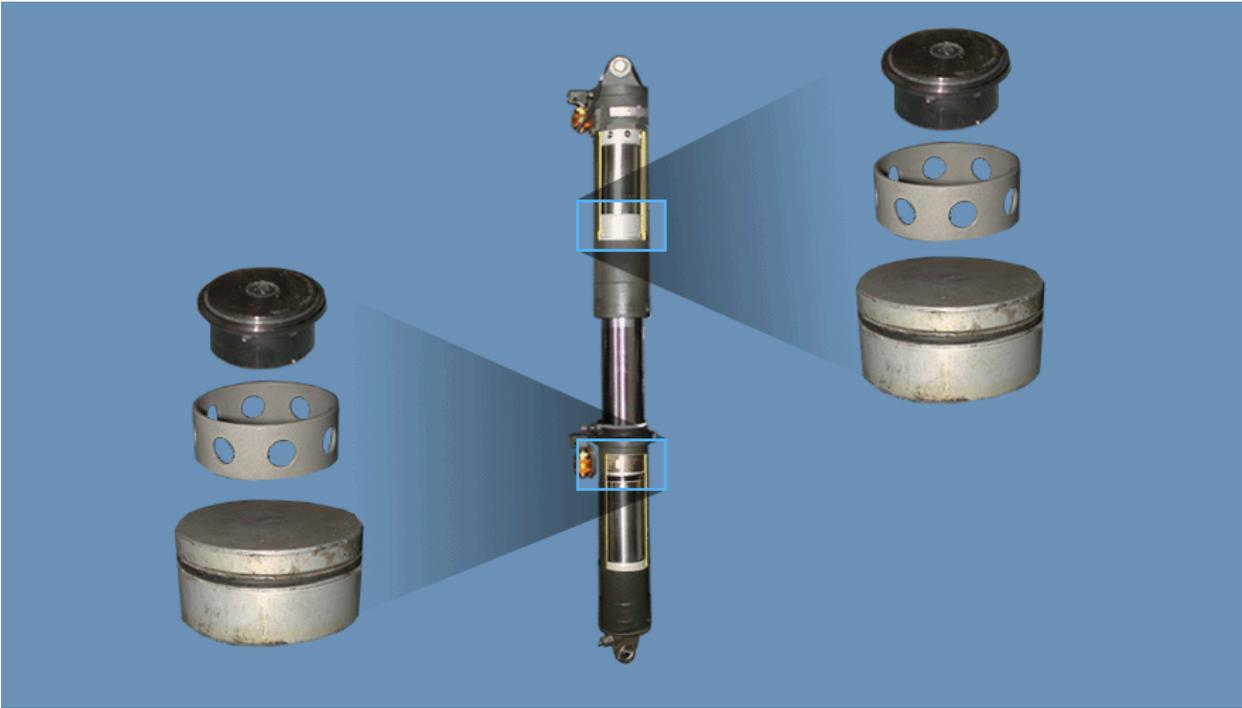
b. Main Landing Gear Strut Description

Frame #0210 (Main Landing Gear Strut Description)



- (1) The UH-60 Black Hawk shock/struts consists of two floating pistons; one in the upper cylinder and one in the lower cylinder.
- (2) These floating pistons keep the nitrogen separated from the hydraulic fluid.
- (3) The lower cylinder absorbs the normal landing loads, up to 10 ft. per second.
- (4) During a hard landing (above 600 ft. per minute) the upper and lower cylinders work together to absorb the shock, preventing damage to the helicopter.

Frame #0210 (Main Landing Gear Strut Exploded View)



c. Weight on Wheel Switch Description/Function

Frame #0215 (Weight on Wheel Switch Description/Function)



- (1) The Weight On Wheel (WOW) switches are activated when the aircraft lifts off the ground and the drag beam weight depresses the switch.
- (2) The switch is deactivated when the weight of the helicopter is on the landing gear.
- (3) The Weight on Wheel switch is normally installed on the left landing gear, to operate selected systems.

Frame #0215 (Weight on Wheel ESSS Installed)



- (4) On helicopters that come equipped with the External Stores Support System (ESSS) fixed provisions, the WOW switch is also installed on the right landing gear to provide AC power under-frequency cutout and external stores jettison.

d. Weight On Wheel Switch Adjustment

Frame #0220 (Weight On Wheel Switch Adjustment)



**WARNING:** Injury to personnel and damage to equipment will result in shock strut is stuck or not fully extended. Kick or shake main landing gear wheel to make sure shock strut is fully extended.

- (1) The left drag beam switch should measure between 0.440 to 0.500 of an inch.

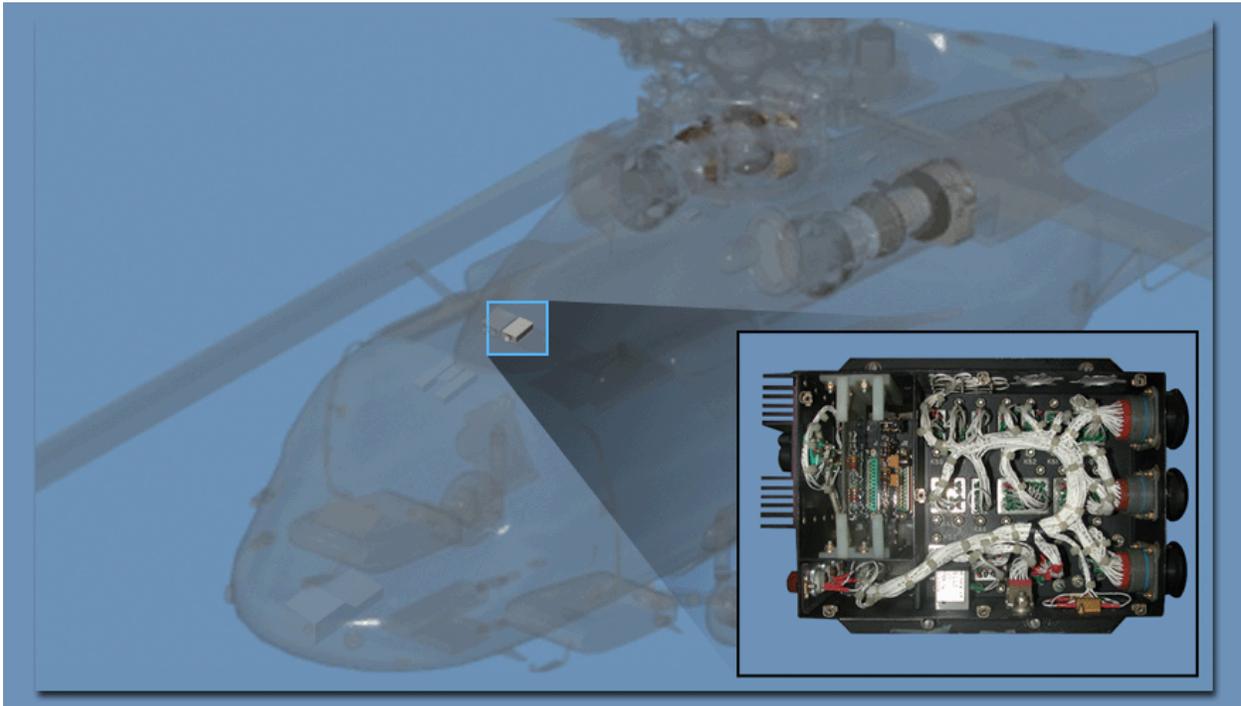
Frame #0220 (Weight On Wheel Switch Adjustment)



