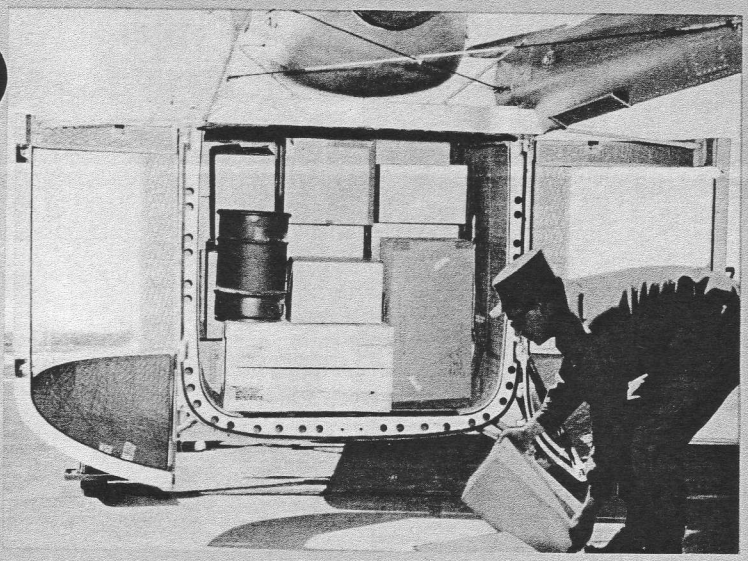
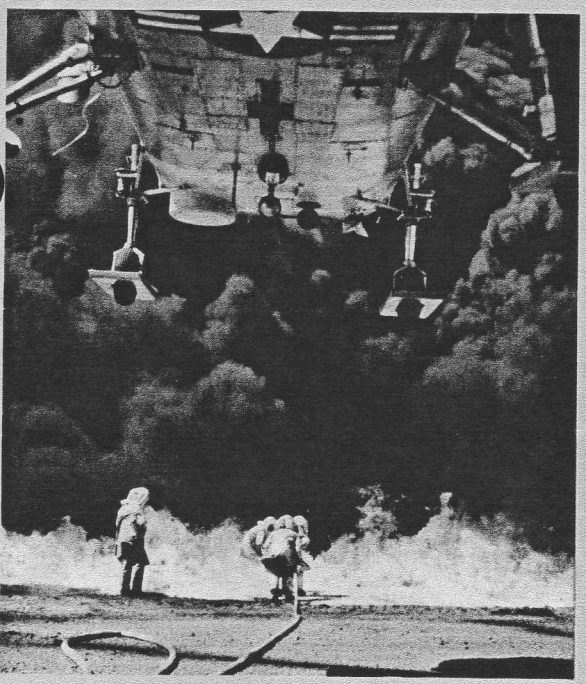
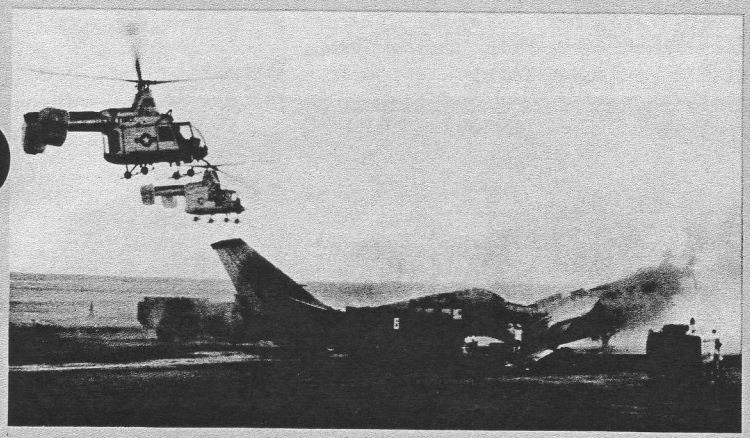
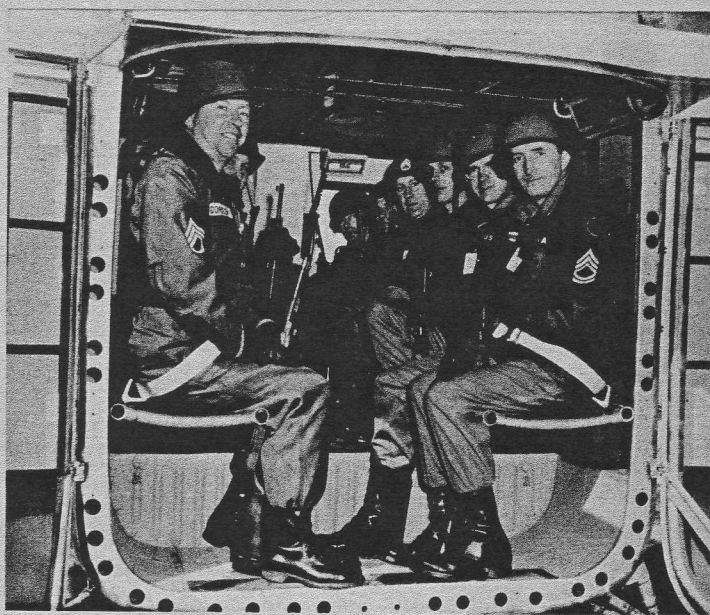
Nav Paramedics HOK - Pg 10-11

