KAMAN Rotor Tips

NOVEMBER-DECEMBER, 1973

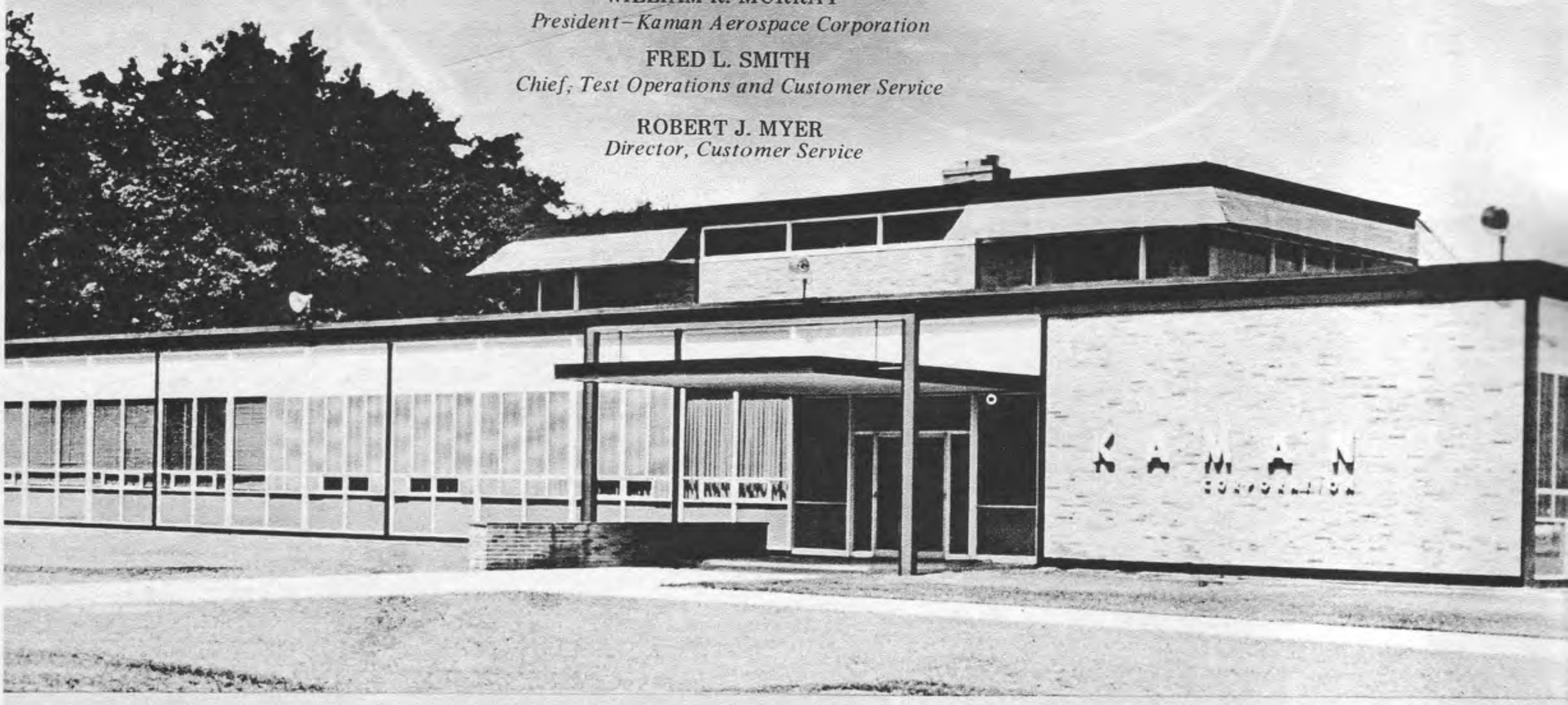
KAMAN AEROSPACE CORPORATION

CHARLES H. KAMAN
President–Kaman Corporation

WILLIAM R. MURRAY
President–Kaman Aerospace Corporation

FRED L. SMITH
Chief, Test Operations and Customer Service

ROBERT J. MYER
Director, Customer Service



Rotor Tips

Everett F. Hoffman *Editor*
Barbara R. Thompson *Editorial Assistant*

Volume VIII No.

FEATURES

DEPARTMENTS

ON THE COVER

Holiday greetings and best wishes from Kaman Aerospace Corporation. Connecticut winter scene by KAC photographer D. J. Ruggiero.

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CUSTOMER OPERATIONS SECTION–ROBERT L. BASSETT, Manager

A few weeks after moving from NAS Lakehurst, N. J., HSL-30 held a change-of-command ceremony in its new quarters at NAS Norfolk, Va. Another ceremony followed, less than two weeks later, when HSL-32 was commissioned and began operations across the hangar from its "parent" squadron. The spit-and-polish atmosphere, dress uniforms and formality during the ceremonies were in direct contrast to the scene in hangar LP3 a short while earlier. Then, sweating, dungaree-clad working parties labored mightily to unload truckload after truckload of stores, equipment, furniture, lockers and all the rest of the material being moved from HSL-30's former home at Lakehurst.

At first consideration, the HSL-30 move seems of a routine nature. But, less routine was the fact that there were two important ceremonies in the offing when the move began, personnel transfers were "in the works" with the imminent formation of HSL-32, the squadron still had its regular committments to meet and the already active LAMPS program was expanding.

Despite the obstacles, HSL-30 met its deadline and the move has become a part of squadron history. However, the following information on the squadron's relocation may give Rotor Tips' readers an insight as to what happens—

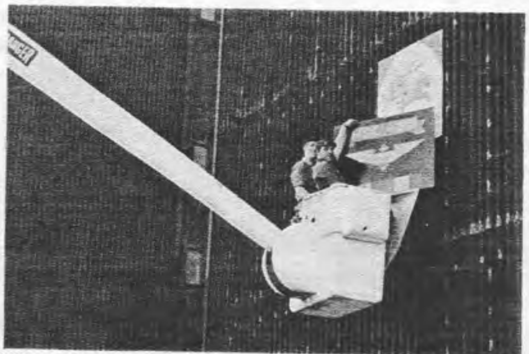
When A Squadron Moves

NAS Lakehurst photos by Lt(jg) Paul Troiano, Former Public Affairs Officer, HSL-30

By Everett F. Hoffman
Editor-Kaman Rotor Tips

Fully loaded "Conex" boxes and the corrosion control trailer were among the many large items shipped to Norfolk on flatbed trucks.

A load of lockers and filing cabinets is moved from squadron spaces to loading area. At right, Cdr William Lang "breaks down" the HSL-30 officers' billet and detachment board in his old office in Hangar 3.



HSL-30 insignia is removed from place on Hangar 3 for transportation to its new home. Doing the work are AA David A. Brown, left, and AA John R. Roy.

Commander Lang and Cdr Charles Myers, HSL-30's C. O. at the time of the move, carry on command activities in the empty administration office. It was the last day before the squadron was officially moved to Virginia. At left, Commander Myers prepares to fly the last HSL-30 SEASPRITE remaining at the station to Norfolk. Wishing him well is Capt W. O. Nealon, C. O. at NAS Lakehurst.

The HSL-30 move was one of many in the Navy resulting from base closures and Fleet unit realignment. In addition, a co-location of helicopters and ships exists at Norfolk but not at Lakehurst. Ninety-three officers and more than 350 enlisted personnel made the 285-mile trip to Norfolk. Eleven aircraft were flown down.

In its quest for information as to what such a move entails, Rotor Tips contacted Lt(jg) Paul Troiano at NAS Lakehurst, until recently Public Affairs Officer for HSL-30, and Lt(jg) Brian Buzzell, his successor (and now PAO for HSL-32). Lt R. D. Childers, move coordinator at NAS Lakehurst, furnished the following information in response to a request from Lieutenant Buzzell (Commander Street was move coordinator at the NAS Norfolk end):

. . . .Forty-four-foot tractor trailer and three flatbed trucks were used to move the squadron. Approximate weight moved was 240,000 pounds. The first trucks were loaded in nine hours—the last four were done in less than eight hours. All of the offices topside Hangar 3 had to be cleared. Material not taken to Norfolk was inventoried and stored in the Hangar. A crane was used to hoist the equipment down to the hangar bay.

. . . .All special tools and IMRL (Individual Material Readiness List) equipment had to be individually wrapped and packed for shipment. The IMRL equipment is valued at more than two million.

. . . .Ninety percent of all furnishings and equipment used at Lakehurst were moved to Norfolk including:

Power Plants—T-58 engine special tools, workstands and engine dollies.
Avionics—the avionics work benches.
Airframes—all corrosion control materials tools and equipment.
Maintenance control—all maintenance records, aircraft log books and status boards.
Material control—the IMRL pack-up, oils and lubs, office supplies, foul weather gear and an amount of aircraft parts. The tool room!

. . . .No loading ramp was available at the squadron's Lakehurst location so we used the bulkhead behind Hangar 3. The trucks had to be backed onto airfield "Marsh-Ton" matting to raise the tailgate up to the level required. The fork lifts were driven onto a piece of C-5A loading pad. This raised them the 4 inches necessary to get onto the trucks. Two tractors were used to pull baggage trailers carrying equipment from inside the hangar to the loading area.

The HSL-30 loading crews worked long hours in sweltering heat and, due to the late arrival of the trucks, much of the work was done after the regular securing time. Despite these and the usual aggravations associated with any move, several humorous incidents did arise and were duly noted by Lieutenant Childers:

. . . .As the office spaces were emptied the officers were left with no place to go so they became spectators/self-designated supervisors of the loading operations. The crew couldn't convince them that they didn't require more suggestions after successfully completing half the move.

. . . .Chief Jackson was the loading supervisor on one truck when he set his clip board down on a desk and walked a few steps away. The desk was loaded and it took 15 minutes of unloading to find the clip board once he realized what had happened.

. . . .Someone from HC-2 parked his "V-W" in the way. It was picked up with a forklift and then set down near Building 124 in such a manner that it could not be moved without a forklift. The unhappy VW driver had to wait until the truck was fully loaded before he got his captive car back.

Operations that could not stop during squadron move: Period of Move Covering 1 June to 30 July (LAMPS only)

Period of Move Covering 1 June to 30 July (LAMPS only)

Three deploying dets.

Three returning dets with return and inventory and accounting of IMRL and other related equipment.

Flight time minimums had to be obtained for all at home pilots and aircrewmen. (Frantic operations to obtain minimums prior to 30 June.)

Weapon system trainer (WST) conferences had to be attended.

Normal correspondence and support for deployed units had to be continued.

Many school qualifications had to be obtained for deploying enlisted personnel.

Personnel reliefs had to be transferred to deployed units.

HSL-30 LAMPS Det 1 deployed aboard USS Belknap (DLG-26) for six months to return late November.

HSL-30 LAMPS Det 11 deployed aboard USS McDonnell (DE-1043) for two week work-up.

HSL-30 LAMPS Det 10 deployed aboard USS Sims (DE-1059) for two week work-up.

HSL-30 LAMPS Det 5 returned from eight month med deployment aboard USS Wainwright (DLG-28).

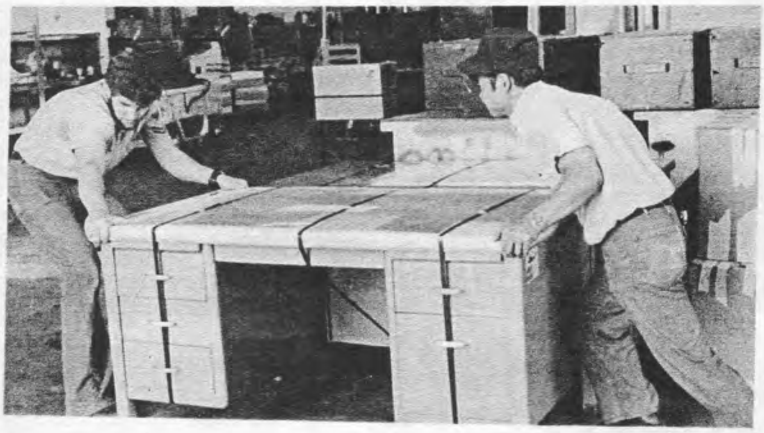
HSL-30 LAMPS Det 7 returned from two month exercise aboard USS Bowen (DE-1079).

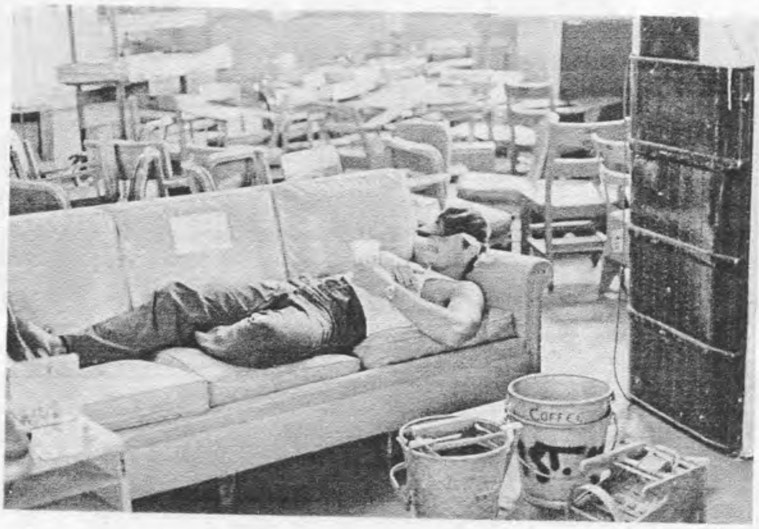
HSL-30 LAMPS Det 9 returned from six month med deployment aboard USS Daniels (DLG-27).

HSL-32 LAMPS Det 3 was preparing for deployment aboard USS Sims (DE-1059).

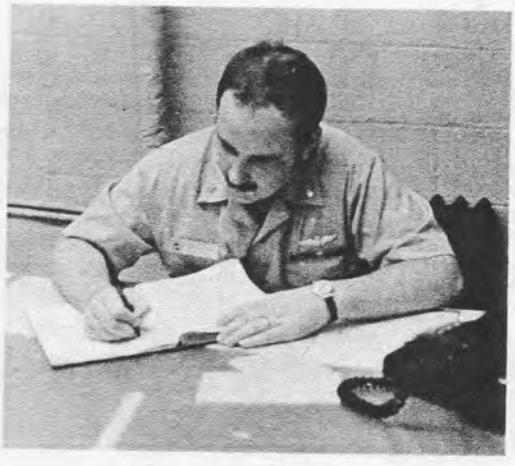
Six SH-2D/2F were transferred, 132 enlisted, 50 officers were relocated (LAMPS personnel only).