- (2) The right drag beam should measure between 0.515 to 0.575 of an inch.
- (3) To check the switch adjustment, jack the side of the aircraft that you are adjusting.
  - (a) Adjust the striker bolt until the head of the bolt touches the drag beam switch, then turn the bolt "toward" the drag beam switch another four full turns.

e. Impact Switch Location and Function

Frame #0225 (Impact Switch Location and Function)



- (1) The impact switch is located in the upper left hand relay panel, which is covered by fire detection/extinguishing system.
- (2) An impact of 10Gs will automatically setoff the fire bottles.

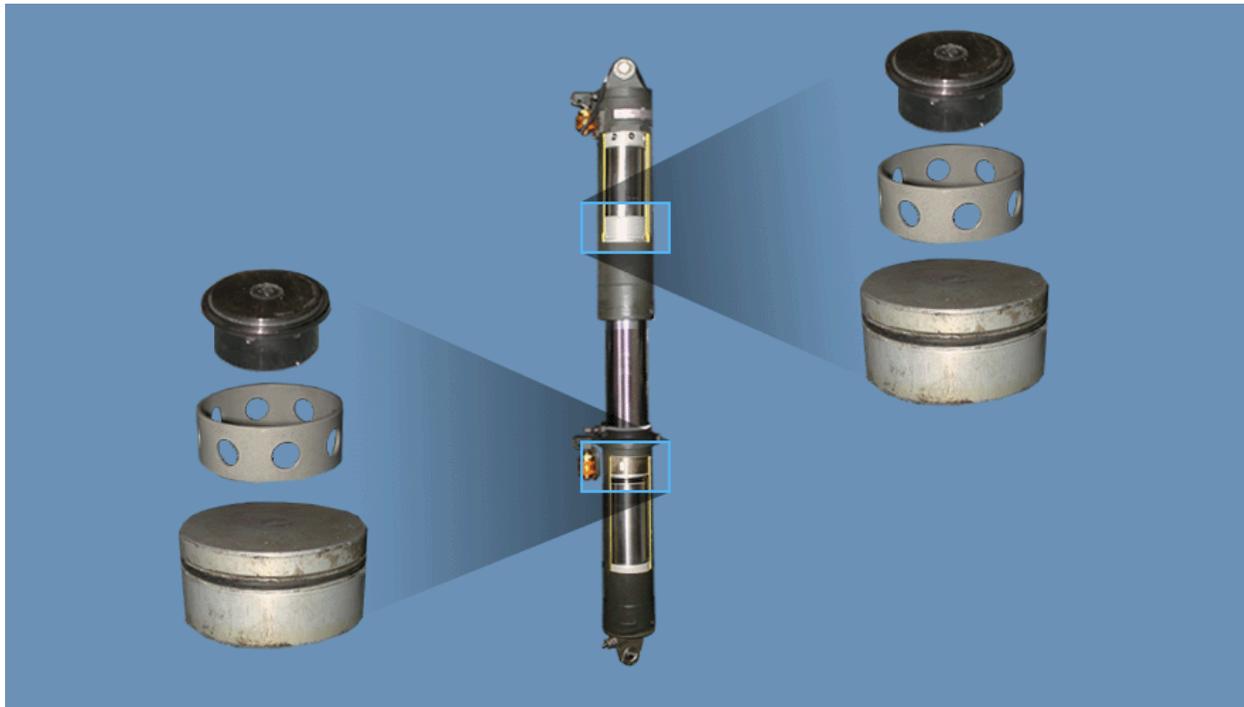
f. UH-60 Shock Strut Operation

Frame #0230 (UH-60 Shock Strut Operation)



- (1) Both main struts work in the same way.
- (2) The only weight to the strut is the drag beam and wheel. In flight, the nitrogen pushes the hydraulic fluid and landing gear extends during flight.