KAMAN Rotor Tips









KAMAN AIRCRAFT CORPORATION

PIONEERS IN TURBINE POWERED HELICOPTERS APRIL 1963

KAMAN Rotor Tips

Volume III Number 2 April, 1963

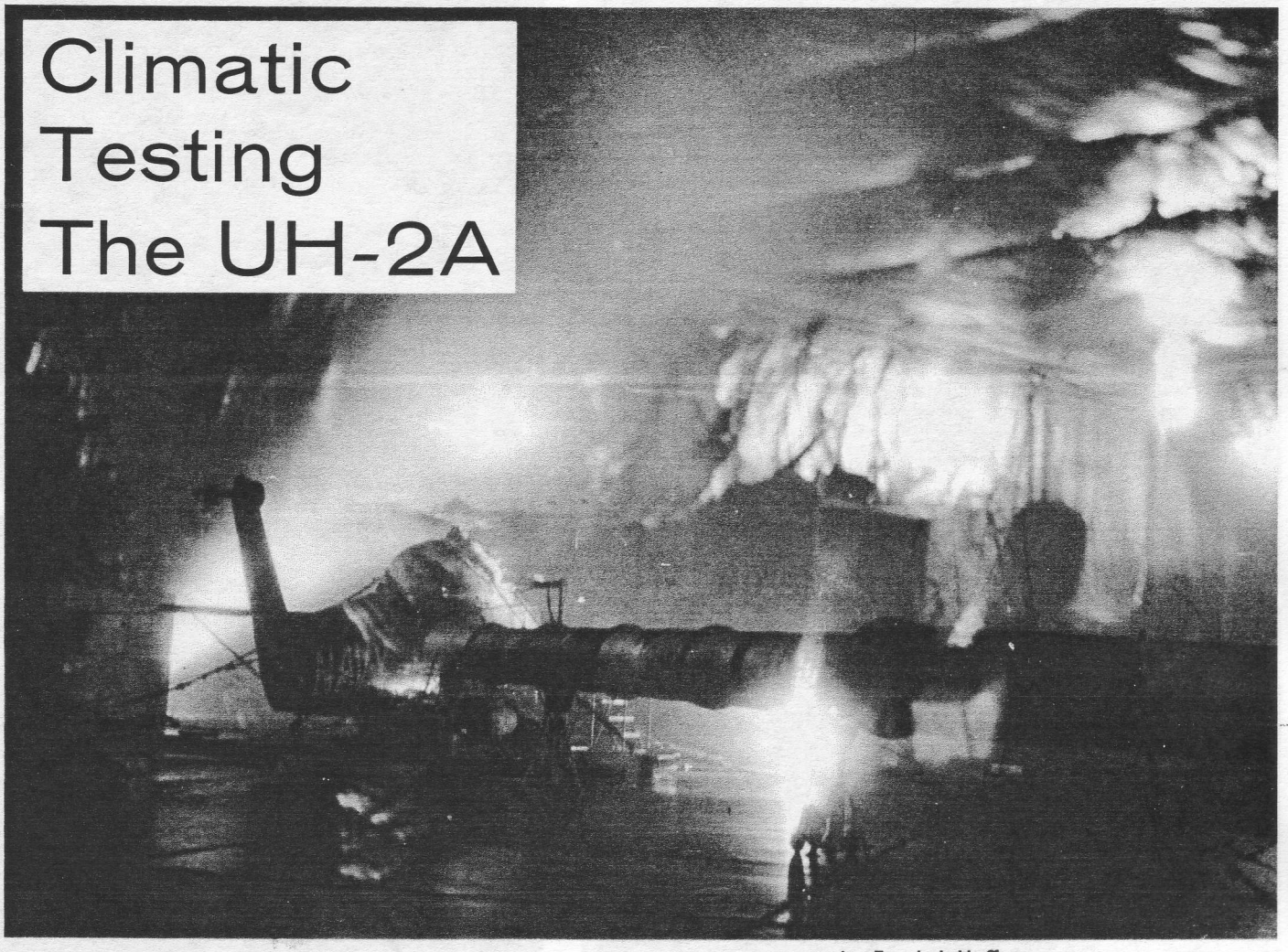
In This Issue

THE COVER

Save a life? Carry cargo? Deliver personnel? Operate at high altitudes?—for more than three years now the turbine-powered HH-43B HUSKIE