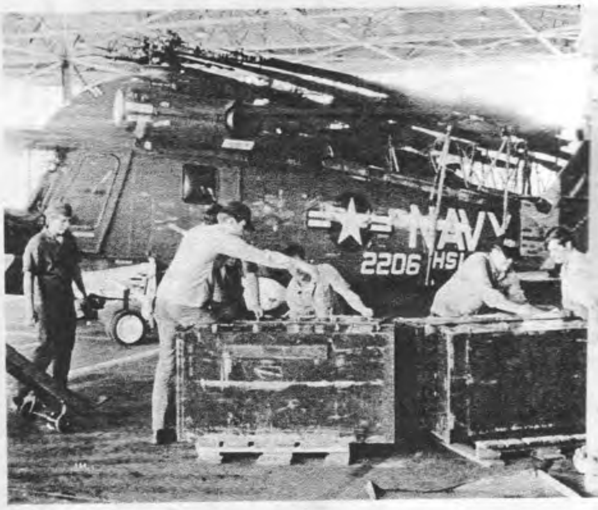
(See photos on page 27)

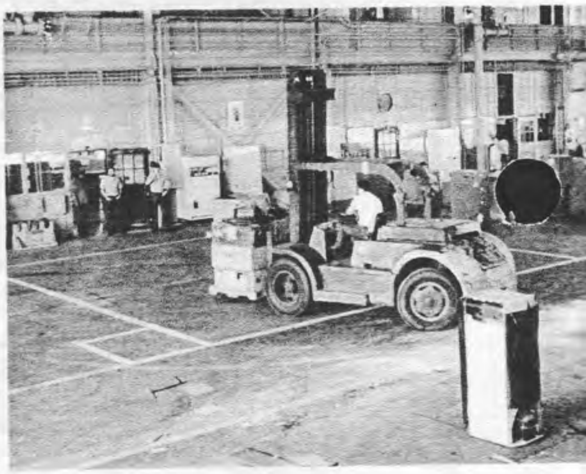




Surrounded by chairs and cleaning gear, ADJAN Larry M. Milone takes a break during the busy packing-up process. In office photos at right, SN Connie Hiemlick carries on administrative work among the many packed cruise boxes being readied for the Norfolk move. In an office stripped clean of all furniture and equipment, PNSN Colleen Hansen telephones BuPers in Washington. Important personnel functions were handled from Lakehurst until the very last day. Lt(jg) James Kuemmel signs off the squadron log book at 0001 after officially "turning over the helm" via telephone to the HSL-30 duty officer at Norfolk. (USN photos by Troiano)







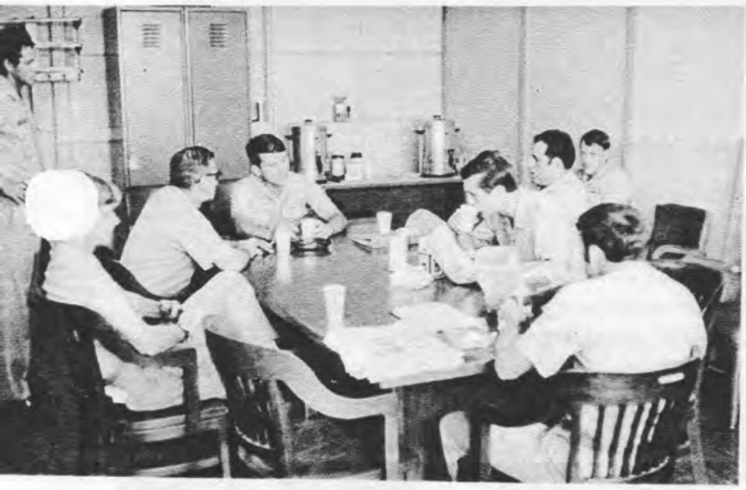
HSL-30 Makes Its Move

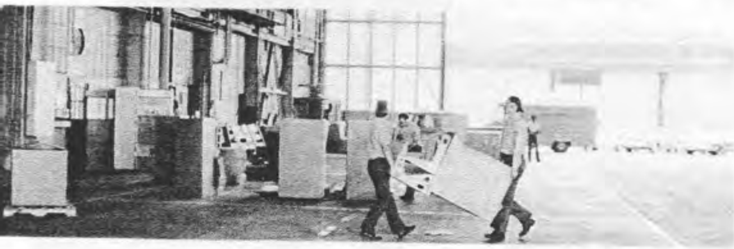
NAS NORFOLK, Va.—The photos above were taken in Hangar LP3 and are representative of HSL-30's "Operation Move" into its new quarters here. As the squadron unloaded the 240,000 pounds of material and equipment brought from Lakehurst, it was a time for working parties, conferences, mock dispair, humor, salty language, busy fork lifts, lost articles, found articles, fixing-up, cleaning-up, unpacking and sorting.

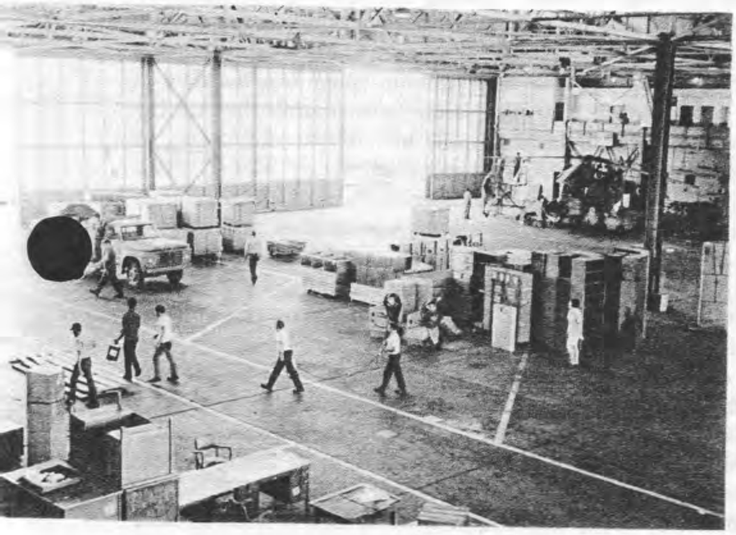
And, of course, there were the usual remarks and rumors of a type known to every military operation since the dawn of history. As he heaved and tugged on a filing cabinet, one Petty Officer muttered, "I'm getting married next week, I hope I last that long.". . . .And an officer who had made repeated trips across the hangar with load after load of papers remarked that he was sure his legs were at least "an inch shorter" than when he started that morning. . . .

And there was the six-man working party which had pulled, pushed, lifted, shoved and otherwise manhandled several tons of equipment during the heat of a humid July day. As they were taking a well-deserved break, the rumor reached them that the "whole squadron is moving back to Lakehurst!" The collective look of consternation was mirrored on the faces of another working party across the hangar which had just received the word (erroneous, of course), that "six more tractor-trailers are waiting outside and others are on the way!". . . .

And so it went until finally the pressure was off and HSL-30 was fully settled into its new home. The heartfelt sigh of relief from all hands was heard all the way back in Lakehurst. . . .at least that's the rumor! (Hoffman photos)

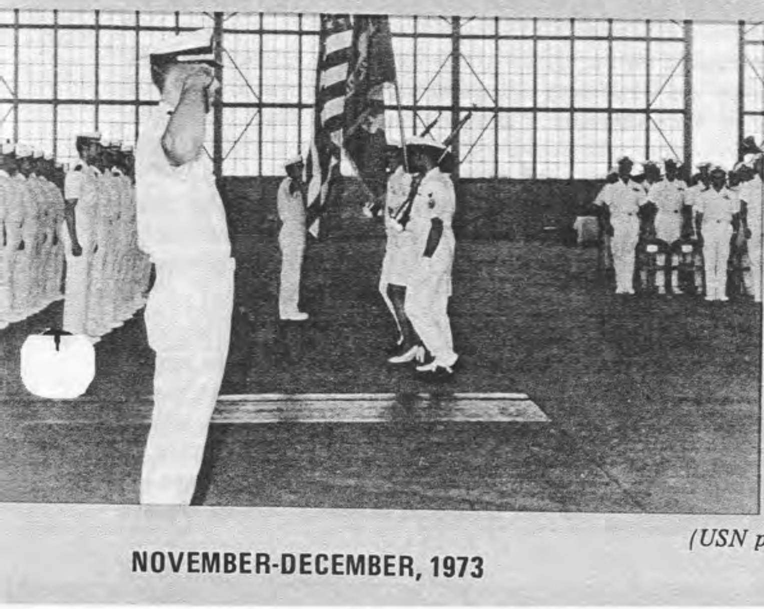


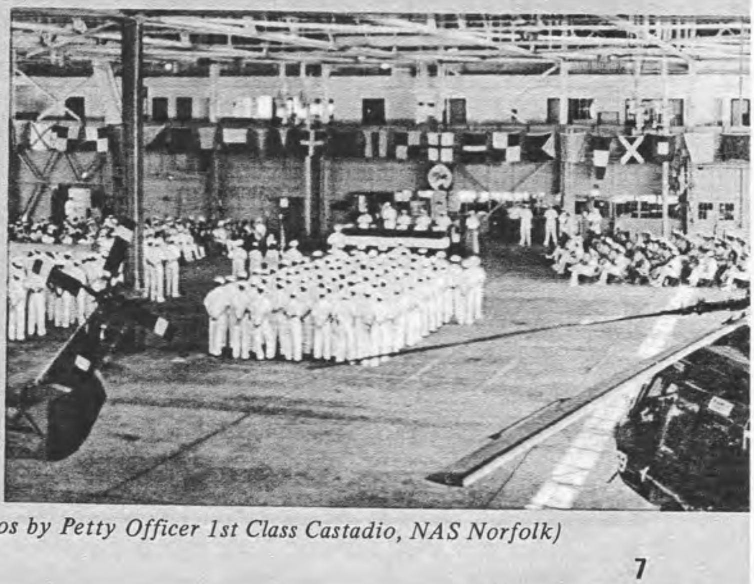




(Continued on page 27)

....And Meets A Deadline





(USN photos by Petty Officer 1st Class Castadio, NAS Norfolk)

FROM THE READY ROOM

By Jack Goodwin, Assistant Chief Test Pilot

While this article is written from a Kaman pilot's viewpoint, it would not be complete without giving recognition to NATC Patuxent River, Md. personnel, shown below, who participated in the test program.

Manning cameras and other equipment, NATC personnel furnished complete photo cover and sink-rate information. Their excellent cooperation provided permanent recordings of each test point while adding to the overall safety of the program. Left to right are, Charlie Archer, Vern Pugh, Mike Ciopryna and Al Koslofsky. Others from NATC who aided in the program were C. Sapricis, Jim Smith, Herman Kolwey and Dave Dufresne, Engineer reps from NATC. (Ruggiero photos)

In the interest of all-weather operation of the SH-2 helicopter from destroyers, an additional landing gear sink-speed capability was required. To provide this capability and to enhance the ability of the helicopter to operate from limited landing areas on small ships, the energy absorption capability of the main landing gear has been improved by replacing the liquid spring and axle assembly and by installation of a higher capacity tail gear positioned approximately six feet forward of the original tail gear location.

Before this new capability was provided to the HSL (LAMPS) squadrons, many months of testing went into the change. It all started with static tests performed on a complete H-2 helicopter in Kaman's Structural Test Lab. Here the helicopter was rigged to simulate landings by means of hydraulic actuated devices. Both main and tail gear were thus subjected to loads representative of very severe landings. Once landing loads were found to meet or exceed "Spec" requirements, operational testing began.

After completion of ground handling tests, mechanical instability tests and autorotation landing tests, a powered landing demonstration was conducted to evaluate various combinations of aircraft sink speed, roll attitude and drift velocity. In order to develop landing loads similar to those found on rolling decks, two sloped ramps were built at Kaman Aerospace, one with a 6 degree slope and another with a 9 degree slope. During the four-month flight test program, a careful, well-monitored landing envelope was defined. Sink rate radar units were installed on the main and tail gear. A sink rate read-out gauge was installed in the cockpit for the pilot, along with monitoring via the telemetry system to determine and record sink rates. A secondary ground read-out was provided by use of "TRODI" (Touchdown Rate of Descent Indicator). This ground-stationed equipment is an electro/optical sink rate measuring system. A sophisticated landing load measuring system for each gear was developed, installed, and calibrated. All landings were recorded with high-speed motion picture cameras as well.

A total of 317 landings were made during this test program. To accomplish the powered landings, a gradual build-up in sink rate was required to obtain a feel at touchdown plus general pilot conditioning. In attaining the end points of the demonstration, a close monitoring of vertical and lateral loads was required so as not to exceed load limits. Although many different conditions were evaluated at gross weights between 13,300 lbs and 13,500 lbs, there are four end points which best define the landing demonstration.

First, over a level surface with zero drift, a sink rate of 14 FPS (feet per second) was attained. This can best be defined as flying into the deck at 840 FPM (feet per minute) measured on the rate of climb indicator. A landing of this type was very heavy at time of impact and was found to be very uncomfortable. Coupled with this type landing, a lateral drift rate of 4-5 FPS was established while generating a sink rate up to 9 FPS.

Moving to the 6 degree slope, after many build-up landings, this environment became surprisingly comfortable. Landing end points were accomplished with no particular difficulty.

Now, having developed a degree of feel for the new high energy landing gear, and being most pleased with the results, the next end points were evaluated on the 9 degree slope. Landings below 3-4 FPS sink rate (normal landings), resulted in hunting for the deck and allowed the helicopter to bounce with some lateral skidding. As sink rate was increased, the helicopter displayed excellent landing charac-

A total of 317 landings were made during the test program. Top photo, landing with a sink rate of 9 feet-per-second on a 9° ramp. Photo at right, landing with a sink rate of 9 feet-per-second with 4 to 5 feet-per-second drift down the 9° slope.

teristics in this environment. Establishment of over 3-4 FPS sink rate and a concentrated effort to fully lower collective once on the ramp (thus completely unloading the rotor), made for a solid and also comfortable landing. A maximum drift of 3 FPS and a sink rate of 9 FPS was attained on the 9 degree slope.

Prior to commencement of the flight test program, stress analysts compiled a computer program to provide time history of landings with readout of loads in the axes of the three gear. Early in the test program, recorded loads were compared to the analytical results, the computer programs were adjusted, and subsequently very good correlation between analytical and actual were obtained. Before more severe landings were conducted, the landing was run on the computer to ensure safety. These computer programs have subsequently been modified for analytical examination of free landings involving ship motion.

In all destroyer landings, the pilot attempts to land when the deck is near level in a so-called null period. Sometimes this is not possible, particularly in sea conditions which result in random rather than repeatable ship motions. When this occurs, landings may unintentionally be made at substantial deck roll angles or with significant lateral velocity relative to the deck. The ramp landing test program recently completed demonstrates that the SH-2F with its higher capacity landing gear provides the capability to handle such adverse conditions. Further, the smaller footprint area with the relocated tail gear will facilitate shipboard landings because the pilot can put the main gear any place in the 24 foot diameter landing circle, while lined up on the approach line, with no fear that the tail gear will miss the deck.

Based upon the characteristics observed during this powered landing demonstration, the SH-2F should prove to be an excellent aircraft for shipboard operations.

Ubon HH-43 Crew Aids Downed Pilots

UBON RTAFB, Thailand—Two F-4 pilots who ejected from their crippled aircraft as it approached the runway were rescued shortly afterward by an HH-43F crew from Det 3, 40th ARRSq (MAC), at this base. Piloting the rescue helicopter was Maj Thomas F. Madden. Copilot was 2ndLt Arthur J. Kenney; mechanic was Sgt David B. Southard; and Medic was Sgt David L. Miller.

One of the downed pilots was sighted in a rice paddie with numerous trees in the vicinity. Major Madden set the helicopter down in the confined space without incident despite the minimum rotor blade clearance and the numerous villagers who thronged to the area. As the survivor's condition was checked, Sergeants Miller and Southard were directed toward the last known position of the other pilot. He was located in a tree, his body suspended 25 feet above the ground by his parachute. Sergeant Miller climbed the tree and assisted the pilot in reaching the ground safely. Both survivors were then returned to base.

Admiral Woods On SH-2F Operations Indoctrination Flight

RAdm Mark W. Woods in the cockpit of the SH-2F LAMPS helicopter on the USS Kirk.

USS KIRK—RAdm Mark W. Woods, USN, Commander Cruiser-Destroyer Force, U. S. Pacific Fleet, saw the new SH-2F LAMPS helicopter put through its paces during an operational indoctrination flight from the USS Kirk (DE 1087). Cdr Meryl Belto, Commanding Officer of HSL-33, NAS Imperial Beach, Calif., was pilot on the flight which took place over Southern California waters.

Rear Admiral Woods and Commander Belto take off from USS Kirk on an operation indoctrination flight.

Before take-off, Admiral Woods received a thorough briefing on the SH-2F, equipment aboard the helo, and operational tactics. Assisting in the briefing was AW1 Anthony McKeown.

The flight included radar operations, MAD tactics and sonobuoy patterns. Afterward, Donald Alexander, Kaman Aerospace Senior Service Representative at Imperial Beach, presented the Admiral with a model of the KAC LAMPS helo currently embarked on Cruiser-Destroyer Force ships.

Fourteen ships have completed tours of the Western Pacific, including Vietnam, with LAMPS helicopters. Accomplishments by these ship-helicopter teams have been described as "outstanding."

AW1 Anthony McKeown, left, Cdr Meryl Belto and the Admiral discuss the operational flight in the SH-2F.

Admiral Woods receives LAMPS model from Don Alexander while personnel from the USS Kirk, COMDESRON 23, and COMCRUDESPAC staff look on. (USN photos)

DET 7 TEAM—The 500th landing of a LAMPS helicopter on the USS Bowen's flight deck was reported in the September-October issue of Rotor Tips. Shown above are the Navymen who make up the LAMPS Det 7 complement. Left to right, standing, Lt(jg) Hallenbeck, AW3 Redford, AEAN Barr, AX2 Ashton, AW1 Kennedy, ADJ2 Scott, AMSC Leonard and ATAN Mobbs. Kneeling, ADJAN Lindley, Lt Phillips, copilot; Lt Farr, pilot; AN Averett and AE1 Anderson. (USN photo)

KAMAN

Rotor Tips

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Kaman Rotor Tips technical information is supplied for informational purposes only and does not in any way supersede operational/maintenance directives established by cognizant authorities. The intent of this data will be incorporated, by future changes, into applicable manuals or directives.