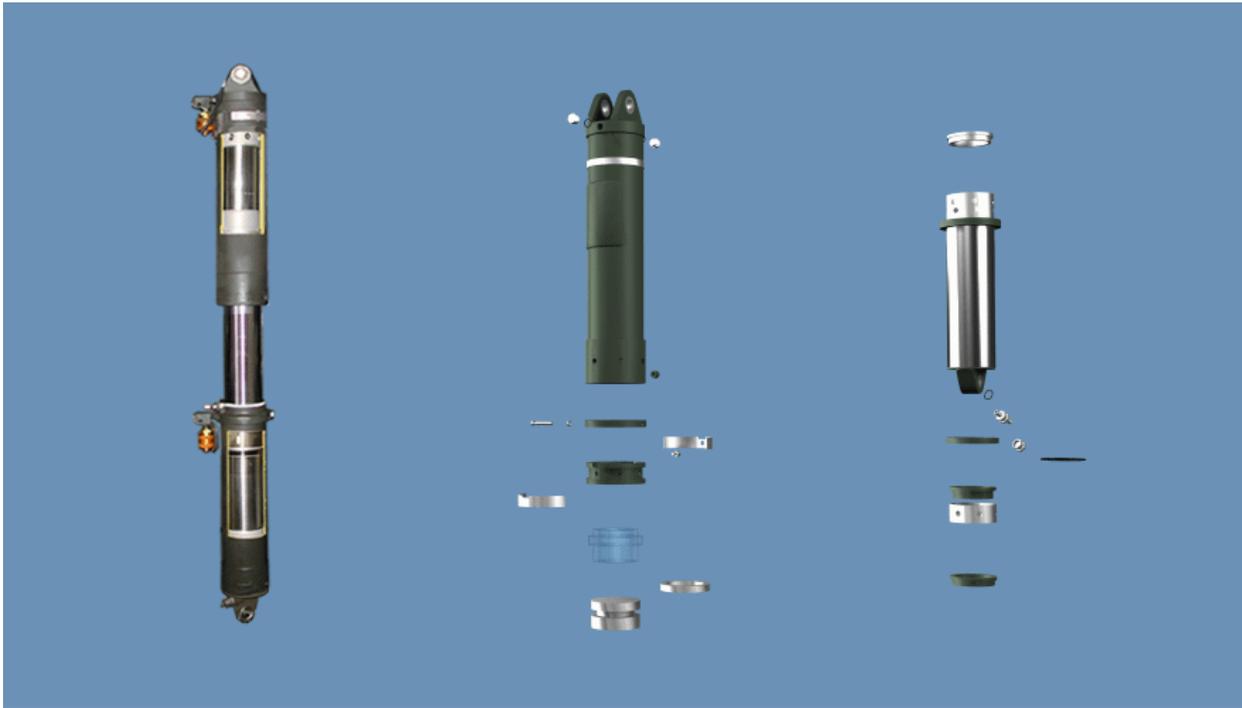
Frame #0230 (Shock Strut Exploded View)



- (3) The upper and lower stages are identical in their function.
- (4) The poppit, orifice, and restrictor keep the hydraulic fluid separate from the nitrogen.

g. Main Landing Gear Shock Strut Removal/Replacement

Frame #0235 (Main Landing Gear Shock Strut Removal/Replacement)

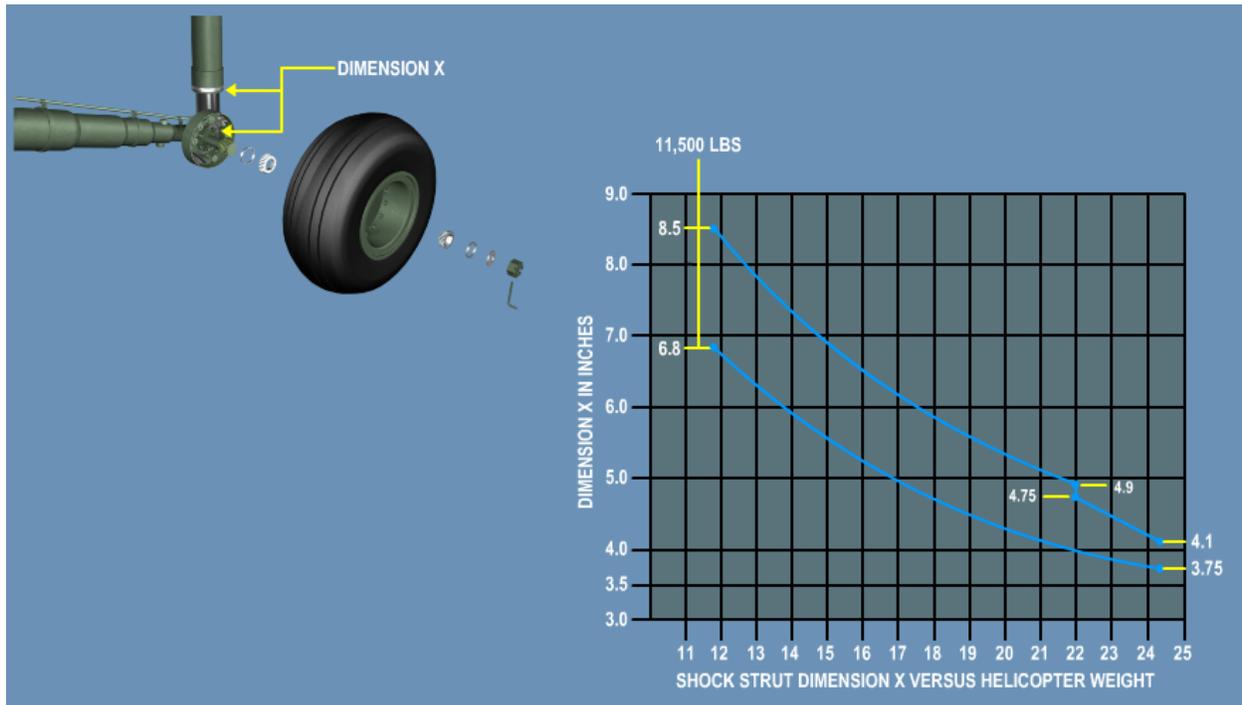


**WARNING:** Injury to personnel and damage to equipment will result if shock strut is not supported during removal. Shock strut weighs 60 pounds. Make sure shock strut is supported during removal. To prevent injury to personnel and damage to equipment, when using shock struts, 70250-12051-042, make sure both left and right sides have same part number. Shock struts, 70250-12051-043, through 70250-12051-045 are fully interchangeable, and may be mixed with each other on left and right sides.

- (1) There are several internal parts that make up the strut, so strut maintenance will be performed at (AVIM).
- (2) Once the scrapper seals and O-rings are damaged, hydraulic fluid will leak into the nitrogen and the strut will need to be repaired.