has demonstrated, time and again, its ability to perform these and similar tasks. (USAF and KAC photos)

ADDRESS ALL INQUIRIES TO:
Kaman Rotor Tips
Field Service Department
Kaman Aircraft Corp.
Old Windsor Rd.
Bloomfield, Connecticut

Climatic Testing The UH-2A



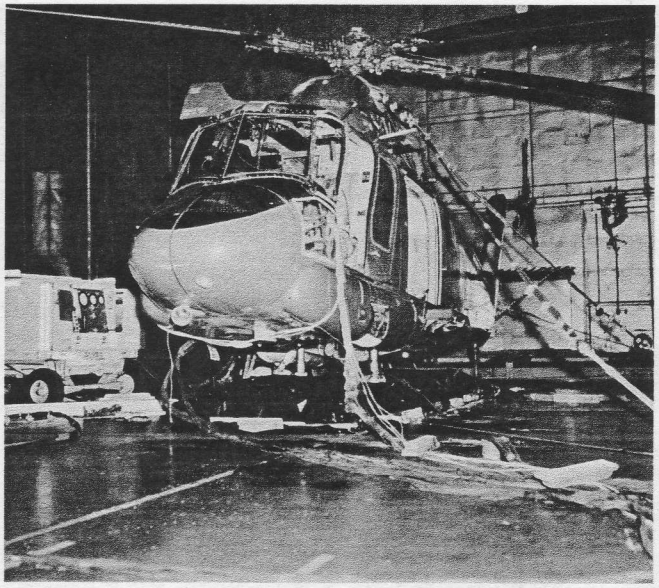
by Frank J. Heffernan
Field Service Representative