G. M. Legault, Manager
Service Engineering

J. P. Serignese, Technical Editor

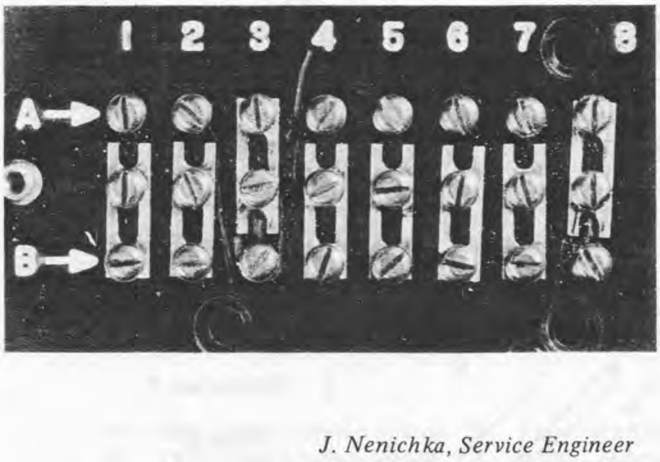
Table of Contents

J1013C INTERCONNECTING BOX–KY28 OPERATION

H-2

When the Juliet 28/KY-28 system is installed in an aircraft, the J-1013/AIC interconnecting (junction) box must be set up for operation as shown in the accompanying photo. Note slide links 3 and 8 are in the "A" position while all the remaining slide links are in the "B" position. If the box is not set up as described here, the KY-28 system will not function properly.

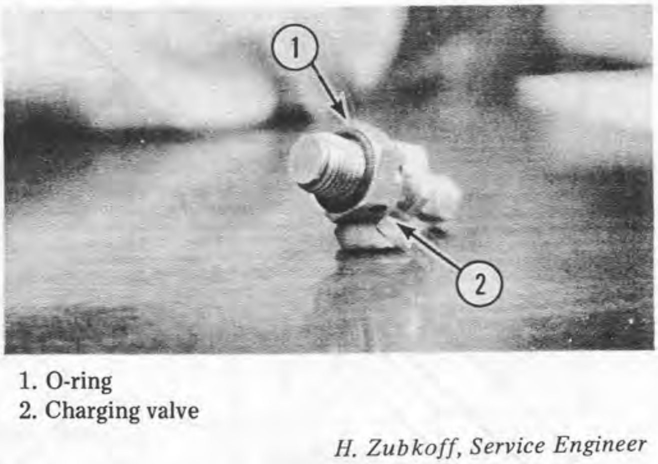
When using dynamic "mikes," be sure to install an inline amplifier, P/N AM3597B/A, FSN RM5831-087-1819FX.



J. Nenichka, Service Engineer

Q. (Applies H-2) What is the part number of the O-ring used on the MS28889-1 tail landing gear charging valve assembly?

A. The part number of the O-ring (1 in the accompanying photo) is MS24690. Leakage at the charging valve can usually be traced to O-ring deterioration. O-ring replacement instead of replacement of the complete valve assembly is possible. The O-ring is normally supplied with the valve as an assembly, but may be ordered separately under Federal Stock Number 9Z5330-079-7381. This information will be incorporated into applicable manuals by future changes.



1. O-ring
2. Charging valve

H. Zubkoff, Service Engineer

SERVICE ENGINEERS: N. L. Hankins, J. M. Nenichka, Avionics; R. J. Trella, Drive/Lube; W. J. Wagemaker, Rotors/Controls/Hydraulics; H. Zubkoff, Engine/Airframe/Fuel/Utilities.

H-2 AIRCRAFT SECURITY-LAND AND SHIPBOARD CONDITIONS

By A. Rita, Chief-Test Operations Engineer

The information presented here reflects the latest requirements for aircraft security under various wind conditions and aircraft locations. The information will be incorporated into applicable manuals by future changes.

SECURITY-LAND-BASED AIRCRAFT

A. Winds from 0 to 25 knots:
aircraft should be placed in the "Parked" configuration.

NOTE

A helicopter is considered Parked when the following conditions are met:

1. Helo facing prevailing wind with main rotor blades at 45-degree position relative to the helo centerline and clear of all obstacles.
2. Main rotor brake set to ON position.
3. Main landing gear brakes set to ON position.
4. Wheel chocks and ground safety pins installed.
5. Tail landing gear locked in fore-and-aft position.

B. Winds expected to be over 25 knots but not exceeding 65 knots:
aircraft should be secured as shown in Illustration 1.

C. Winds expected to exceed 65 knots:
aircraft should be secured as shown in Illustration 2.

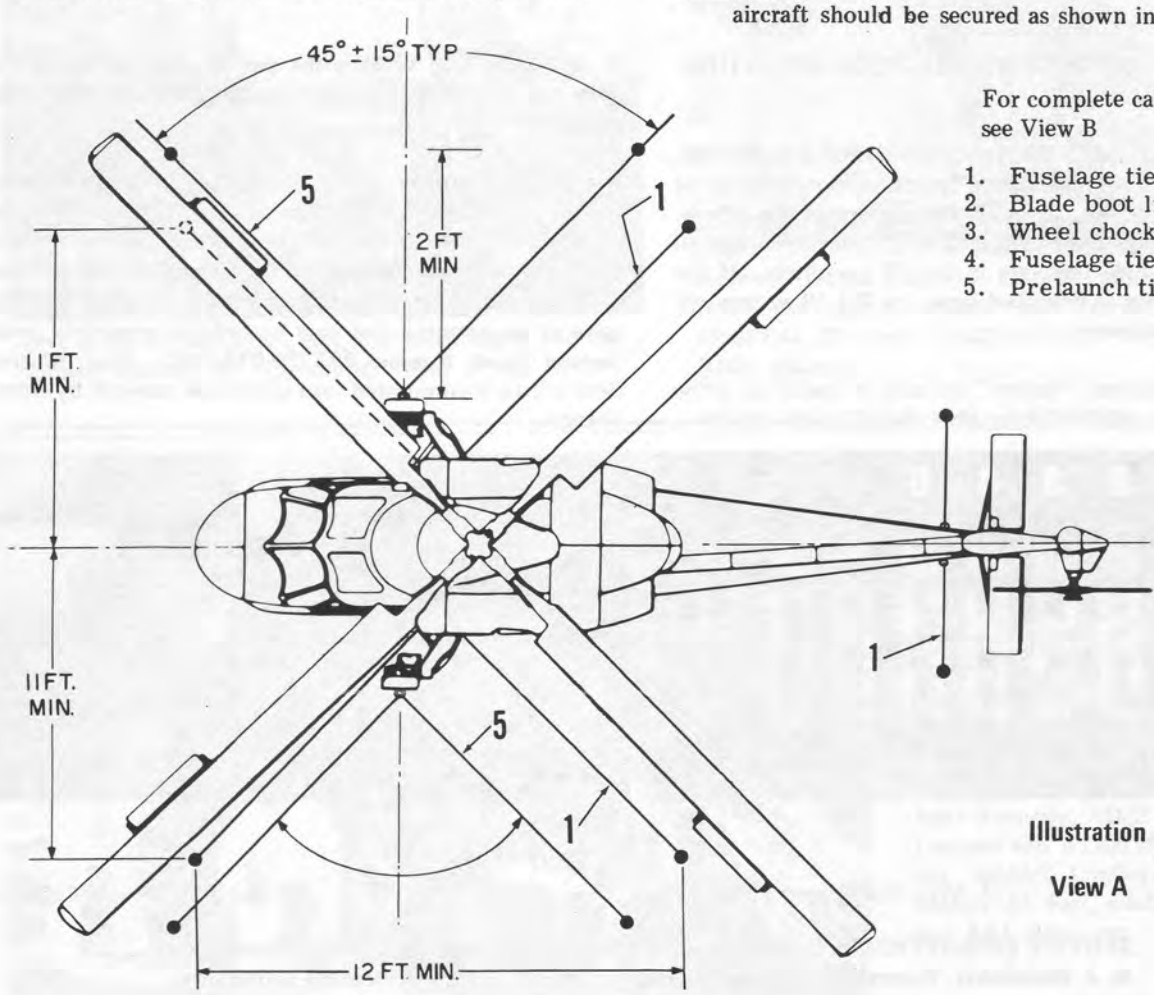
D. Regardless of the wind conditions, if the aircraft is not to be scheduled for flight over an extended period of time:
aircraft should be secured as shown in Illustration 2.

SECURITY-SHIPBOARD AIRCRAFT

A. When at Flight Quarters but launch is not imminent:
aircraft should be secured as shown in Illustration 1.

B. When not at Flight Quarters:
aircraft should be secured as shown in Illustration 2.

C. PRELAUNCH. . .when at Flight Quarters and launch is imminent:
aircraft should be secured as shown in Illustration 3.

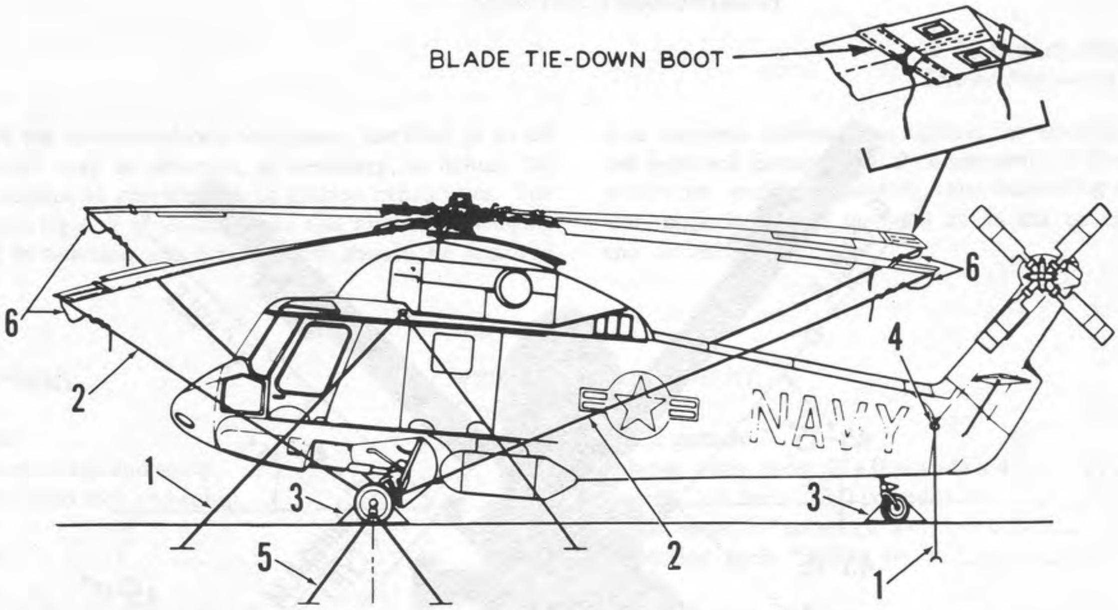


For complete callouts see View B

1. Fuselage tiedown lines
2. Blade boot lines
3. Wheel chocks
4. Fuselage tiedown ring
5. Prelaunch tiedown line

Illustration 1

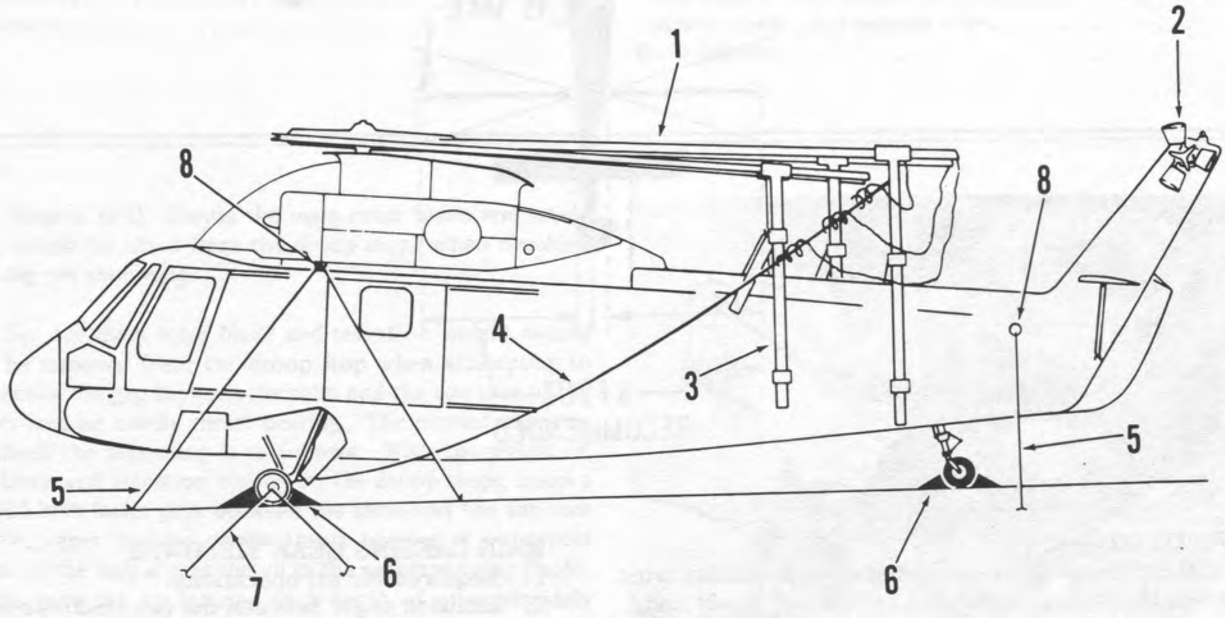
View A



1. Fuselage tiedown lines
2. Blade boot lines
3. Wheel chocks
4. Fuselage tiedown ring
5. Prelaunch tiedown line
6. Blade boot pull line

Illustration 1

View B

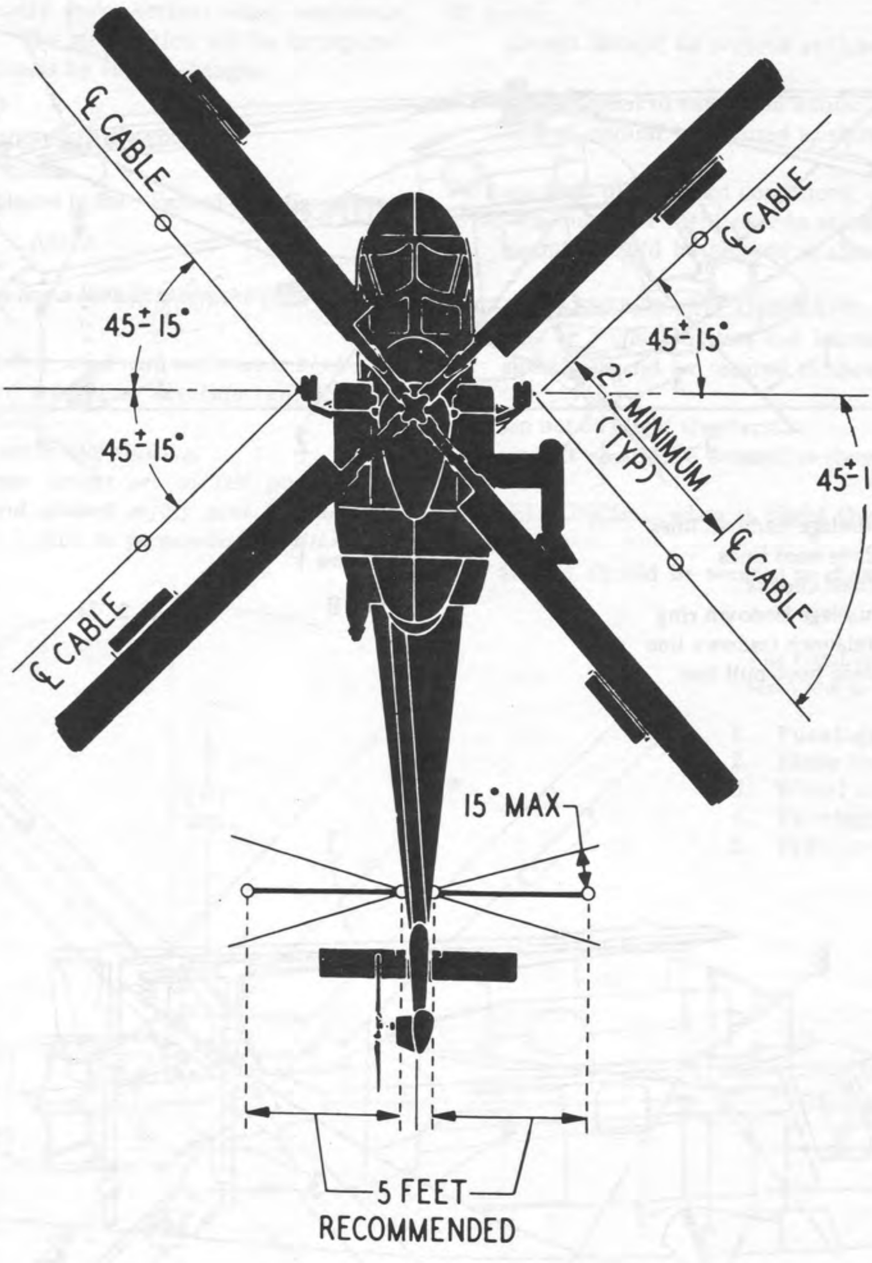


1. Main rotor blades folded
2. Tail rotor blades folded
3. Blade folding retaining assemblies
4. Guide lines
5. Fuselage tiedown lines
6. Wheel chocks
7. Prelaunch tiedown line
8. Fuselage tiedown rings

Illustration 2

CAUTION

Do not rig tiedown lines taut, but do remove slack.