h. Main Strut Quick Service Check

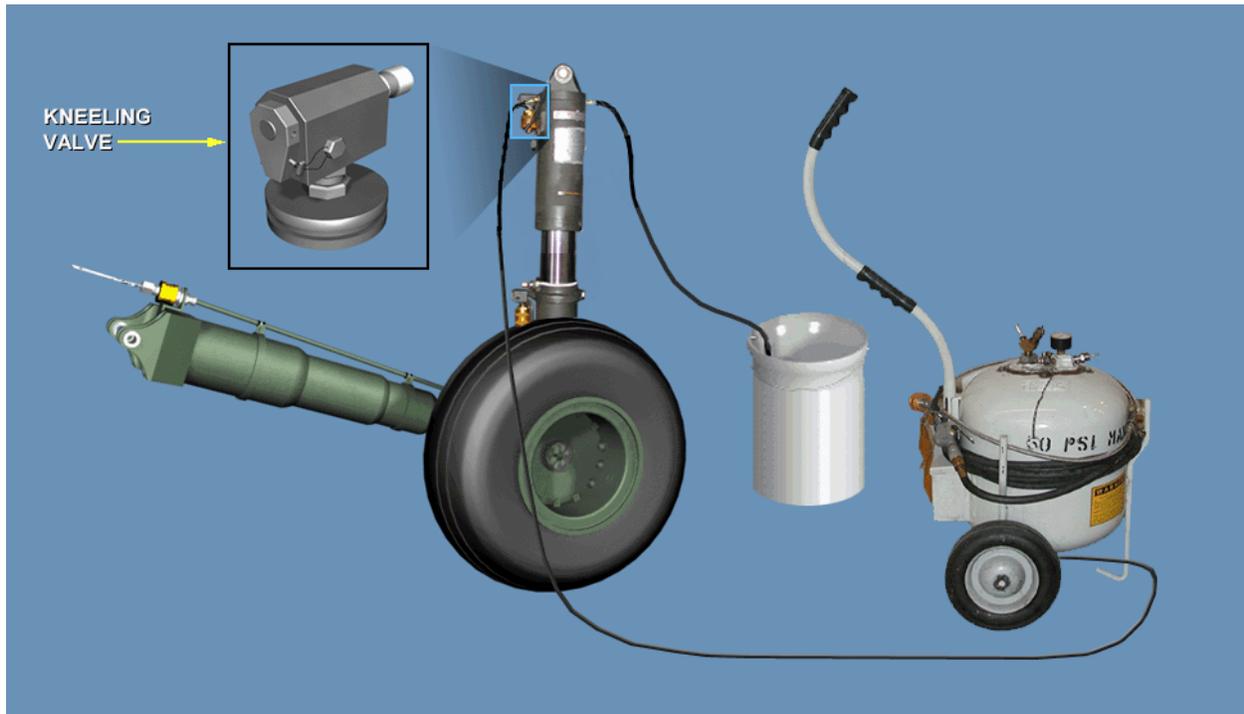
Frame #0240 (Main Strut Quick Service Check)



- (1) Perform a quick reference check to see if the strut needs to be serviced.
- (2) The strut should have no more than 1 - 1.7 inch variation between the two main struts.
- (3) Refer to the 365-4 weight and balance sheet in the aircraft log to check the aircraft weight.
- (4) The TM General section will give you the Dimension X information, which is a measurement of the lower portion of the strut to the center of the attachment bolt.

i. Service Main Landing Gear Shock Strut

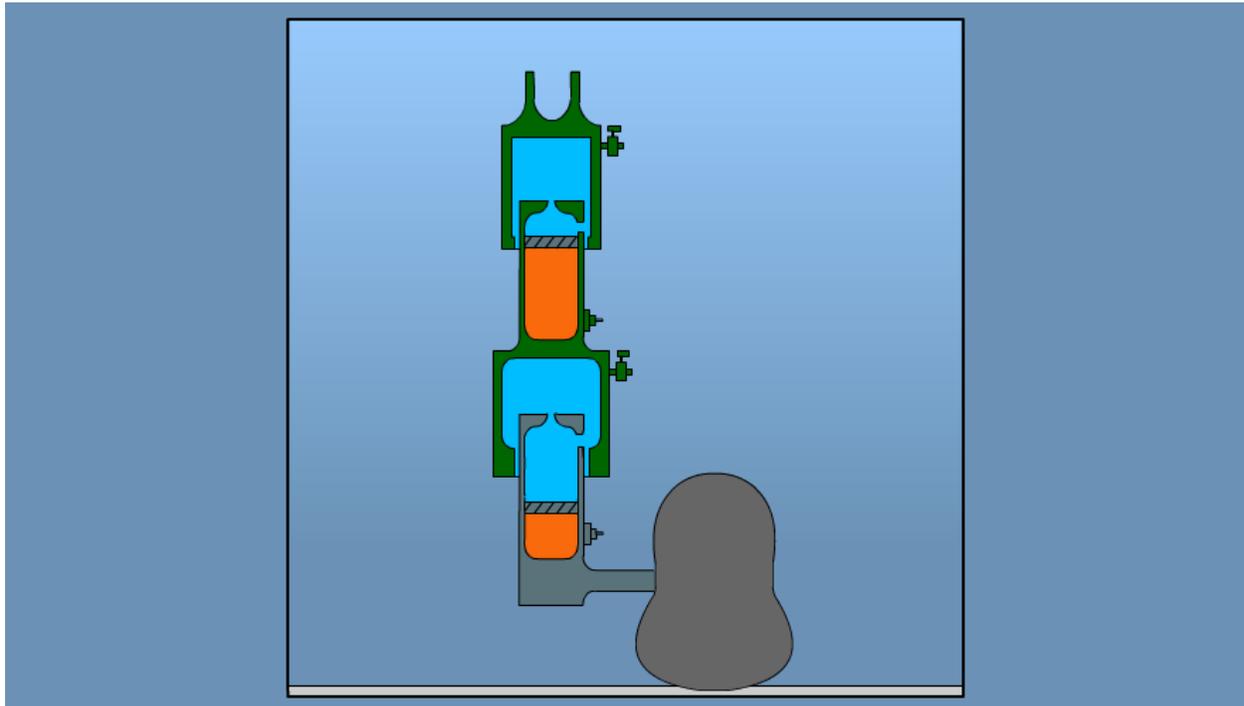
Frame #0245 (Service Main Landing Gear Shock Strut)



- (1) Service the main landing gear strut IAW the TM.
- (2) If the upper and lower strut need servicing, service the upper strut first.
- (3) Abide by all WARNINGS, CAUTIONS, and NOTES.
- (4) Due to the accessibility of the upper servicing port on the landing gear strut, follow the safety precautions in the TM.
- (5) Inspect the hydraulic seals for leakage.
- (6) Refer to the TM 1-1520-237-23-3 for leak criteria.
- (7) This section will give the allowable leakage limits and whether or not the strut is good or needs to be changed.