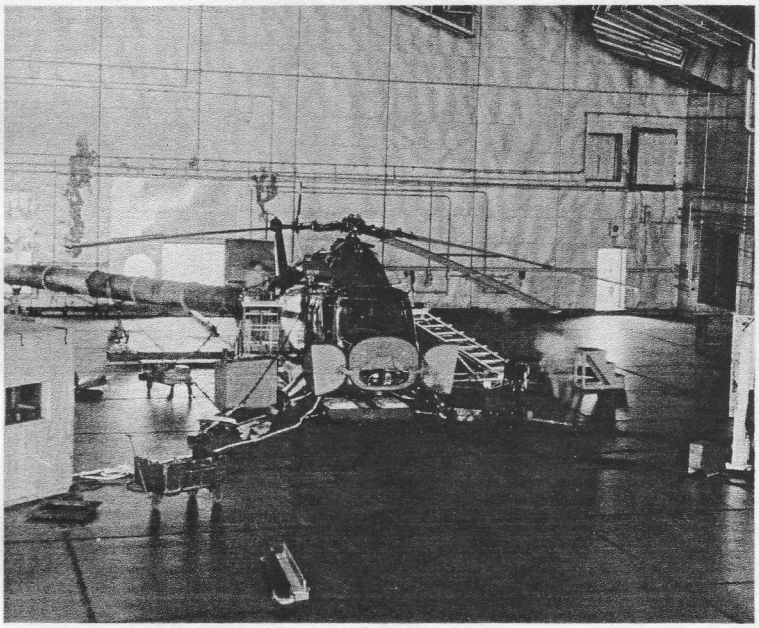
What happens when an aircraft goes through cold weather testing in the Climatic Laboratory at Eglin Air Force Base, Florida? The photographs of the UH-2A SEASPRITE appearing on the following pages don't tell the whole story by any means, but they do point out just a few of the numerous steps taken to prepare this helicopter for the all-weather missions ahead.

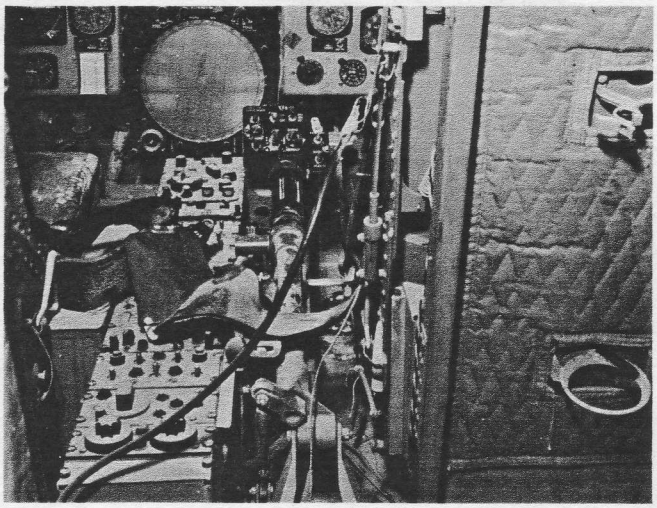
Spraying the aircraft with an icy, penetrating fog at -4°F, as shown in the above photo, and then running a series of checks on all the various helicopter systems was just one of the many tests performed during the three months the SEASPRITE was in the huge refrigerated hangar at Eglin. One of the most stringent tests called for the immediate turnup, at military power and without preheating, after the helicopter was "cold soaked" at -65° for as long as three days.

The tests were conducted by a Navy cold weather detachment from USNATC, Patuxent River, Md., consisting of 18 enlisted men and two officers---Cdr William Matthews, OIC, and LCdr John Wolff, AOIC. KAC personnel aiding the detachment were Wayne Davis, project engineer, Edward Eckhart, pilot, and Peter Caruso, mechanic, all from Test and Development; and Frank Heffernan, field service representative. Also taking part were the civilian employees at the hangar.

While, at the present time, there is no requirement for the UH-2A to operate under many of the conditions experienced during the testing, the SEASPRITE showed that if these conditions are encountered—it is ready!