TAIL TIEDOWNS:

Tail tiedowns will be added when the relative wind from the lateral quadrants exceeds 30 knots and/ or the relative wind from the forward and aft quadrants exceeds 45 knots.

MAIN LANDING GEAR TIEDOWNS:

1. Required for all operations.
2. Included angle between the two tiedowns on each main gear should be approximately 90°.
3. Distance between axle tiedown ring and deck attachment is to be at least 2 feet.

Illustration 3

H-2

COMPONENT WEIGHTS

G. M. Legault, Manager, Service Engineering

Much of the mission-related equipment installed in or on H-2 aircraft may be removed, as necessary, to lighten the aircraft and/or to provide various mission capabilities. The accompanying list of components and applicable weights will aid in selecting which equipment should be removed if it becomes necessary to lighten the aircraft. While the list does not include all H-2 components, it does list those which are easily removable, thus facilitating the mission. The large items are included as an aid to cross-decking the aircraft.

COMPONENT	WEIGHT (Pounds)
Avionics	
LN-66 rec/trans and equip.	92.0
mission radio rack and equip.	125.1
Doors	
copilot	22.4
pilot	32.4
Engine, each: 485.0 pounds x 2=	970.0
External stores	
aux tank, empty, each	40.0
MAD bird	40.0
MAD bird support and reel	111.6
MK-46 torpedo	529.0
Fuel	
aux, each	408.0
internal, total	1876.8
Gearboxes	
combining	475.0
tail rotor	66.0

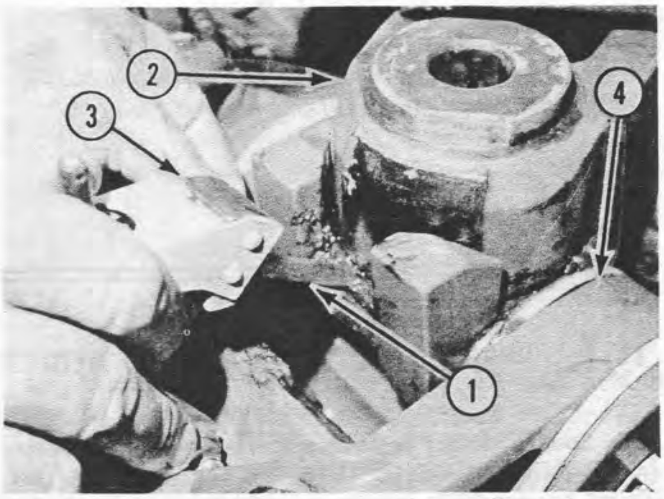
COMPONENT	WEIGHT (Pounds)
Rotor system	
blades, main, each: 174.0 pounds x 4=	696.0
blades, tail, each: 19.0 pounds x 4=	76.0
flaps, each: 5.2 pounds x 4=	20.8
retention, each: 110.0 x 4=	440.0
Seats	
copilot's with cushions	22.0
pilot's with cushions	26.0
sensor operator's, with cushions	38.9
Smoke	
dispenser, each: 13.2 pounds x 2=	26.4
marker, each: 4.0 pounds x 8=	32.0
Sonobuoy launcher	
rack	81.5
tubes with initiators, each: 8.4 pounds x 15=	126.0
Sonobuoys	
active, each: 32.0 pounds x 12=	384.0
passive, each: 18.0 pounds x 3=	54.0
Work platform	21.5

Q. (Applies H-2) Should the main rotor blade and retention weight be lifted from the droop stops when checking lead-lag pin shimming?

A. No, the main rotor blade and retention weight should not be removed from the droop stop when attempting to determine the gap between the shim and the top race of the upper lead-lag needle thrust bearing. The correct sequence to check the shimming is as follows: With the weight of the blade and retention resting on the droop stops, insert a 0.0015-inch feeler gage between the shim and the top race of the upper lead-lag needle thrust bearing at outermost point of the hub arm as shown in the accompanying Photo. If the gage can be inserted to a depth of approximately 1/4-inch, shimming is incorrect and must be replaced.

Correct shimming procedures are contained in NAVAIR 01-260HCA-2-4.2.

W. Wagemaker, Service Engineer



1. Feeler gage
2. Hub
3. Anti-coning stop
4. Retention

H-2 FLIGHT CONTROL SYSTEM–CERAMIC BEARINGS

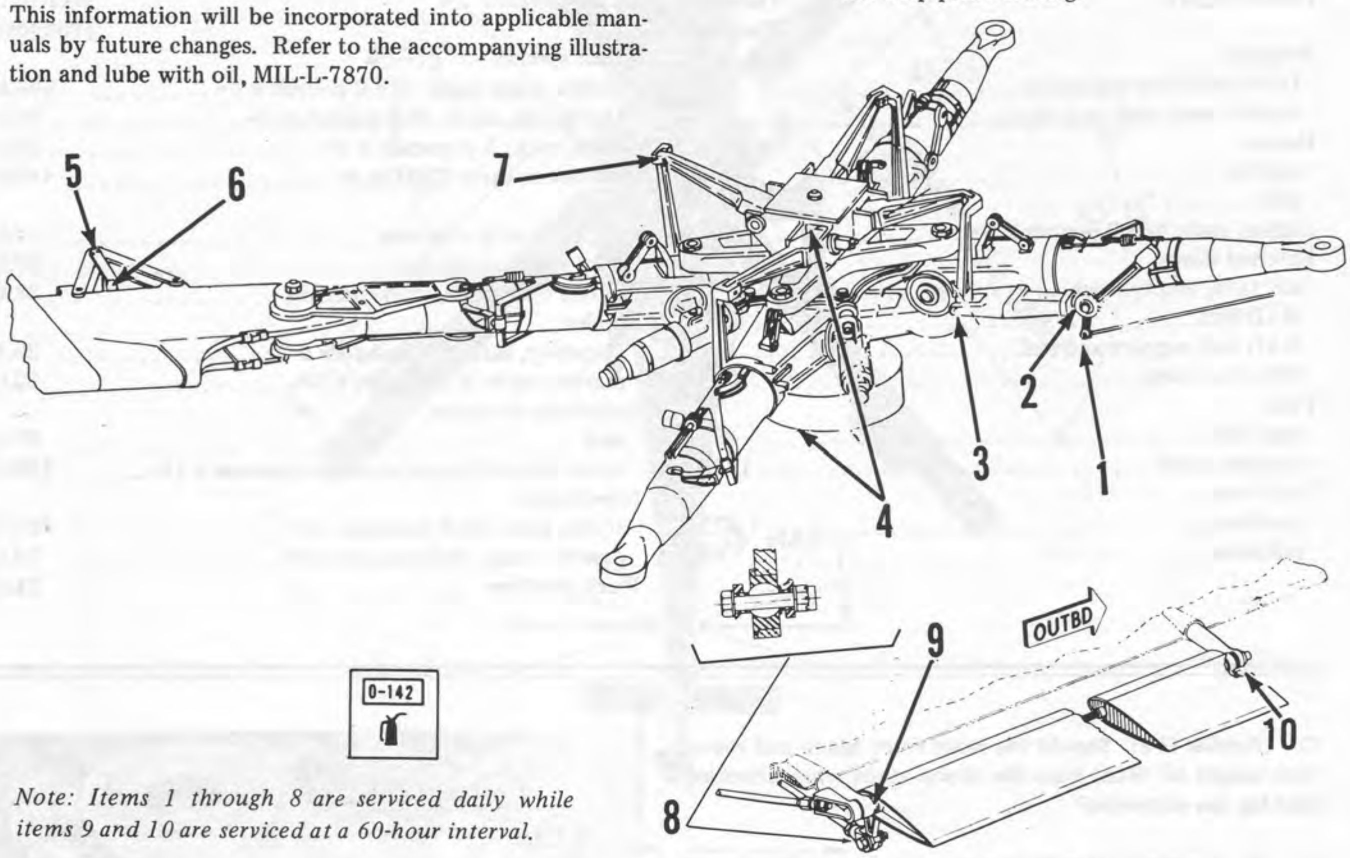
W. Wagemaker, Service Engineer

Kaman experience has shown that the H-2 main rotor performance is greatly enhanced by oiling of ceramic bearings in the rotor flight control system. Kaman has therefore initiated action to remove all no-lube references from affected publications. Also, the words "NO LUBE" will no longer be etched onto rodends containing the ceramic-type bearings.

The white stripe on control components (which indicate that the bolts and nuts must be tightened to a special torque as called out in applicable manuals) will continue to be in effect.

This information will be incorporated into applicable manuals by future changes. Refer to the accompanying illustration and lube with oil, MIL-L-7870.

1. Main rotor control rod
2. Main rotor control crank assy
3. Control connector assembly
4. Rod assy-Azimuth
5. A-Frame-upper bearing
6. A-Frame-lower bearing
7. Pitch control link assembly
8. Flap horn bearing
9. Flap pivot bearings lubed with MIL-L-7870 @60-hour phase period.
10. Flap pivot bearings



Note: Items 1 through 8 are serviced daily while items 9 and 10 are serviced at a 60-hour interval.

H-2 CHARGED COOL GAS GENERATOR WEIGHT

The Special 231-day Inspection Maintenance Requirements Cards (MRC), NAVAIR 01-260HCB-6-3, 15 March 1973 (Card number 32.2), requires a weight check of the UH-2C/HH-2D flotation installation cool gas generator. A "go-no-go" serviceability determination can be applied using the minimum weight of an RFI (ready for installation) cool gas generator (24.5 lbs).

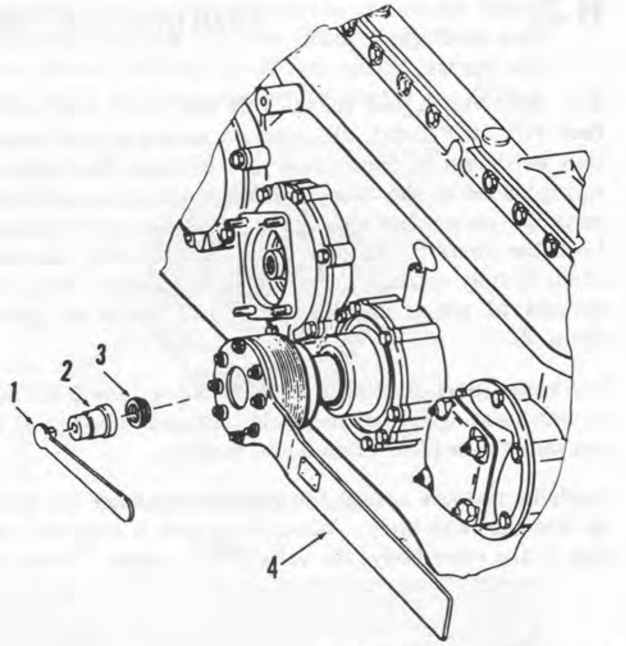
The 24.5 pound figure is established by adding the MINIMUM weights of the basic container, the propellant, the ignitor, the alcohol, and the CO_2 charge.

H. Zubkoff, Service Engineer

TECHNICAL SECTION

Q. (Applies H-2) To what torque should the main driveshaft coupling hub retaining nuts (both ends) be tightened?

A. The main driveshaft coupling retaining nut should be tightened to 200-240 pound-feet. A recent authorized change has uprated the torque callout in NAVAIR 01-260 HCA-2-4.1, dated 1 July 1971, changed 15 July 1972, paragraph 4-22, steps d and g from 80-120 to 200-240 pound-feet. The new, higher torque requirement will ensure adequate clamp-up loads during driveshaft installation. (Inadequate torque would allow spacer movement inside of combining gearbox resulting in galling and subsequent contamination of the oil system.) Be sure to use the tools called out in the accompanying illustration.



1. Standard 3/4-drive torque wrench
2. K604351-101 socket
3. Nut, K674455-11
4. Holding plate, K604356-3

R. J. Trella, Service Engineer

H-2 EXPLOSIVE CARTRIDGES

H. Zubkoff, Service Engineer

The following list encompasses all of the explosive cartridges used on H-2 aircraft. The fire extinguisher cartridge, which was previously procured as an assembly with the container, may now be obtained separately using the number listed below. This information will be incorporated into applicable manuals by future changes.

1. Fire Extinguisher Container (All H-2's)
   Cartridge, P/N 13083-5;
   FSN 9C 1377-930-9390.
   Service Life - 12 months.
2. Flotation System (UH/HH)
   (a) Propellant, grain, general purpose,
   P/N 2518493 (supercedes P/N 842077);
   FSN 1377-910-6097.
   Service Life - 30 months.
   (b) Ignitor, MK22-MOD O, P/N 2518291;
   FSN 1377-690-1456.
   Service Life - 30 months.
   (c) Bolt cutter squib (Fairing),
   MK 23-MOD O, P/N 491837;
   FSN 1377-632-8714.
   Service Life - 12 months.
3. Rescue Hoist Cable Cutter Squib (All H-2's)
   MK 23-MOD O, P/N 491837;
   FSN 1377-632-8714.
   Service Life - 12 months.
4. MAD Gear Cable Cutter Squib (SH's)
   MK 23-MOD O, P/N 491837;
   FSN 1377-632-8714.
   Service Life - 12 months.

H-2 KAMAN FOREST PENETRATOR AND FLOAT

The following information is presented in response to several inquiries from Fleet personnel as how to order the Kaman Forest Penetrator and Float assemblies.

The Forest Penetrator and Float assemblies may be ordered using the following numbers:

Forest Penetrator Rescue Seat, P/N K26-1000-9; FSN RH4240-199-7353.
Flotation Collar,P/N K26-1017-1;FSN RM4240-936-2795DH.

For operation and maintenance, with a complete parts list, refer to T.O. 14S6-3-1, 15 July 1970, Changed 10 January 1972.

H. Zubkoff, Service Engineer

Q. (Applies H-2) What is the engage-disengage RPM of the tail rotor flapping locks?

A. Tail rotor flapping locks disengage at 58 percent with increasing rotor RPM and re-engage at 44 percent RPM with decreasing rotor RPM.