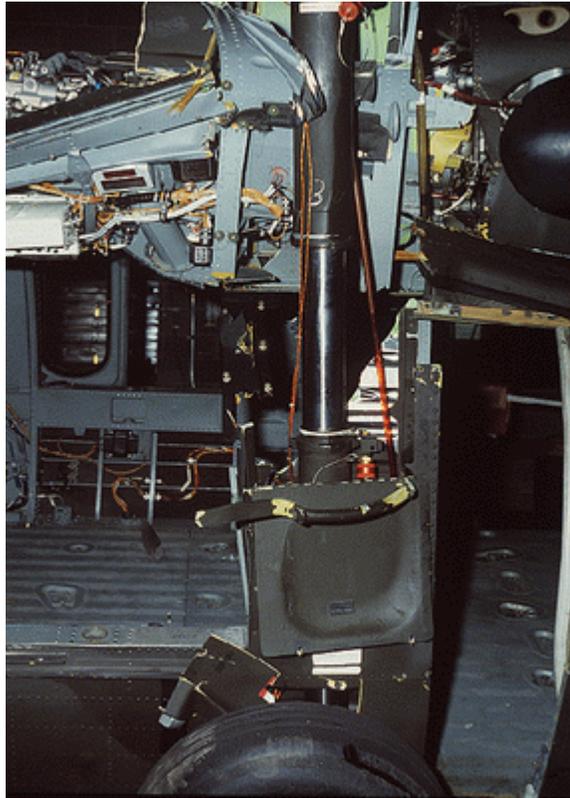
j. Strut Conditions

Frame #0250 (Strut Conditions FLASH)



- (1) Strut at rest
  - (a) The condition where the strut collapses and the nitrogen is compressed.
- (2) Strut in flight
  - (a) The condition where the nitrogen pushes back up on the floating piston, pushing the hydraulic fluid back into the upper portion of the lower stage.
  - (b) The nitrogen uncompressed, causing the strut to extend.
- (3) Strut/High Impact Load
  - (a) Upon impact, the tires blow, then the lower stage floating piston bottoms out.
  - (b) Next, the second stage kicks in.
  - (c) The nitrogen compresses, forcing the hydraulic fluid back into the upper portion of the upper stage.

Frame #0205 (Shock Strut Extreme Conditions )



- (d) This shock was improperly serviced and was involved in an aircraft crash.

k. Tail Landing Gear System Components

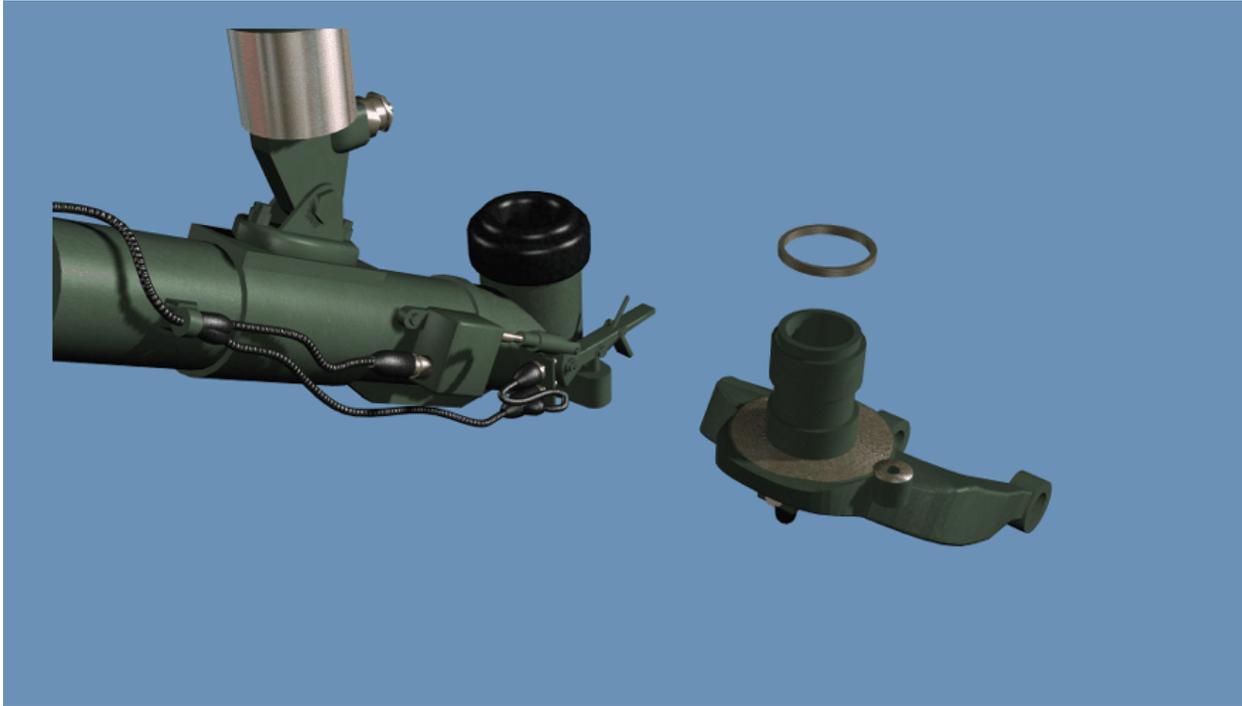
Frame #0255 (Tail Landing Gear System Components)



- (1) The tail landing gear is a fixed gear, secured to structural attachment fittings in the rear tail cone structure.
- (2) The tail landing gear provides rear support of the helicopter and supports the helicopter rear structure during ground operations and cushions impact loads when landing.
  - (a) The shock strut is a two-stage, air-oil type strut with two floating pistons separating air from hydraulic fluid, with a servicing valve for each stage.
  - (b) The fork assembly, secured to the yoke assembly, is the attachment point for the tailwheel, and allows the wheel to swivel 360° for ground control.
  - (c) The lock actuator is mounted to the yoke assembly and secures the tailwheel in the trailing position when the helicopter is parked or in flight.

## I. Tail Landing Gear Fork Inspection

Frame #0260 (Tail Landing Gear Fork Inspection)



- (1) When inspecting the tail landing gear yoke and fork, check the snap ring that holds the fork to the yoke.
- (2) Check the yoke for cracks and lateral movement.
- (3) Inspect the yoke mounts inside the tail cone.

m. Tail Landing Gear Shock Strut Servicing

Frame #0265 (Tail Landing Gear Shock Strut Servicing)



**CAUTION:** To prevent damage to helicopter, refer only to procedure in this manual for proper charge pressure. Disregard all other labels attached to the helicopter concerning charge pressure. A strut needing service should be carefully checked for hydraulic leakage. Repeated nitrogen servicing of a leaking strut without servicing with hydraulic fluid can lead to a completely nitrogen-inflated strut, causing internal damage.