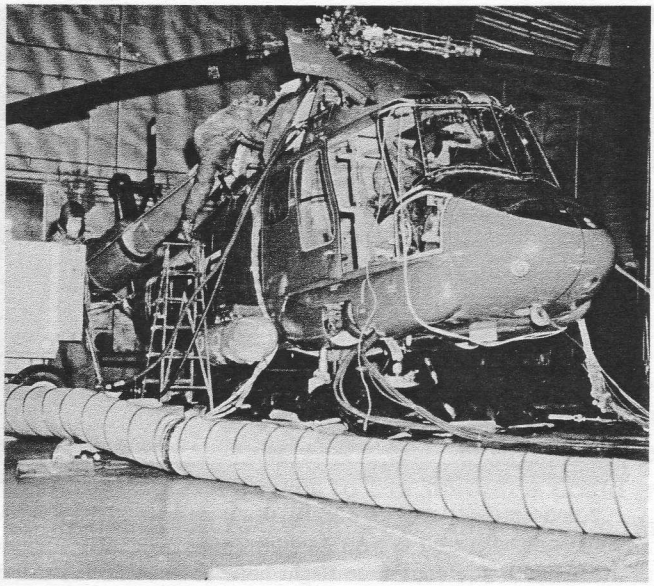


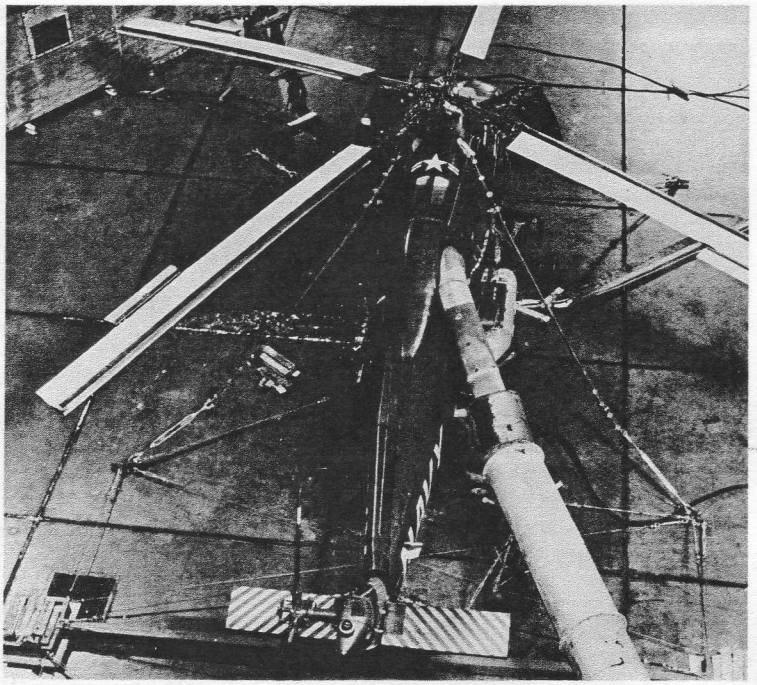


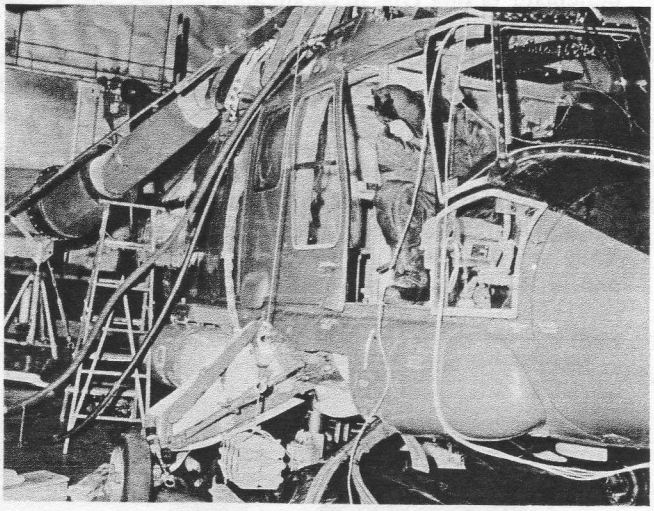
In the top photo, left, the UH-2A is shown outside the climatic laboratory while another aircraft is undergoing testing at -20°F. In the middle photograph, left, the SEASPRITE is being prepared for the rigorous testing to come. The large pipe in the rear conducts the exhaust fumes to the outside atmosphere.