W. J. Wagemaker, Service Engineer

H-2 AUXILIARY FUEL TANK, FUEL AND AIR DROP VALVES

H. Zubkoff, Service Engineer

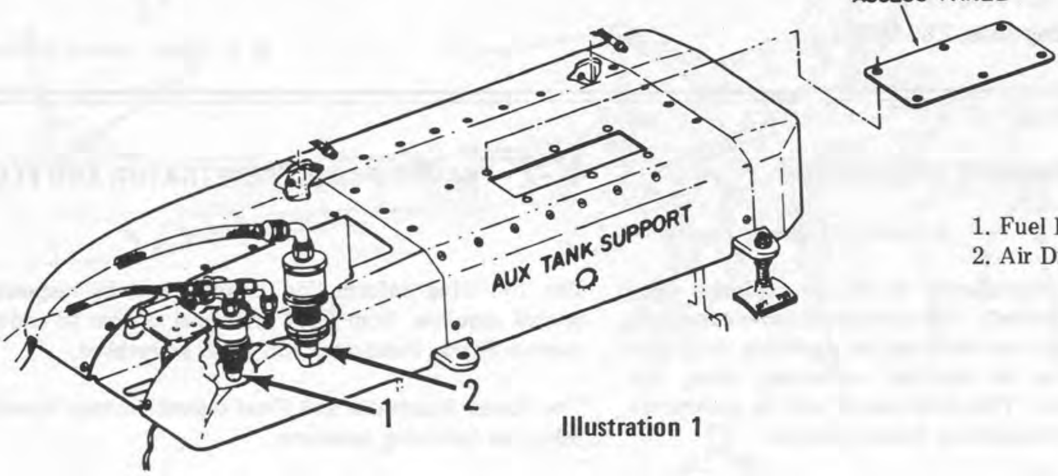
Two drop valves, one for air, P/N 6DC100-1, and one for fuel, P/N 10DC100-1, are used on each aux tank installation as shown in Illustration 1. Because the valves are spring-loaded to the closed (extended) position, they automatically close when an aux tank is jettisoned or removed from the aircraft. Photo A shows a valve with the piston (item 1) fully extended to the closed position. Notice the amount of piston showing above and below the groove (item 2).

The valves function alike in that the ball-end (item 3, Photo A) must seat against a receptacle located in the top of the aux tank as the tank is raised into position.

Applying pressure against the ball-end will force the piston up into the valve body. When the groove is even with the end of the valve body, the valve is fully open. Therefore, with the aux tank installed and the ball-end seated properly, the groove should just be visible or out of sight, otherwise the system will not function properly.

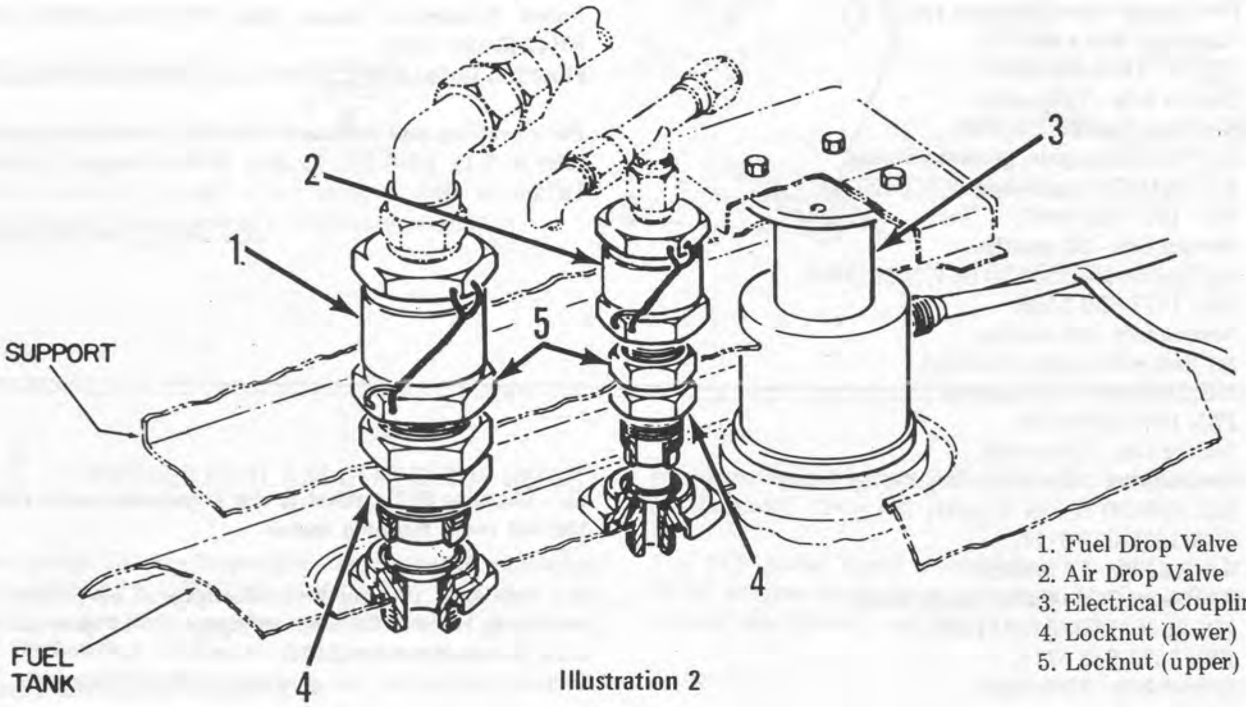
Illustration 2 shows a cutaway view of the valves installed on the aux tank support. Locknuts 4 and 5 are used to lower or raise a valve to achieve correct positioning of the ball-end in the receptacle and the groove in the valve body.

Prior to aux tank installation, inspect the ball-end for nicks or scoring. The ball-end has a special, hard-coat finish and if found damaged, the valve must be replaced. Check the piston for freedom of movement. Push the piston completely up into the valve body by hand. If no binding exists, the piston will return to the extended position as soon as the pressure is removed. In the event binding does exist, remove the valve from the support and check the piston for



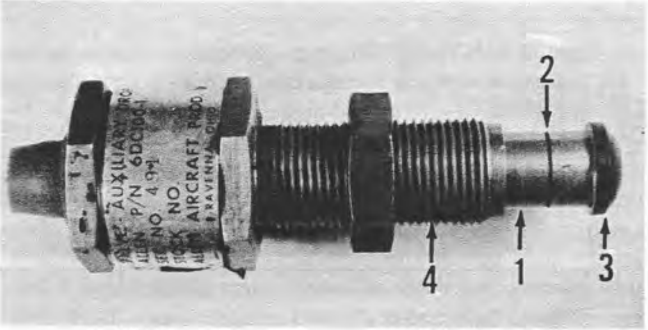
1. Fuel Drop Valve
2. Air Drop Valve

Illustration 1



1. Fuel Drop Valve
2. Air Drop Valve
3. Electrical Coupling
4. Locknut (lower)
5. Locknut (upper)

Illustration 2



1. Piston
2. Groove
3. Ball-end
4. Valve Body

Photo A

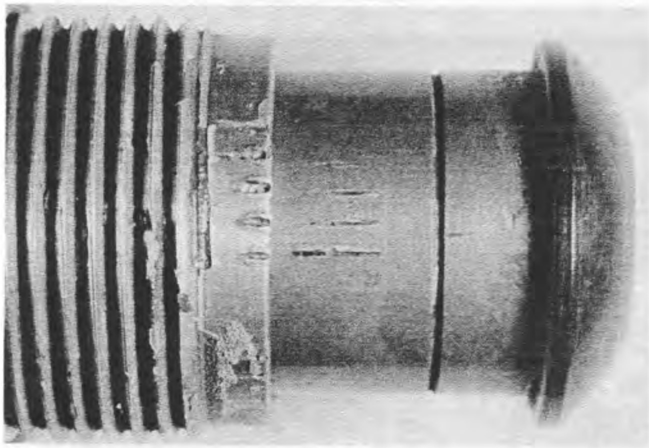


Photo B

gouges or burrs. Light scratches or burrs may be blended out; deep penetration necessitates valve replacement. In cases where the cause of binding is not apparent, wipe the piston clean and apply a light coating of general purpose lubricating oil or jet fuel. Work the piston in and out of the valve body several times while rotating it to distribute the lubricating agent. If binding persists, replace the valve.

The valve piston shown in Photo B is an example of what NOT to do. After an aux tank had been installed, fuel leakage occurred at the point of contact between the ball-end and the aux tank receptacle. The mech correctly determined that the cause was improper seating due to piston hang-up or binding within the valve body. Instead of removing and cleaning the valve, a pair of water pump pliers was employed in an attempt to pull the piston out of the valve and down into the receptacle! The sought after tight seal was never attained—instead, the valve had to be replaced.

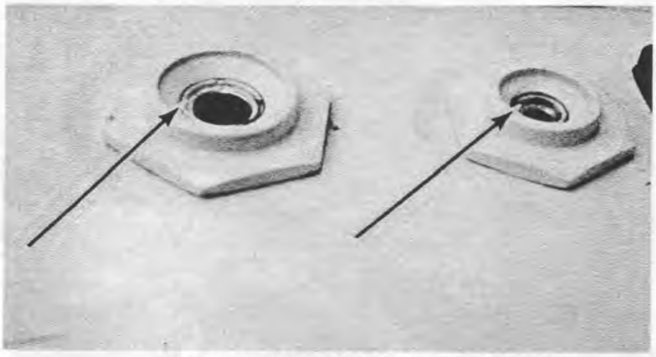
The drop valves mate against fuel and air fittings (P/N K679185-7 and -5, respectively) installed in the aux tanks. The condition of these fittings is as important as the condition of the drop valves. Photo C shows the -7 fuel fitting. (The -5 air fitting is similar except the air hole has a smaller diameter.)

Note that the sleeve in the center of the fitting extends above the O-ring seal approximately 0.25-inch. When properly aligned, the drop valve fits over the sleeve allowing the valve ball end to contact the fitting O-ring, thus providing a leak and fume proof seal.

Mis-aligned drop valves may contact the end of the fitting sleeve and force it down into the fitting body flush with the seal as shown in Photo D. If this occurs, leakage will be evident and it will be necessary to change the fitting.

Sleeve protrudes 0.25-inch

Photo C



Incorrect sleeves do not protrude

Photo D

A change to Kaman Drawing K686703 provides mechanics with a reminder to check the fuel and air drop valves prior to installing the aux tank. The stencil, shown in Photo E replaces the previously authorized "AUX TANK SUPPORT" stencil. Fleet Activities may apply the stencil (1/4-inch letters) at their descretion. For further information concerning the drop valves and the aux tank, refer to NAVAIR 01-260HCA-2-4.

Photo E

TECHNICAL SECTION

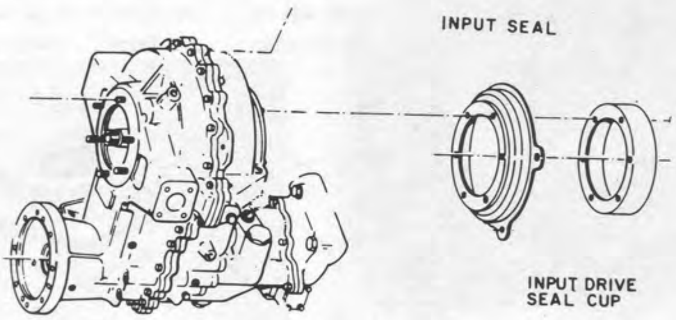
Q. (Applies H-2) To what torque should the speed decreaser gearbox/Zurn coupling input seal nuts be tightened?

A. The 6 nuts which attach the input seal and the seal cup to the speed decreaser gearbox (SDG) at the output shaft coupling hub, shown in the accompanying illustration, should be tightened to 80-100 pound-inches torque (It was formerly 120-143 pound-inches). The reduced torque will preclude damage to the seal cup from overtorque while still maintaining proper security of the seal. Figure 5-13 and Paragraph 5-20, Step e, of NAVAIR 01-260HCA-2-4, Dated 1 October 1967, changed 30 November 1971, will be changed to reflect this torque requirement and add the following procedure:

Tighten nuts evenly till snug. Torque in a cross-tightening sequence, in small increments, until all 6 nuts are evenly torqued to 80-100 pound-inches.

CAUTION

Do not initially tighten any single nut directly to full torque as this will distort the seal cup, allowing air leakage which will cause oil seepage from the combining gearbox (CGB) into the speed decreaser gearbox (SDG).



H. Zubkoff, Service Engineer

HH/UH

TAIL ROTOR BLADE RIGGING PROTRACTOR

W. Wagemaker, Service Engineer

Fleet activities which have not modified the K604403 tail rotor blade rigging protractor should do so as soon as possible to provide clearance between the tail rotor blade pitch arm and the support which rests on the tail rotor blade grip. The Photo shows a modified protractor installed on a tail rotor blade grip. The controls have been placed in the full left position and the close proximity of the inboard leg of the support and the pitch arm can be seen (Arrow). The accompanying illustration lists the dimensions necessary to accomplish the modification.

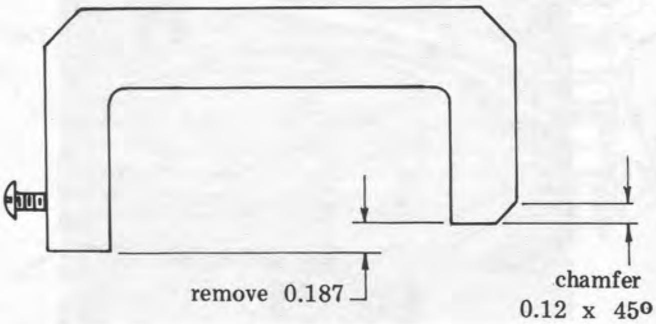


Illustration 1

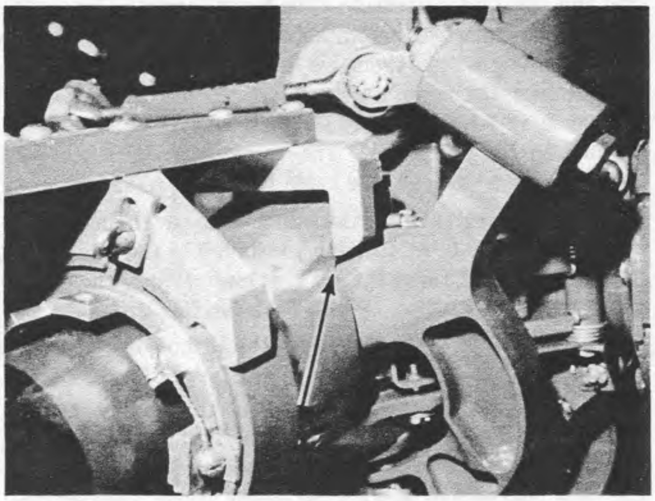


Photo A

H-2

ENGINE MOUNT PADS BOLT HOLES

H. Zubkoff, Service Engineer

The GE T58-8B/F engine has three forward engine mount pads. When installed on H-2 aircraft, only the inboard pad is utilized thus leaving the top and outboard pads unused and exposed as shown in Photo A. Each pad contains four bolt holes which extend through the engine front frame, resulting in eight 5/16-inch diameter holes in the engine inlet directly forward of the inlet guide vanes.

To prevent small objects such as cotter pins and safety wire from falling through these holes and being ingested into the engine, and to eliminate air burbling caused by the holes, it is necessary to install bolts as seen in the closeup Photo B. Use AN5CH4A bolts with one washer, AN960C516 under the head, and install in the top and outboard mounting pad bolt holes (total of eight bolts and washers). Be sure to lockwire the bolts. This information will be incorporated into applicable manuals by future changes.