**NOTE:** Servicing tail landing gear strut with helicopter on jacks is the preferred method of servicing strut. If both upper and lower struts require servicing, service upper stage first. If installed, external fuel tanks must be defueled and removed prior to servicing struts.

- (1) There are two kneeling valves on the tail landing gear shock strut, for the upper and lower stage of the strut.

Frame #0265 (Kneeling Valve Access)



- (2) The position of the upper kneeling valve presents a problem when trying to service the system.
- (3) Due to the accessibility of the upper servicing port on the landing gear strut, follow the safety precautions in the TM.
- (4) For servicing procedures and allowable leakage limits, refer to TM 1-1520-237-23-3.
- (5) Servicing the tail landing gear strut with the helicopter on jacks is the preferred method.
- (6) Perform a leak check IAW TM, which will give the inspection criteria for the hydraulic seal leakage.

n. Tail Shock Strut Dimension X

Frame #0270 (Tail Shock Strut Dimension X)



- (1) To find dimension X for the tail strut you measure only the exposed portion of the piston.

o. Tail Landing Gear Lock DC Component Location

Frame #0275 (Tail Landing Gear Lock DC Component Location)



- (1) The 28 V dc components consist of the tailwheel lockout button which is located on the top center console on the miscellaneous switch panel, between the pilot and copilot seat.

Frame #0275 (Miscellaneous Switch Panel Location)



Frame #0275 (Tail Landing Gear Lock Actuator Location)



- (2) The lock actuator and lock/unlock switches are located on the left side of the tailwheel yoke assembly.

p. Tail Landing Gear Lock Actuator Operation

Frame #0280 (Tail Landing Gear Lock Actuator Operation)



- (1) Every time the TAILWHEEL lockout button is pushed in the cockpit, the actuator arm either fully extends or fully retracts.

Frame #0280 (Tail Landing Gear Manual Release Lever)



- (2) The spring is energized even if the pin is not lined up.
- (3) Once the wheel is lined up, the pin pops into place.
- (4) During the adjustment, the lock pin needs to be in the most accurate position.
- (5) The unlocked pin indicator light will come on as soon as it clears.
- (6) The manual lever disengages so you can freely rotate the wheel.

q. Tailwheel Lock/Unlock Switch Adjustment

Frame #0285 (Tailwheel Lock/Unlock Switch Adjustment)



- (1) Adjust the unlock switch until the multimeter needle shows continuity and turn the adjustment nut an additional 1/3 turn 'CLOCKWISE'.
- (2) Adjust the lock switch until the multimeter needle shows continuity and turn the adjustment nut an additional 2 to 3 turns 'CLOCKWISE'.

## CHECK ON LEARNING

1. How many fixed struts are on the UH-60?
2. What two items are the struts serviced with?
3. What are the three strut conditions?
4. What happens to the lock actuator when the tailwheel button in the cockpit is activated?
5. In the Manual Mode, what allows you to freely rotate the tailwheel?
6. Where is the tail landing gear lock/unlock switch located?

## SECTION IV. - SUMMARY

### 1. REVIEW/SUMMARIZE:

You have completed the UH-60 Landing Gear Strut Lesson.

The key points to remember are:

- The main components of the tail landing gear is the actuator, yoke, and fork.
- Due to the accessibility of the upper servicing port on the landing gear strut, follow the safety precautions in the TM.
- The tailwheel lock/unlock components are located on the left side of the tail landing gear yoke assembly.
- The tailwheel lock/unlock DC components consist of the button in the cockpit, the lock actuator and the lock/unlock switch on the yoke.
- The landing gear strut consists of two floating pistons that separates the hydraulic fluid from the nitrogen.
- The WOW Switch is normally located on the left side landing gear.
- With ESSS installed; there will be a WOW switch on the right side landing gear too.
- The landing gear supports the helicopter on the ground, absorbs impact loads when landing, and permits the helicopter takeoffs and landings on slopes. The strut can be raised or lowered for air transportability.
- The Impact Switch will set off the fire bottles when a 10G impact is detected.
- The shock strut quick service check consists of a visual check of the strut height and looking for any hydraulic leaks.
- When servicing the landing gear strut, follow all safety criteria and check for leaks.
- There are three strut conditions; strut at rest, strut in flight, and strut/high impact load.

C. ENABLING LEARNING OBJECTIVE ELO No. 3

ACTION: Identify the Towing and Jacking procedures for the UH-60.

CONDITIONS: Using TM 1-1520-237-23-1 and TM 1-1520-237-23-3

STANDARD: IAW TM 1-1520-237-23-1 and TM 1-1520-237-23-3

a. Aircraft Towing Procedures

Frame #0405 (Level Stabilator)



**CAUTION:** Damage to tail landing gear will result, if a helicopter over 16,825 pounds gross weight is towed with tail landing gear swiveled 180° underneath tail cone. Do not tow helicopter with tail landing gear, 70250-13103-042, with tailwheel swiveled under tail cone, when gross weight exceeds 16,825 pounds.

**NOTE:** Battery power may be used to level stabilator. However, if battery low light is on, battery power will only be available for APU starting, and external power should be used to operate stabilator.

- (1) Level the stabilator so the tow operator can see all around the aircraft.

Frame #0410 (Attach Tow Bar)



**CAUTION:** Damage to helicopter will result if tow bar becomes separated from tailwheel. Make sure tow bar is properly secured to tailwheel.

- (2) Connect the tow bar to the tailwheel axle.

Frame #0415 (Unlock Tailwheel)



- (3) Disengage the lock/unlock pin on the tail wheel.