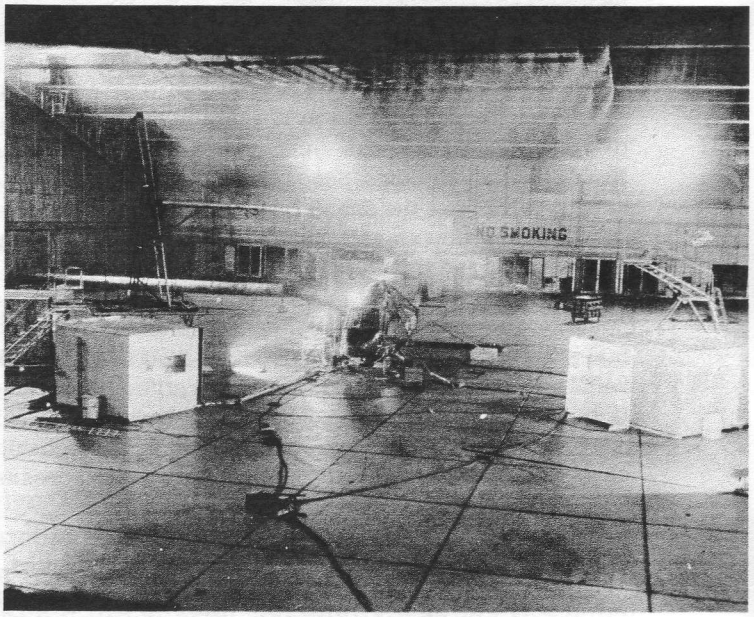
Pictured at the bottom, left is the UH-2A at -65°. When the photo was taken the aircraft had been exposed to this "deep freeze" for three days and would soon be turned up without preparatory warming. The helicopter remained at this temperature for lesser intervals and starts were made after each period. At least four engine and rotor runs were carried out at each temperature; +70°, 0°, -25°, -45°, -65°, and +110 (in that order). In top photo, right, the SEASPRITE is shown wired for instrumentation and on jacks during a systems checkout at -25°. Approximately 18 different instruments were monitored by personnel during the various tests. The instruments indicated engine, fuel, hydraulic and rotor system performance.

Shown in the middle photo, right, are the radio control heads on the cockpit console. Note the heavy frost accumulation which formed at -65° on the various switches, dials and collective stick. Operation of these units at this tempera- is not required since, under all but the most unusual circumstances, the inside of the cabin would be heated.