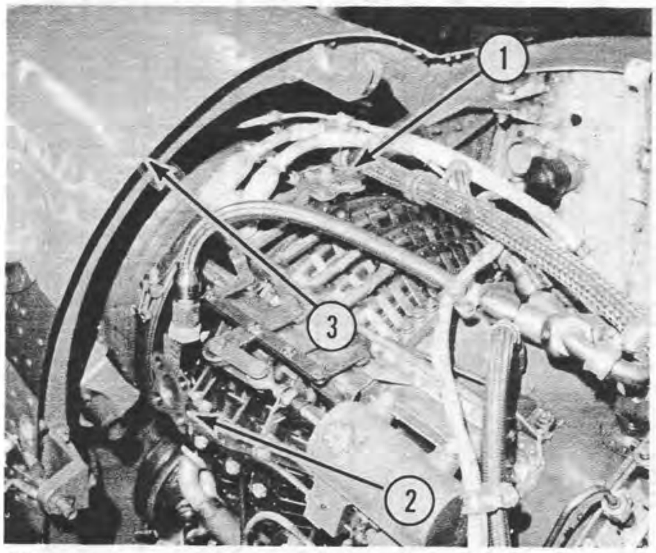


Photo A
1. Top mounting pad
2. Outboard mounting pad
3. Engine nose cowl

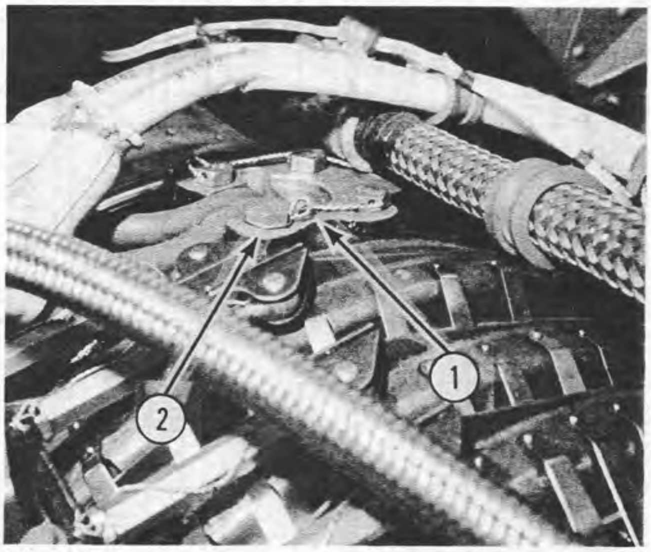


Photo B
1. Top mounting pad
2. Bolt, washer with lockwire

H-2

MAIN GEARBOX ROTOR SHAFT AXIAL PLAY

R. Trella, Service Engineer

In the event aircraft ground bounce occurs after gearbox replacement, it is suggested that the main gearbox rotor shaft be checked for excessive axial play.

a. Install the aircraft hoisting sling assembly, P/N K604010, on the main rotor hub in accordance with NAVAIR 01-260HCA-2-1.

b. Install a dial indicator assembly onto the rib of the main gearbox upper housing. Place the dial indicator plunger against the lower portion of any arm of the rotor hub, as far inboard as possible and zero the indicator.

c. Use a 7-ton rated hoist and apply lifting force to the sling. Raise the aircraft slowly until partial extension of the main landing gear liquid spring is observed. Stop lifting force and record dial indicator reading.

NOTE

It is not necessary to lift the aircraft clear of the deck during this check.

d. Slowly lower the aircraft to the static ground position (with full weight of aircraft on landing gear).

e. Repeat steps c and d for three cycles and determine the average reading of the dial indicator.

f. An average dial indicator reading greater than 0.007 inch necessitates sending the gearbox to an Overhaul facility.

This information will be incorporated into applicable manuals by future changes.

H-2 AVIONICS SYSTEM APPLICABILITY

The following information is presented in response to Fleet inquiries. The listing identifies major, avionics-related systems installed on H-2 aircraft. Due to varying mission requirements, any given aircraft may not have all of the system's components installed but all aircraft do have the capability to utilize the systems listed.

N. Hankins, Service Engineer

	NOMENCLATURE	ABBREVIATION	UH-2C/HH-2D	SH-2D/F	REMARKS
1	Interphone system	ICS	AN/AIC-14	AN/AIC-14	
2	Radar altimeter	RAD ALT	AN/APN-117	AN/APN-171	
3	Compass system	-----	MA-1	See remarks	SH2D has AN/ASN-73; 2F has AN/ASN-50.
4	Navigational computer	NAV COMPUTER	AN/ASA-13	AN/AYK-2	---------
5	Identify, friend or foe; Selective identification feature	IFF/SIF	AN/APX-6 and AN/APA-89	See item 6	---------
6	Airtraffic control radar beacon system; Identification, friend or foe; Mark XII identification system; Systems	AIMS	See remarks	AN/APX-72	Aircraft with AFC 190 installed.
7	Doppler radar	DOPPLER	AN/APN-130 See remarks	AN/APN-182	APN-182 installed on aircraft with AFC 179.
8	Search radar	-----	N/A	LN-66HP	North Stab and other improvements per AFC 204.
9	Ultra high frequency radio	UHF	AN/ARC-52	AN-ARC-159 See remarks	SH aircraft have two units installed.
10	Ultra high frequency automatic direction finder	UHF/ADF	ARA-25	ARA-25	---------
11	Secure speech system	-----	See remarks	KY-28	Installed by AFC 152 (Juliet 28).
12	High frequency radio	HF	AN/ARC-39	See item 9	---------
13	Low frequency automatic direction	LF/ADF	AN/ARN-59	See item 10	---------

	NOMENCLATURE	ABBREVIATION	UH-2C/HH-2D	SH-2D/F	REMARKS
14	Tactical air navigation	TACAN	See remarks	AN/ARN-52	Aircraft will have either AN/ARN-21 or -52.
15	Plotting board	-----	PT/429/A	PT/429/A	---------
16	Radar altimeter warning system	RAWS	AN/APQ-107	AN/APQ-107	---------
17	Electronic countermeasure system	DECOY	See remarks	N/A	Installed by AFC 157.
18	Electronic support measures	ESM	N/A	ALR-54	---------
19	Magnetic anomaly detector	MAD	N/A	AN/ASQ-81	---------
20	Magnetic anomaly detector recorder	MAD recorder	N/A	RO-32	---------
21	Data link	-----	N/A	AN/AKT-22	---------
22	On top position indicator	OTPI	N/A	R-1047A/A	---------
23	Sonobuoy receiver	-----	N/A	AN/ARR-52	---------
24	Sonobuoy recorder group	-----	N/A	AN/ASA-26	---------
25	Smoke launcher	-----	N/A	K682780	---------
26	Sonobuoy launcher	-----	N/A	K682770	---------
27	Torpedo provisions	-----	N/A	MK-46/44	---------
28	Loud hailer	-----	Yes	N/A	---------

Q. (Applies H-2) Is there a convenient source of 115VAC and 28 VDC power located in the helicopter for utility purposes?

A. The cabin overhead test receptacle will provide 115 VAC. A simple, all-purpose harness can be made by using a PT06SE14-5P connector and No 20 gage wire. If an AC current greater than 1 ampere is anticipated, TEMPORARILY replace the existing 1 ampere fuses with up to 5 ampere fuses during use. Fuses with ratings greater than 5 amperes should not be used. MAKE CERTAIN that the 1 ampere fuses are returned to their places after the test is completed. A utility receptacle rated at 28 VDC, 20 amps, is also available on the test panel.

H-2 INSTRUMENT PANEL LIGHTING SYSTEM

N. Hankins, Service Engineer

Modification of the instrument panel lights wiring was authorized by AFC 188. Incorporation of this change will increase the safety of night operations by precluding the loss of both pilot's and copilot's instrument lighting due to the failure of one circuit breaker. As can be seen in the accompanying schematic, AFC 188 modification consists of removing the pilot's instrument lights from the instrument light circuit and connecting them to the floodlight circuit through a change in the panel wiring.

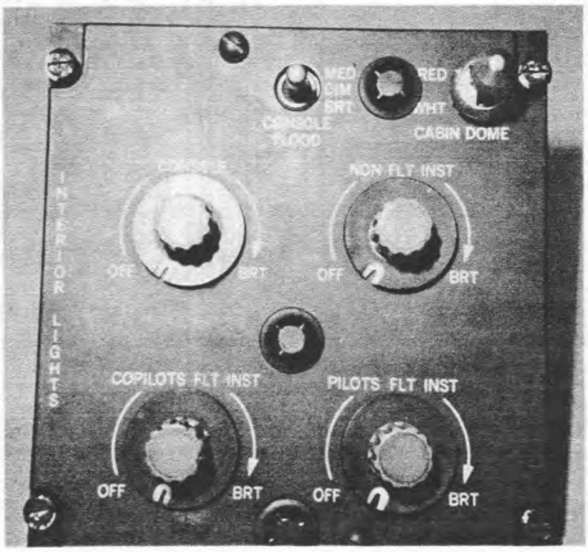
The existing cockpit floodlight circuit breaker (3-AMP) on the main circuit breaker panel is replaced by a 5-amp circuit breaker and re-identified as the cockpit flood and pilot's instruments.

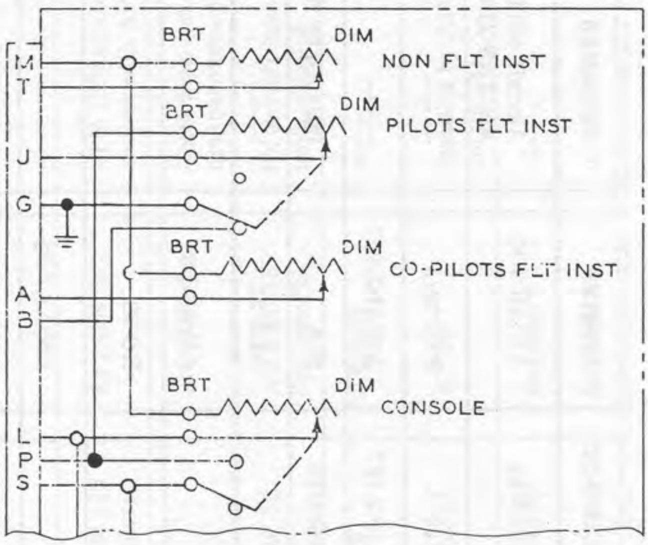
When replacing the interior light panel (shown in the photo), care should be exercised to insure the part number is correct for the aircraft application. If an unmodified panel were installed in an aircraft with AFC 188 incorporated, it would overload the instrument light circuit breaker and could cause the loss of all instrument panel lights.

Before AFC 188, Install Interior Light Panel, P/N C220, FSN RH1560-807-3640BH.

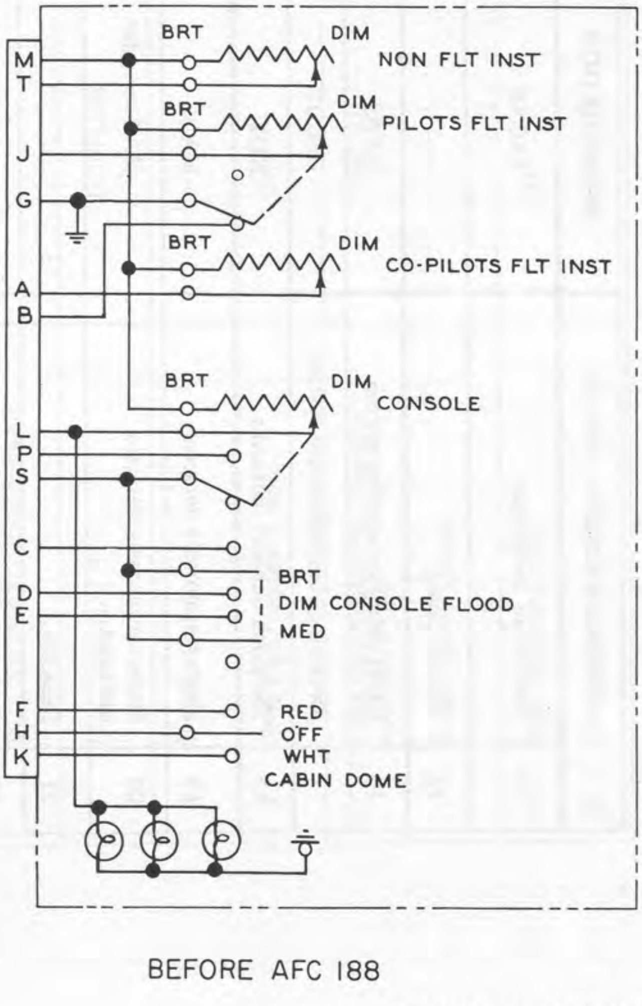
After AFC 188, Install Interior Light Panel, P/N 71766-1, FSN RH1680-169-0736BH.

This information will be incorporated into applicable manuals by future changes.





AFTER AFC 188



BEFORE AFC 188

DRIVE SYSTEM COMPONENT APPLICABILITY

The H-2 has gone through several growth phases since its introduction. Due to this growth, several combinations of component use, Time Between Overhaul (TBO), and model application have developed. The following list details these components and the applicability of each. (Be sure to check the notes identified by A, B, and C.)

R. J. Trella, Service Engineer

Main Gearbox Assembly	TBO Interval	A/C Model Application	Remarks
K674877-1	360	UH-2C	Basic Configuration.
K674877-3	360	UH-2C	AFC 194, Part II (Azimuth Lugs).
K671802-1	2000(A,B,C)	UH-2C/HH-2D/SH-2D	Basic Configuration.
K671802-3	2000(B,C)	UH-2C/HH-2D/SH-2D	AFC 189 (New Rotor Shaft).
K671802-5	2000(B,C)	UH-2C/HH-2D/SH-2D	AFC 189, AFC 194 (Azimuth Lugs).
K671802-105	2000(B,C)	UH-2C/HH-2D/SH-2D	AFC 189, AFC 194, AFC 198, Part II (Flex Lube Lines).
K671802-7	2000(B,C)	SH-2F	AFC 189, AFC 194, AFC 181 (Tail Rotor Drive Ratio Change).
K671802-107	2000(B,C)	SH-2F	AFC 189, AFC 194, AFC 181, AFC 198, Part II, (Flex Lube Line).
Main Gearbox Lube Oil Pump Assembly			
GD318-1	360	UH-2C	Basic Configuration-Use with K674877 Gearbox.
GD318-2	2000(B)	All H-2 Aircraft	AFC 170, Part II (New Drive Shaft).
Combining Gearbox Assembly			
K674702-3	750	UH-2C/HH-2D/SH-2D	Basic Configuration.
K674702-5	2000(B)	All H-2 Aircraft	AFC 199, Part II (Internal Improvements), Part IV(Oil Cooler Blower Drive Spline Adapter), Part V (No. 1 Gen RPM Drive Ratio Change).
Combining Gearbox Lube Oil Pump Assembly			
K674708-13	750	All H-2 Aircraft	Basic Configuration.
K674708-15	750	All H-2 Aircraft	AFC 199, Part I, Paragraph I. (Internal Lube).
K674708-17	2000(B)	All H-2 Aircraft	AFC 199, Part I, Paragraph II. (New Drive Shaft).
Intermediate Gearbox Assembly			
K671402-1	2000(B)	All H-2 Aircraft	Basic Configuration.
Tail Rotor Gearbox Assembly			
K671302-3	2000(B)	UH-2C	Basic Configuration (3 Blades).
K671302-5	2000(B)	UH-2C	AFC 133 (Positive Spline Index).
K671652-1	2000(B)	HH-2D/SH-2D/SH-2F	AFC 170 (4 Blades).
K671652-3	2000(B)	HH-2D/SH-2D/SH-2F	AFC 219 (Rocking Pin Liners).
Resolver Gearbox Assembly			
K674826-5	2000(B)	All H-2 Aircraft	Basic Configuration.
K674826-7	2000(B)	All H-2 Aircraft	Basic Configuration-In Production Change-New Housing.

NOTES: (A) — 1250 Hour removal interval for main rotor shaft. (Reference AFC 189).
(B) — Provisional TBO contingent upon analytical evaluation being accomplished at 1,000 and 1,500 hours.
(C) — Main gearbox cover rated for a 600-hour life.

PUBLICATION INFORMATION

This list reflects latest manual changes and technical directives released to the field.