Frame #0420 (Disconnect Tie Downs)



**NOTE:** The helicopter may be either pushed, or pulled during towing.

- (4) Disconnect the tie down lines and grounding straps.
- (5) Have an assistant release the parking brakes and ride in the cockpit to work the brakes if required.
- (6) The minimum personnel required for towing the UH-60 is four.
- (7) You can use a pickup, scamp, or HMMWV to tow the aircraft.
- (8) Do not exceed 5 mph when towing the aircraft.

b. Jacking Point Locations

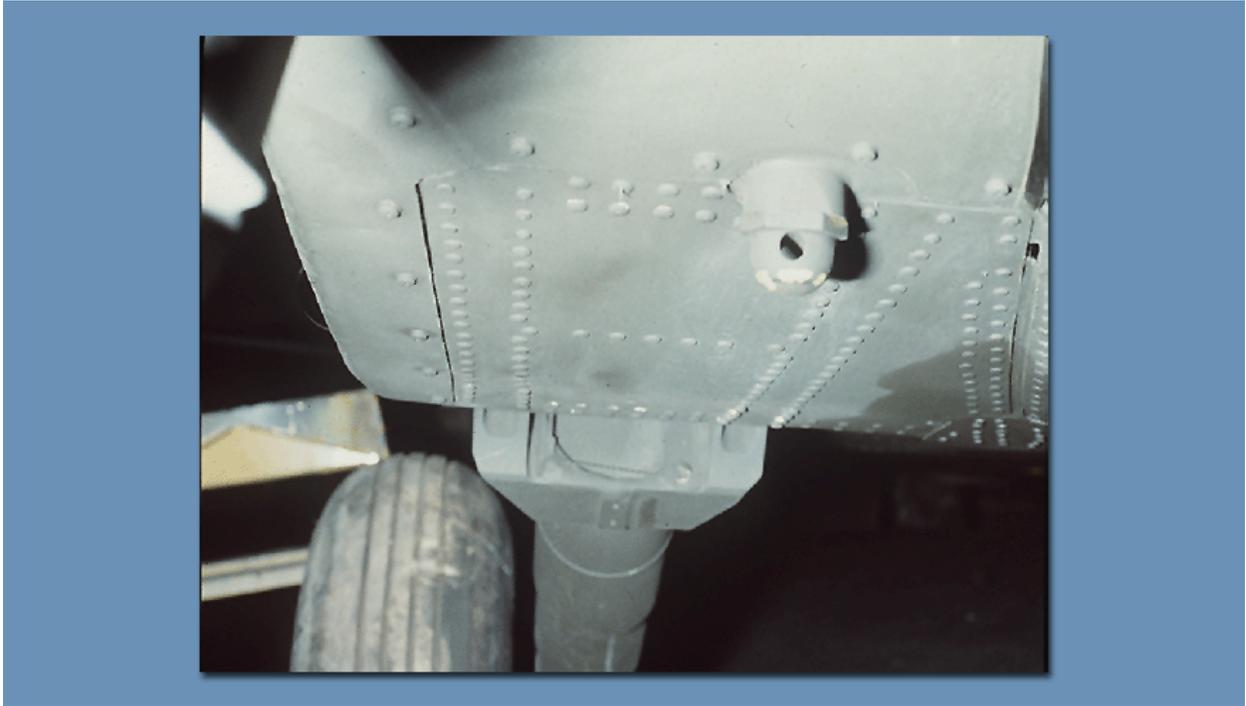
Frame #0425 (Jacking Point Locations)



- (1) The UH-60 Black Hawk has six jack points that are used to support the aircraft when replacing tire assemblies, landing gear, or to weigh the aircraft.

(a) Main Landing Gear Jacking Points

Frame #0430 (Main Landing Gear Jacking Points)



- 1) There are two airframe jack points located on the fuselage just forward of each drag beam, that are used when performing maintenance on the landing gear or weighing the aircraft.

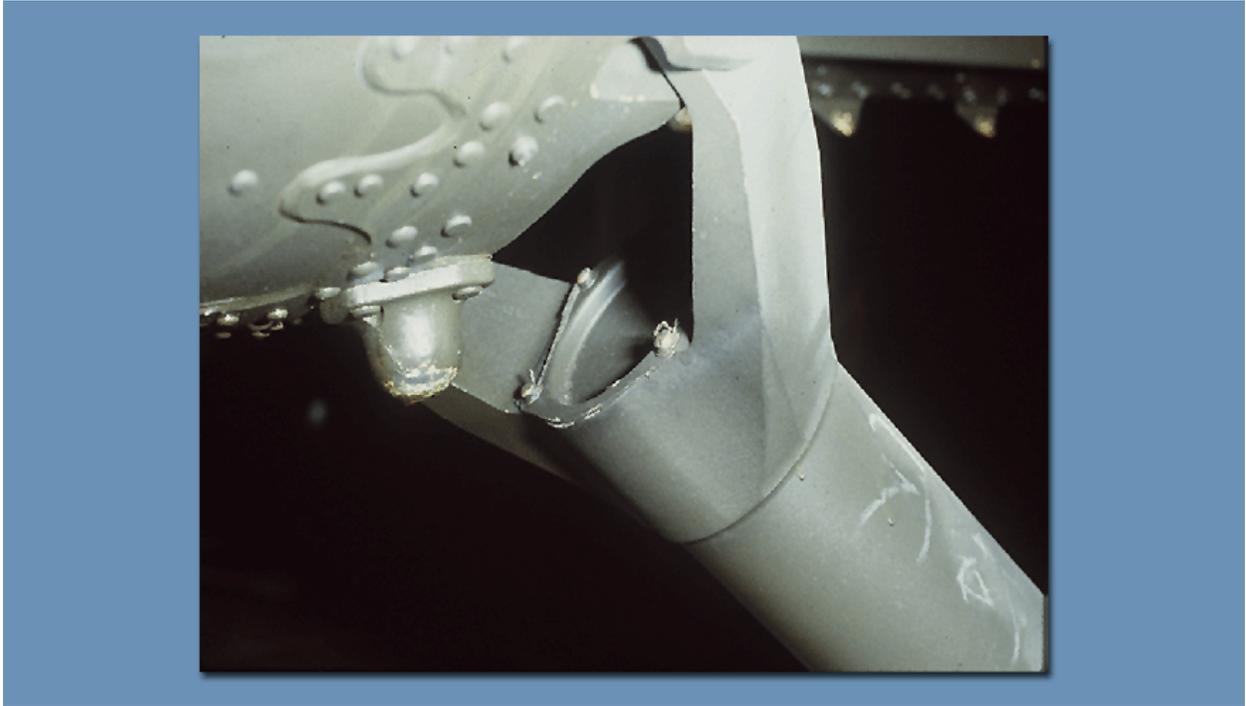
Frame #0435 (Drag Beam Jack Point)



- 2) There is one jack point on each drag beam that is used when changing tires or working on the brakes.

(b) Tail Landing Gear Jacking Points

Frame #0440 (Tail Landing Gear Jacking Points)



- 1) There is one airframe jack point located on the fuselage skin, just forward of the tail landing gear yoke.

Frame #0445 (Fork Jack Point)



- 2) There is one jack point on the fork, used for changing the tire, lubricating wheel bearings, and axle maintenance.

c. Aircraft Jacking

Frame #0450 (Aircraft Jacking)



**WARNING:** To prevent helicopter from rolling off jacks, make sure parking brake is off, and that chocks are moved as helicopter is jacked. In addition to these procedures, follow other procedures in TM 1-1500-204-23.

**CAUTION:** To prevent damaging helicopter, check overhead clearance before jacking.

- (1) Jacking The Complete Aircraft
  - (a) Park helicopter indoors on a solid and level area as possible.
  - (b) Place the tripod jack beneath jack pad on bottom front of each drag beam support, and bottom rear of tail cone.
  - (c) Hang plumb bob from slot just inside left troop/cargo door above leveling plate.
  - (d) Release parking brake, and do not remove chocks.
  - (e) Using four people, one for each jack, and one observer, jack helicopter slowly and evenly while adjusting height of jacks to line up plumb bob with intersection of zero marked on outboard edge of leveling plate until desired height is reached, and helicopter is level.
  - (f) Move the chocks to keep landing gear secured until tires are off ground.
  - (g) Lower helicopter in same manner used to jack it.
  - (h) As helicopter is lowered, move chocks to keep landing gear secured as weight of helicopter comes off jacks.
  - (i) Remove jacks, and lock the parking brake.

(2) Jacking a Wheel

- (a) Wheel and tire maintenance, or brake system maintenance, will require jacking an individual strut.
- (b) Park helicopter on as solid and level an area as possible.
- (c) Place a landing gear jack beneath the jack pad on drag beam, or the tail landing gear fork, and slowly start to jack the landing gear until the tire just clears the ground.
- (d) Upon completion of the task, let the tire slowly glide to the ground, then remove the jack.

## CHECK ON LEARNING

1. Where are the jacking points for the main landing gear located?
2. Where are the tail section jack points located?
3. How many jack points are on the UH-60 aircraft?
4. Where is the tow bar connected?
5. What is the minimum crew required when towing an aircraft?

## SECTION V. -SUMMARY

### 1. REVIEW/SUMMARIZE:

You have completed the UH-60 Towing and Jacking Lesson.

The key points to remember are:

- There are four Main Landing Gear Jack Points: one on the lower fuselage forward of the each drag, beam and one on the drag beam on each side of the aircraft.
- There are two Tail Landing Gear Jack Points: one on the fuselage skin forward of the yoke, and one on the fork.
- To tow a UH-60, attach the tow bar to the tail landing gear axle, remove the tie downs and grounding straps, set the stabilator to straight, assign proper safety personnel, and tow no faster than 5 mile per hour.
- The proper vehicles to use to tow a UH-60 is a pickup, scamp, or HMMWV.

APPENDIX A  
LIST OF ILLUSTRATIONS

Graphic Number	Graphic Name
0015	Main Menu
0025	Main Landing Gear Wheel Assembly
0030	Main Landing Gear Tire Buildup Flash
0035	UH-60 Tire Leak Check
0040	Main Landing Gear Tire Subcomponents
0040	Main Landing Gear Tire Inside Bearing Installed
0040	Main Landing Gear Tire Complete
0045	Tail Landing Gear Wheel And Tire Assembly Flash
0050	Tail Landing Gear Wheel Removal/Replacement
0055	Tail Landing Gear Wheel And Tire Removal Flash
0060	Wheel Brake Description
0060	Wheel Brake Disassembled
0065	Brake Assembly Function Flash
0070	Brake Inspection
0075	Brake Wear Check Flash
0080	Parking Brake Component Location Menu
0085	Brake Master Cylinder Location/Function
0090	Slave Mixer Valves Location/Function
0095	Brake T-Handle
0095	Caution Advisory Panel
0100	Parking Brake Valve Location/Function
0105	Brake System Hydraulic Flow Flash
0110	Brake Bleeding Techniques
0115	Brake Bleed Method
0205	Landing Gear Location And Function
0210	Main Landing Gear Strut Description
0210	Main Landing Gear Exploded View
0215	Weight On Wheel Switch Description/Function
0215	Weight On Wheel – ESSS Installed
0220	Weight On Wheel Switch Adjustment Left Side
0220	Weight On Wheel Switch Adjustment Right Side
0225	Impact Switch Location And Function
0230	UH-60 Shock Strut Operation
0230	Shock Strut Exploded View
0235	Main Landing Gear Shock Strut Removal/Replacement
0240	Main Strut Quick Service Check
0245	Service Main Landing Gear Shock Strut
0250	Strut Conditions Flash
0250	Shock Strut Extreme Conditions
0255	Tail Landing Gear System Components
0260	Tail Landing Gear Fork Inspection
0265	Tail Landing Gear Shock Strut Servicing
0265	Kneeling Valve Access
0270	Tail Shock Strut Dimension X
0275	Tail Landing Gear Lock Dc Component Location
0275	Miscellaneous Switch Panel Location
0275	Tail Landing Gear Lock Actuator Location
0280	Tail Landing Gear Lock Actuator Operation
0280	Tail Landing Gear Manual Release Lever
0285	Tail Wheel Lock/Unlock Switch Adjustment
0405	Level Stabilator

0410	Attach Tow Bar
0415	Unlock Tailwheel
0420	Disconnect Tie downs
0425	Jacking Points Location
0430	Main Landing Gear Jacking Points
0435	Drag Beam Jack Point
0440	Tail Landing Gear Jacking Point
0445	Fork Jack Point
0450	Aircraft Jacking

APPENDIX B  
TEST AND TEST SOLUTIONS

1. This appendix is only used when the test and solutions are internal to the POI file.
2. When the test and solutions are internal to the POI file, then the POI file becomes a FOR OFFICIAL USE ONLY document.