R. H. Chapdelaine, Manager, Service Publications

NAVAIR 01-260HCA-2-1 — Manual, Maintenance Instructions, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters, GENERAL INFORMATION
15 February 1972
changed 1 April 1973

NAVAIR 01-260HCA-2-2 — Manual, Maintenance Instructions, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters, AIRFRAME
30 November 1971
changed 1 April 1973

NAVAIR 01-260HCA-2-3 — Manual, Maintenance Instructions, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters, EQUIPMENT (FURNISHINGS, HYDRAULICS, UTILITIES)
1 March 1972
changed 1 April 1973

NAVAIR 01-260HCA-2-4 — Manual, Maintenance Instructions, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters, POWER PLANTS AND RELATED SYSTEMS
1 October 1967
changed 1 April 1973

NAVAIR 01-260HCA-2-4.1 — Manual, Maintenance Instructions, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters, TRANSMISSION SYSTEM
1 July 1971
changed 1 April 1973

NAVAIR 01-260HCA-2-4.2 — Manual, Maintenance Instructions, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters, ROTORS
1 April 1973

NAVAIR 01-260HCA-2-5 — Manual, Maintenance Instructions, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters, AUTOMATIC STABILIZATION EQUIPMENT
1 April 1973

NAVAIR 01-260HCA-2-6 — Manual, Maintenance Instructions, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters, ELECTRICAL SYSTEM
1 March 1972
changed 1 April 1973

NAVAIR 01-260HCA-N2 — Technical Manual, CROSS SERVICING SCHEDULE, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters
15 August 1972
changed 15 August 1973

NAVAIR 01-260HCB-4-3 — Illustrated Parts Breakdown, FLIGHT CONTROLS, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters
1 June 1967
changed 1 April 1973

NAVAIR 01-260HCB-4-4 — Illustrated Parts Breakdown, EQUIPMENT (FURNISHINGS, HYDRAULICS, INSTRUMENTS, UTILITIES) Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters
1 May 1969
changed 1 April 1973

NAVAIR 01-260HCB-4-5 — Illustrated Parts Breakdown, POWER PLANT AND RELATED SYSTEMS, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters
1 May 1969
changed 1 April 1973

NAVAIR 01-260HCB-4-6 — Illustrated Parts Breakdown, TRANSMISSION SYSTEM, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters
1 June 1967
changed 1 April 1973

NAVAIR 01-260HCB-4-7 — Illustrated Parts Breakdown, ROTORS, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters
1 April 1973

NAVAIR 01-260HCB-4-8 — Illustrated Parts Breakdown, RADIO AND ELECTRICAL, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters
1 June 1967
changed 1 April 1973

NAVAIR 01-260HCB-4-9 — Illustrated Parts Breakdown, SPECIAL SUPPORT EQUIPMENT, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters
1 June 1967
changed 1 April 1973

NAVAIR 01-260HCD-1 — NATOPS FLIGHT MANUAL, Navy Models SH-2D/SH-2F Helicopters
1 September 1972
changed 1 July 1973

NAVAIR 01-260HCD-1C —NATOPS AIRCREWMAN'S POCKET CHECKLIST, SH-2D/SH-2F Helicopters
1 September 1972
changed 1 July 1973

NAVAIR 17-15KL-1 - Manual, Operation and Service Instructions with Illustrated Parts Breakdown, AMPLIFIER BENCH TEST SET, P/N K604603-9, -6
15 November 1965
changed 15 July 1973

NAVAIR 17-15KL-24 — Manual, Operation, Service and Overhaul Instructions with Illustrated Parts Breakdown, ASE AMPLIFIER MODULE TEST SET, P/N K604669-1, -3
15 July 1973

As reported on page 4, while move was underway other operations continued without interruption. Above, maintenance personnel prepare an H-2 for deployment. At right, H-2's are brought in from the line and precision parked. In other photo, SN Wendy Winquist, who is working toward becoming a plane captain, checks a fuel sample she just drew from an H-2. At right is ATAN Sue E. Batterson.

AX1 J. F. Hanig and Lt Hank Lewandowski, Quality Assurance Officer, pause during their task of sorting and arranging the three and one half tons of technical publications, current changes and similar material moved from Lakehurst. Twenty-one detachments receive such technical information from this office. Both Petty Officer Hanig and Lieutenant Lewandowski are now attached to HSL-32.

In new office at NAS Norfolk, Cdr Charles E. Myers, left, commanding officer, and Cdr William C. Powell, executive officer of HSL-30 at the time of the move, try out new location for squadron insignia. Commander Myers is now serving with Helicopter Sea Control Wing as the Readiness Officer. Commander Powell is C. O. of HSL-32.

KAC Service Representatives, from left, Ed Noe, John Leavitt and Jack King, watch as squadron painters stencil sign on parking space at new quarters.

HSL-30 personnel were awarded Letters of Commendation by Cdr D. R. Bilicki, HSL-30 skipper, for their hard work in moving the squadron to Norfolk from Lakehurst. With little or no working equipment and in intense heat, they worked around the clock in order to ready the hangar spaces in time for the squadron's arrival at Norfolk in June and July. They are, left to right, ADJC D. C. Green, ASE3 B. J. Hampton, AA L. M. Milone, AA J. Jones, AT1 V. J. Turosky, AA A. H. Wieman and ADJC R. E. Wiese.

MEDEVAC Briefing By Pensacola SAR Unit

Story by Lt(jg) Dick Brown

Photo by PHAN L. Randall

Petty Officer Second Class Wolfe, a rescue aircrewman, explains the characteristics of the H-2 to hospital representatives while Petty Officer Third Class Smith looks on. (USN photo)

NAS PENSACOLA, Fla.—With the hurricane season at its height, and "Delia" churning up the Gulf of Mexico, the Pensacola Search and Rescue Detachment hosted a "Helicopter Medevac Indoctrination" meeting. Representatives of Sacred Heart, Baptist, and University Hospitals were on hand for the briefing which included a flight demonstration and walk around of the UH-2C helicopter.

LCdr Lee F. Wright, Officer-in-Charge of the SAR Detachment, welcomed the visitors aboard with an overview of the Detachment's mission. He stressed the importance of coordinating the efforts of every medical facility in the area in order to facilitate an efficient relief effort in the event of a large community disaster or any other local emergency. The purpose of the program, he explained, was to familiarize area hospitals with the procedures necessary to ensure maximum air-ground coordination in the event of a medevac.

The presentation included a demonstration and explanation of ground handling signals as well as a discussion of considerations for helicopter operations in the vicinity of community hospitals. Special emphasis was placed on the safety precautions all personnel associated with helicopters must observe.

HM3 Barratt Sturtevant, a rescue aircrewman and corpsman who flies with the Pensacola SAR Detachment, extensively briefed the hospital representatives on the type and degree of medical care a survivor could receive in the helicopter enroute to the hospital. His presentation included an explanation of the medical supplies and types of litters carried in the H-2 helicopters.

The morning-long program gave the hospital representatives a good look at helicopter medevacs. They had a chance to see what the evolution was like from the helicopter crew's standpoint, and an opportunity to express considerations from the hospital's point of view. The result was a mutual understanding of helicopter medical evacuations—a basis for a civilian-military effort to provide the Pensacola area with a safe and effective medevac capability should the need ever arise.

H-2 crews from the Pensacola SAR Det also fly plane guard for the USS Lexington as well as carrying out Medevac missions and providing other services for the Naval Air Station and civilian communities in the area.

Shown is the UH-2C utilized by Lt John P. Harris and his crew to rescue a pilot who ejected when his A-4 plunged into the sea after being catapulted from the carrier's deck. Seconds later the H-2 was over the downed airman, who was tangled in his parachute. AMS3 John W. Singer, second crewman aboard the H-2, went into the water to his aid and worked for seven minutes before the pilot was cut free from the entangling shroud lines. Both men were hoisted from the water without incident and the H-2 returned to the ship. Others manning the rescue helo were Ens Richard M. Eubanks, copilot and AEAN Miles E. White. (USN photo)

Sailors Medevaced In Hazardous HH-43 Night Mission

After landing at night on the rolling deck of a US Navy ammunition ship, an HH-43F crew successfully evacuated two injured sailors to the hospital. Pilot of the rescue helicopter from LBR Det 12, 40th ARRSq (MAC), was Capt Lawrence S. Laronge. LtCol Norman C. Buck was copilot; SSgt Norman V. Thomas, medical technician; and A1C John M. Coiro, helicopter mechanic. Det 12 is based at U-Tapao Royal Thai Navy Base, Thailand.

The hazardous mission began with a call from the U-Tapao 11th USAF Hospital Commander. Two men had suffered head injuries when a winch gave way as they were loading ammunition on the deck of the ammunition supply ship USS Haleakala. Both were unconscious and choppy, four-foot waves made it unsafe to risk a transfer by small boat.

Pedro 36 launched and headed for the vessel which was located outside the Sattahip deep-water port. Due to the poor visibility, the ship could not be located visually but, after radio contact was established, Navy personnel used strobe lights to pinpoint their location for the Air Force helicopter.

Pedro 36 flew a high recon over the ship and then to the stern where a small flat area was used as a landing deck. Despite the darkness and 18-knot winds, the landing was made without incident and Airman Coiro and Sergeant Thomas began examining the injured men. Meanwhile, Colonel Buck and Navy personnel checked the overhanging superstructure and guidewires around the landing area. Once the injured men were aboard, the helicopter took off from the pitching deck and headed for shore through a light rain. Much of the return mission was flown on instruments due to the high overcast and poor visibility. One sailor was released from the hospital two days later, the other was in the hospital for eight days.

Captain Laronge said afterward that the mission was "made easy by fine crew effort and coordination."

Speedy HH-43 Rescue Saves Three In Iran

MEHRABAD AFB, Tehran, Iran—An HH-43 crew from the 11th Helicopter Search and Rescue Squadron at this base responded to a call for assistance after a two-car accident at Chazvin which left four persons dead and three seriously injured.

Manning the rescue helicopter were 1stLt Mohamad-Valli-Nazarian, pilot; WO Ebrahime Kazemi, copilot; and A1c Khosrow Fazlekhoda, crewman. They evacuated the accident victims to medical facilities at Tehran. Two of the injured suffered brain concussions and multiple cuts on their heads and bodies in the accident. The other crash survivor, who suffered two broken feet and a broken arm, was in shock when the helicopter arrived. Doctors said afterward that the three persons surviving the accident would have died without the advance medical treatment available at Tehran.

HSL-32 Makes First Local Rescue

NAS NORFOLK, Va.—An H-2 crew from HSL-32, commissioned here in August, made the squadron's first local rescue a few weeks ago. Manning the helicopter were LCdr Ed Higginbotham, pilot; Lt(jg) Brian Buzzell, copilot; and AW2 Ben Holder, aircrewman.

The H-2 was on a routine training flight when a request was received from the NAS tower to investigate a report that a small boat had capsized 300-yards off-shore and a man was in the water. The SEASPRITE headed for the area, near the Ocean View section of Norfolk, and spotted the accident victim immediately upon arrival. As LtCommander Higginbotham held the H-2 in a steady hover, the sling was lowered and the survivor, Horace Moore, was brought aboard. He was airlifted to NAS Operations where an ambulance was waiting. Mr. Moore, who was suffering from exposure, had been in the water approximately half an hour.

Rescuee Horace Moore renews his acquaintance with the sling used to hoist him from the water after his boat capsized. Members of the H-2 crew which rescued him are, left to right, AW2 Ben Holder, LtCdr Ed Higginbotham and Lt(jg) Brian Buzzell. (USN photo)

FROM THE READY ROOM

By John Anderson, Test Pilot

A recent visit to several of the H-2 operating squadrons has prompted me to write a short article on the Doppler Approach situation. My purpose here is not to prescribe specific procedures, but rather to supply a little background on the system, discuss what the system will do and what it will not do, and perhaps shed a little light on why we are where we are today.

Basic to the situation is the knowledge that we are using the installation for a purpose that was not included in its design. The system is designed to provide cockpit indication of surface track to the pilot, continue this indication during his approach to a hover, and *then,* assist him in maintaining that hover. This assist in a hover consists of a RAD ALT hold feature, and a groundspeed input into the ASE for improved low speed and hover flight characteristics. It was not until *after* the system was in service that some operators started using it to descend under RAD ALT control by selecting the desired hover altitude while still in forward flight.

The purpose of bringing out this background is to support the explanation of why we see so many variables in approaches, not only between different aircraft, but on the same aircraft during a series of approaches.

In order to have a repeatable "black box" system, all of the variables that combine to affect the end result must be controlled and a specific, repeatable recipe formulated. Some of the more important of the variables are:

1. System Sensitivities
2. Airspeed
3. Altitude
4. Attitude
5. Power
6. Pitch Rate
7. Vertical Speed
8. Accelerations
9. Ground Track

Now, comparing these variables with the system we are flying, it should be quite apparent that we do not have an automatic approach system. Throw in the variable of how fast the copilot turns the ALT HOLD knob, and you should come up with one basic conclusion: "The system *will not* operate consistently in a ONE-TWO-THREE NATOPS style." The attempt *to do so* can only create flight and maintenance problems and lend a measure of unsafeness to the operation.

Assuming a proper operating system (Doppler and ASE), let's examine its capabilities:

A. WHAT IT WILL DO (By design)

1. Provides ground track reference to the pilot through the PT 429 plotting board.
2. Provides drift information during the approach and hover through the GSDA and the DVI.
3. Provides ALTITUDE HOLD in a hover through the ASE, doppler, and the radar altimeter.
4. Provides stabilization over the desired hover point by supplementing the ASE with ground speed data.

B. WHAT IT WILL NOT DO (By design)

1. Make an automatic approach.
2. Control airspeed, attitude, pitch rate, accelerations, and all the other little variables that you control yourself during a normal approach.
3. Consistently repeat an exact set of conditions of aircraft control, such as attitude, power, vertical speed and ground track.

C. WHAT IT CAN DO (By accepted use)

1. Provide a measure of altitude control (and thus rate of descent) during an approach, but only thru the acceptance of a pre-set internal recipe, that is not being compensated by all of the applicable variables.

With this in mind, and assuming that we will continue to use the system as we do today, let's look at some of the characteristics that we should be aware of.

1. Aircraft attitude: Pitch attitude during the approach has a large affect on the behavior of the collective. The V_Z signal can vary as much as $\pm$ 500 feet/min from actual vertical speeds during the pitch changes required to maneuver the aircraft, and this is fed to the collective channel of the ASE.

Suggestion: Keep pitch (airspeed) changes slow and gentle. Avoid abrupt movements. TRIM SMOOTHLY!

2. Use of ALT HOLD knob: The rate at which the copilot turns this knob will have a direct affect on the altitude error seen by the ASE, and thus the rate of climb/descent.

Suggestion: Move the knob slowly, monitoring torque and vertical speed, making adjustments in the rate at which you turn the knob to keep these items under control.

3. Memory light: The memory light, and thus the "OFF" flag in the DVI, is your key to what the doppler is doing. During transients in and out of memory, control motions can result, the degree dependent upon the time in memory and the changes in aircraft motion during the memory.

Comment: This "memory" characteristic is normal and will vary with sea state, system conditions and aircraft attitude. The pilot must be alert to the situation, and be prepared for the ensuing result. Momentary periods of Doppler memory should not prevent the accomplishment of a successful approach and hover.

4. Altitude "HANG-UP": When 80 feet is selected on the ALT HOLD knob, the aircraft "hangs up" in the 110-115 foot area while at 40 knots. Attempting to reach the stabilized 80 feet and 40 knots as called for in the NATOPS manual results in an extremely long approach (if in fact it can be reached at all) and degrades pilot confidence in the system if he does not thoroughly understand it.

Comment: The 80 feet/40 knot point should be used as a check point on the way down. The only purpose for setting in the intermediate 80 foot point instead of setting in the desired hover altitude is to ensure collective response to the altitude hold requirement. The "hang-up" is a result of the V_z signal error discussed in item 1 (aircraft attitude) and should be of no concern. Once a power response is noted and the aircraft begins to level, the ALT HOLD knob should be cranked down to the desired hover altitude and the approach continued. A similar "hang-up" will be observed as you approach the selected hover altitude, but this will disappear as speed is reduced.

Since the Navy is not likely to be purchasing the Kaman developed automatic approach system in the immediate future, we need to set our sights on making the best use of the existing system in the safest manner possible. To do this we must understand and appreciate the capabilities and characteristics with which we are confronted, and utilize our professional pilot skills accordingly.

Detailed review has determined that the treatment of this subject in the current NATOPS manual should be improved to avoid further misunderstanding. I have discussed proposed NATOPS changes with several squadron NATOPS officers and I am aware that changes are forthcoming, but simply changing words in a standardization manual does not solve the problem. I urge all fleet H-2 pilots to become intimately acquainted with the system, and to apply their knowledge in a professional manner, avoiding the role ONE-TWO-THREE tendencies.

If you have any questions on this subject check with the Kaman tech reps or feel free to call the Kaman pilots' ready room at (203) 242-4461, Ext 232. One of us will be pleased to discuss this or any subject with you.

HSL-33 Runners 'Show The Way' With LAMPS Torch

Captain Smith hands the LAMPS torch to YN1 Costkow as YNSA Weber shows the way to Tecate.

The West Coast LAMPS' (Light Airborne Multi-Purpose System) physical fitness program got underway with a bang on 21 September at the main gate of NAS Imperial Beach, Calif., when HSL-33 initiated its First Annual 40-Mile Relay to Tecate, Mexico. On hand to start the event was the station's Commanding Officer, Captain G. E. Smith. He handed the first runner a torch (symbolic of the LAMPS Squadron ASW mission) which was carried by each runner on the 40-mile run.

YN1 S. E. Costkow, the first runner, began the first two-mile leg at 0745. The 16 remaining members of the team boarded several trucks which carried them to their respective starting points along the 40-mile course. On this run, starting at sea level and climbing almost continually to an altitude of 1800 feet, each member jogged legs ranging from two to over three miles in distance. Weather along the route varied from fog and drizzle in Imperial Beach to high desert temperatures during the final legs of the afternoon. These were but minor difficulties encountered by the determined relay team. Undaunted by altitude, distance or Mother Nature, the torch was carried to Mexico in 5 hours and 15 minutes—averaging 7 3/4 minutes per mile.

At the end of the run, the team was hosted by representatives of the Mayor of Tecate, Dr. Arturo Floris. Cdr M. S. Belto, Commanding Officer of HSL-33 and the team's anchor man, carried the torch across the International Border. Inside the torch was a certificate to be presented to Dr. Floris from Captain Smith. This certificate designated the Mayor an "Honorary Helicopter Pilot" at NAS Imperial Beach.

The Tecate Relay demonstrates HSL-33's concern for readiness through physical fitness. Since its establishment, HSL-33 has sponsored a highly successful aerobics program. This program considerably surpasses the standards for fitness outlined by the Secretary of the Navy. The list of "Thirty-Three's" aerobics accomplishments continues to grow each month as many members earn in excess of 500 points or complete the 100-Mile Club run in less time than required.

Not wanting to sit on their laurels, the team now plans a 65-mile relay to Ensenada, Mexico. A standing invitation has been extended by HSL-33 to all other NAS Imperial Beach units which would like to jog along or compete in this challenging event.

JEEP LIFT—At left, AMH2 Gary Labonte, assisted by ADJAN Gregory Paige, hooks up cable to the H-2's cargo hook preparatory to airlifting 2400-pound jeep to ship waiting off shore. At right, vehicle begins its over-water trip.

HSL-30 Aids Med Survey Operation

H-2 Used for Varied Missions by MC&G Det A

Story by Lt(jg) Richard L. Purcell, USN
HSL-30 MC&G Det A, USNS Harkness

USN Photos by PHC Van Der Bloemen
USNS Harkness

With the advent of LAMPS and the continually growing role of the H-2 primarily as an ASW/ASMD weapons system, the H-2 as a purely utility-support helicopter is becoming, it would seem, a thing of the past. HSL-30's Marine, Coastal, and Geodetic (MC&G) Detachment A is proving, however, that the days of the utility H-2 are not completely numbered.

MC&G Det A is assigned aboard USNS Harkness (T-AGS-32) which is engaged in hydrographic survey operations in the Mediterranean. The ten-man detachment supports a single HH-2D and consists of two pilots, Lt(jg) Gregory J. Scott (Officer-in-Charge) and Lt(jg) Richard L. Purcell, plus an eight-man maintenance crew lead by Crew Chief AMH-1 Bruce M. Laurendeau. The mission of the detachment is to provide helicopter services in support of the ship's survey operations. This mission has proven not only to be a challenging one, but also a true test of the helicopter's capabilities under harsh environmental conditions and taxing operational requirements.

The USNS Harkness is operated by the Navy's Military Sealift Command and is one of the Navy's first ships to be designed and built specifically for hydrographic surveying. The ship utilizes sophisticated sensors and computers for collecting and processing survey data and is fitted with a computer automated survey system called the Hydrographic Data Acquisition System. Highly sensitive navigational systems and accurate depthfinding equipment are used to provide precise position and depth information which is the basis of the survey. The information obtained provides a detailed study of the physical features of the ocean bottom and the adjoining coastal areas. It is then used to construct nautical charts which are essentially maps of the ocean and coastal areas. U. S. Navy Oceanographic Unit Five, aboard the Harkness, conducts the surveys assisted by scientists from the U. S. Naval Oceanographic Office. The information obtained is used by the Naval Oceanographic Office in Washington, D. C. to produce new charts or to up-date those in existence. The work of the Harkness is being done at the request of, and in cooperation with, the Greek government. Having recently finished surveys off the eastern coast of the island of Crete, the ship is presently conducting survey operations in the north Aegean Sea area.

Although not involved directly in the actual survey work, the helicopter is indispensible to the ship for successfully carrying out her mission. The most important function of the helo is the transfer of personnel and equipment for shore-based stations. Normally two stations are required for each area to be surveyed. The geographic position of the shore stations is precisely determined and they are electronically linked to the ship's computers so that the exact position of the ship in relation to the reference stations is always known. Each station involves the transfer of approximately 25,000 pounds of gear and equipment. Most of the equipment is carried externally in cargo nets with the average load weighing about 1000 pounds. Once a station is established, fuel, water, and other supplies are transferred on a daily basis to support its six-man crew. Since most of the stations are inaccessible by sea or land routes, the helo provides the only means of establishing and supporting them.

WORKHORSE—At left, HH-2D lowers 1300-pound load of fuel oil at a shore site. At right, helo is shown supplying a shore station. Tents, antennas, and other equipment in background, were all flown in by the H-2 crew.

Before the shore sites can be established, however, it is necessary to decide where to put them. In this phase of operations the helo is used for photo reconnaissance flights to evaluate possible locations. The helo is also employed at this stage to confirm the location of charted geodetic markers which are used as reference points in the coastline surveys.

A secondary function of the helo is the deployment of geodetic teams to various sites located on mountains and islands in the vicinity of the survey area. Most of these geodetic sites are accessible only by helo. Of course the detachment provides other routine services such as personnel transfers, medical evacuations, and mail runs.

During July and August, while conducting survey operations off the eastern end of Crete, the harsh environmental conditions of the area plus operational requirements proved a true challenge to the capabilities of the helicopter. This particular island was mountainous, rocky, and rugged. There was no such thing as a level or grassy area in which to land. During numerous landings the jagged rocks took their toll on the aircraft's tires. The wind was often in the 30 to 40 knot range with gusts sometimes reaching 50 knots or more. The effect of the wind was accentuated even more by the rough terrain causing gusting through the valleys and gorges, and updrafts and downdrafts over mountains and cliffs.

The helo was required to operate at high altitudes to deliver personnel and equipment to mountain sites. With temperatures reaching over 100° F daily, the helo was needed to lift heavy external loads. Since many areas were not suitable for landing, personnel and equipment frequently had to be raised or lowered to a site by hoist. Under these conditions operating near the limits of power and performance became routine.

Although required to carry heavy loads under conditions of high temperature, high altitude, and gusting winds, the H-2 proved to be more than capable to get the job done and get it done safely. During 50 days of survey operations in July and August the helicopter carried a total of 269,850 pounds (approximately 135 tons) of external cargo, 380 passengers, and 2241 pounds of mail in 132.4 flight hours. The heaviest and most unusual single load carried was a 2400-pound jeep. The H-2 proved that, not only is it a remarkable workhorse, but the helicopter is the only practical and safe vehicle for accomplishing this type of work.

The mission of the Harkness provides HSL-30 MC&G Det A with the opportunity and the challenge to test the remarkable capabilities of the H-2. It is also a challenge to the determination and "can do" spirit of the people behind the machine who keep it flying and performing. The success so far speaks well of both the people and the helicopter.

THE MC&G DET A TEAM—Seated, left to right, ADJAN Gregory Paige, ADJAN Bruce Dethloff, AE3 Mark Saunders, AMH2 Gary Labonte, Standing, AMH1 Bruce Laurendeau, Lt(jg) Gregory Scott, Officer-in-Charge; Lt(jg) Richard Purcell, ADJ3 Richard Peterson, AA Ricky Taylor, ATAN Michael Rann.

FROM THE READY ROOM

By F. A. Foster, KAC Chief Test Pilot

The position of the cyclic stick when operating on the ground has a very important influence on main rotor hub life. There are a number of "caution" notes in the NATOPS Flight Manual recommending that minimum cyclic inputs be used to reduce hub bending moments on the ground. This cannot be overemphasized.

To give you a feel for the situation, let's consider a little background information. The life of any dynamic component is based upon three fundamental items:

1. The fatigue strength of the component. This is determined by laboratory fatigue testing with supporting analysis.

2. The loads imposed on the component for various operating conditions. These loads are determined primarily by flight strain surveys with an instrumented aircraft.

3. The distribution of time at various operating conditions. This is determined by a combination of means including reference to applicable military specifications, measurements on specially instrumented operational aircraft, and estimates based upon operational experience.

The only one of these factors which the pilot can influence at all is the distribution of time at various operating conditions. Usually, the pilot can't do much about this either because the most significant loads occur in flight and the mission dictates the distribution of time at various flight conditions. However, the case of the main rotor hub is an exception because the most significant loads occur on the ground and the pilot can usually control the magnitude of these loads without compromising operational considerations.

The main rotor hub receives loads high enough to start using up some of the fatigue life when blade flapping exceeds about 4 degrees. This is a relatively large amount of flapping and does not often occur in non-maneuvering flight. Consequently, little fatigue damage is done in flight and a main rotor hub life based only on flight considerations would be very high indeed.

However, the fatigue life of the main rotor hub is heavily dependent upon ground operation. Roughly 90% of the fatigue damage sustained by the hub occurs on the ground. The amount of fatigue damage incurred, or hub life used, is directly related to the position of the cyclic stick during ground operation. Large flapping angles can be generated and sustained on the ground if the cyclic stick is positioned too far forward.

Fatigue damage to the hub starts occurring when the cyclic stick is displaced about 2 inches from neutral on the ground. (Neutral stick position is with the bend in the cyclic stick lined up with the most forward part of the electrical conduit under the pilot's collective stick and centered laterally.) The farther forward the stick is displaced and held on the ground the more damaging it is to the hub, i.e., the greater the amount of hub life used per unit of time.

Now what can we, as pilots, do about this? First, during sustained periods of ground running, such as when going through the check list or waiting to takeoff, pay attention to the position of the cyclic stick and, hence, the rotor tip path plane. Make sure the stick is near neutral. Second, use collective when taxiing. Taxiing can be done using amounts of cyclic that are quite acceptable without generating stresses that will damage the hub. This is accomplished by using a little more collective and, for the most part, maintaining cyclic within an inch or so of neutral. The 6° forward tilt in the rotor shaft actually makes it possible to taxi quite comfortably with neutral cyclic.

This is not a new problem and it is not peculiar to any particular model of the H-2. Attempts have been made over the years, by means of NATOPS entries and personal contacts, to advise pilots on the proper positioning of the cyclic stick on the ground. We felt that progress was being made; however, ground cyclic stick position measurements made by NADC on six operational aircraft not long ago indicate that some pilots still spend a considerable amount of time on the ground with the cyclic much too far forward.

The detailed study of these results is really what caused this article to be written. I've always felt that when pilots have the necessary background information to understand and appreciate a problem, they are much more receptive to training procedures that will substantially reduce, if not completely eliminate, the problem. My purpose here has been to provide that background.

The message on what needs to be done seems clear. We should follow the NATOPS procedures for ground operation by paying more attention to keeping the cyclic stick near neutral unless there is a good reason to have it elsewhere.

Why treat the main rotor hub in a manner which causes it to have a life of H hours when it has the potential for a lifetime several times that high with no operational penalty?

"Mini"-Det 9—*Continued from back cover*

A common sight, at-sea refueling.

Due to the "Mini"-Det concept, the reduced maintenance manning level required many long and arduous hours to maintain the aircraft in a ready status. Led by crew leader AMSC J. A. Imler, the maintenance team did an outstanding job which resulted in availability of well over 90 percent. This was achieved by each crew member obtaining cross-training in all LAMPS related rates. Major maintenance included three calendar inspections and an engine change at sea. The availability of the helicopter maintained by Chief Imler and his men allowed the pilots and crewmen to log approximately 260 flight hours. During this time, the crew carried 7000 pounds of mail, 26,000 pounds of cargo, and 270 passengers; and last and most important, they flew 82.7 ASW/ASMD (Anti-Ship Missile Defense) hours.

Though many thought it impossible to effectively deploy an H-2 aboard a non-aviation ship (destroyer, etc.) with so few personnel, the men of "Mini"-Det 9 and USS Reasoner have shown that it was both possible and effective. With the positive results Det 9/Reasoner had, CNO has chosen a revised manning level for future deploying LAMPS/ship ASW teams. These future detachments will be composed of three pilots, two crewmen, and seven to eight maintenance personnel. The experience in reduced manning gained by Det 9 and USS Reasoner will greatly enhance the effectiveness of these future ASW/ASMD teams.

Capt S. L. Corner, FASOTRAGRULant, was on hand to greet commanding and executive officers from area commands and ships who attended the FASO LAMPS Familiarization Orientation Class held recently at NAS Norfolk. He is shaking hands with Cdr J. J. Gelke, skipper of the USS Donald B. Beary. It was the first such class to be held at Norfolk since the school moved to the area. The two-day course was formerly held by the FASOTRAGRULant Det at NAS Lakehurst,N.J. (USN photo by PHAA Drew Trampe,AFCCG)

RAdm Denis-James J. Downey, left, COMDESGRU 8, is briefed on the SH-2F by Lt(jg) Jack Smith. (USN photos by Ens Chuck Keller, HSL-30)

Lieutenant Khademolama

1000-Hour Pilot Award

One HH-43 pilot and three H-2 pilots have been awarded plaques for logging 1,000 hours each in Kaman-produced helicopters. Recipients are: HH-43 – 1stLt J. Khademolama,IIAF, Vahdat AFB, Iran. H-2 – Lt Charles M. Hartwell and Lt Dick Carroll, SAR Unit, NAS Pensacola, Fla., Lt Michael J. Coumatos, NATC, Patuxent River, Md.

ASW/ASMD Team Effectiveness Enhanced by New Concept

"Mini"-Det 9's Crew—Front row, left to right, ADR2 A. Charydczak, AX3 R. Robinson, AW3 R. Borne, AW3 R. Rutledge, AMH3 J. Scott. Rear row, Lt(jg) M. Charley, AMSC J. Imler, AT2 C. Watson, AE2 W. Nelson, Lt W. Hayes, Det Officer-in-Charge.

Helo stands ready for call to flight quarters.

Maintenance is an "all-hands" evolution while on "Mini"-Det deployment.

NAS IMPERIAL BEACH, Calif.—What? Deploy an H-2 helicopter aboard a destroyer with only two pilots, two crewmen, and six maintenance personnel? Although, at the time, not a routine practice, that is exactly what HSL-33 did last spring. HSL-33's LAMPS (Light Airborne Multi-Purpose System) Detachment Nine, better known as "Mini"-Det 9, sailed for the Western Pacific aboard USS Reasoner (DE-1063) on 9 March, 1973.

The purpose of this unusual detachment complement was to evaluate, through a trial program, the Chief of Naval Operations' (CNO) reduced LAMPS manning concept—hence the name "Mini"-Det. Up to this time all detachments had deployed with four pilots, three crewmen and eleven maintenance personnel.

In March 1972, Lt W. S. Hayes, Officer-in-Charge of Det 9, and his detachment, with the 4-3-11 complement, began the work-up phase with the ship. In the following months, the Det went aboard Reasoner for short cruises helping to ready the ship for LAMPS certification and to get their sea legs. Shortly after the ship's refresher training (REFTRA) in October, 1972, CNO directed USS Reasoner and LAMPS Det 9 to test the reduced manning concept for deploying LAMPS detachments. So, 4-1/2 months prior to deployment, Det 9's personnel list was reduced to two pilots, two crewmen, and six maintenance personnel, forming "Mini"-Det 9.

This reduction in Det 9's manning did not dampen the spirit nor hamper the efficiency of the HSL-33 personnel remaining on board Reasoner. Prior to the completion of the REFTRA period, the LAMPS/ship team had set an enviable ASW (Anti-Submarine Warfare) record. This team became fully qualified as an ASW "A" crew; achieving this by completing selected exercises with a grade of better than 80 percent.

(Continued on page 35)

Pre-flight checks by maintenance personnel are an integral part of every mission.