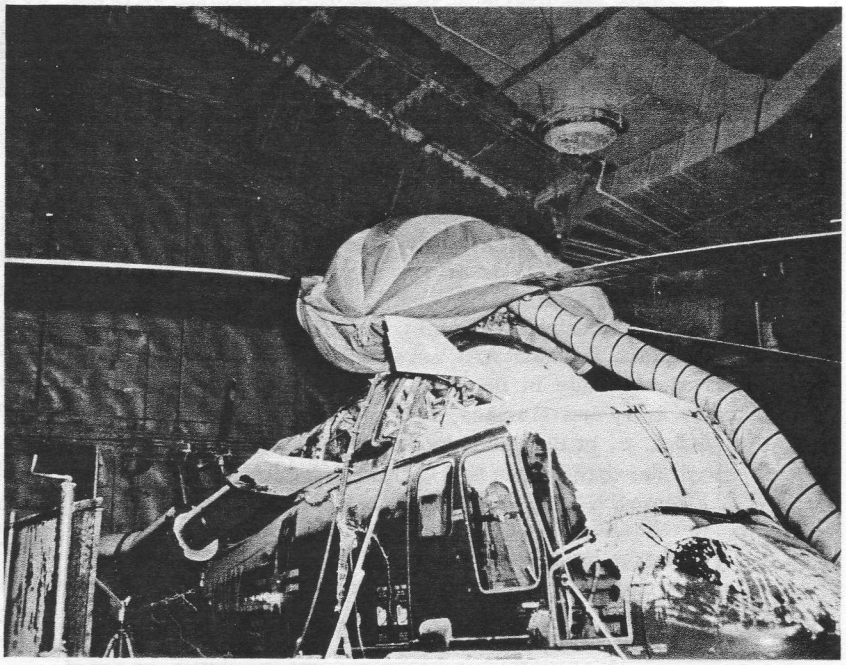




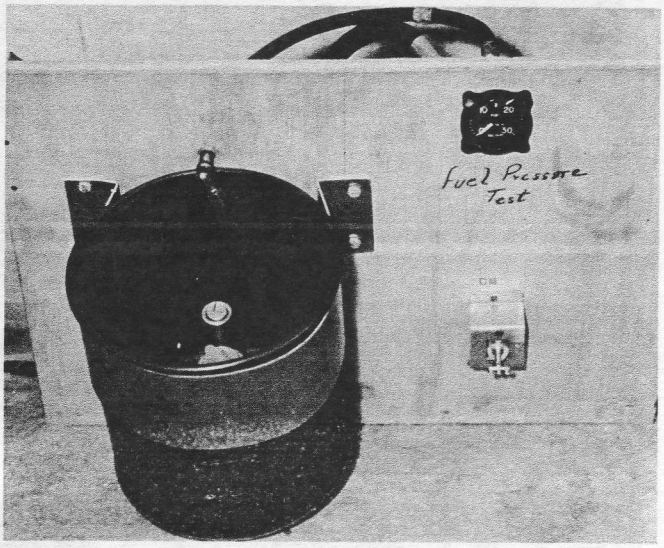
In top photo, left, parka-clad Navy personnel check engine and cockpit areas at -25° while third specialist stands by hydraulic power unit preparatory to landing gear test. How does the rescue hoist function at 0°, -25°, -45° and -65°? The Navy specialist in the middle photo, left, is finding out. The lead bars being hoisted weigh 600 pounds.

The view of the UH-2A at the top, right, shows the means used to tie the helicopter down during testing. Note the "weight tray" extending to the left and right at the aft end of the helicopter. The containers were loaded with lead ingots weighing 100 pounds apiece and similar weights were secured in another weight tray beneath the aircraft.

Not only was the SEASPRITE subjected to temperatures far below zero, it also underwent icing tests while at Eglin. In the middle photograph, right, the aircraft is being sprayed with water while the temperature hovers around the -4°F mark. The helicopter was also spray tested at +23°, and +15°. Purpose of this testing was to check the de-icing system on the rotor blades and to ascertain if the engine and induction system had any unusual icing characteristics. In the lower photograph, right, a parachute has been wrapped around the rotor head and heat applied at -45° in order to isolate the rotor components from the rest of the aircraft as part of a dynamic check. No rotor heat was required prior to run-ups. (USN – USAF photos)



VMO-2 ACTIVITIES



MCAF, Futema, Okinawa, Feb. 15, 1963——Marine Observation Squadron-2 is at it again——as far as inventive minds are concerned. Gunnery Sergeant G. D. Adams, NCOIC of the Avionics Shop, found that VMO-2 did not have a way to set the submerged fuel pump relief pressure valve of the OH-43D (HOK) type helicopter, except by guessing; and this guess work caused quite a task.

Previously, the fuel tanks had to be drained, the fuel pump detached from the aircraft, the relief valve set, the fuel pump reinstalled in the aircraft, then the fuel tanks refilled to check the guess-work setting of the relief valve. If the setting was incorrect, the entire process would have to be accomplished again. This chain of mechanics caused loss of many man hours and, also, unnecessary loss of precious aviation gas.

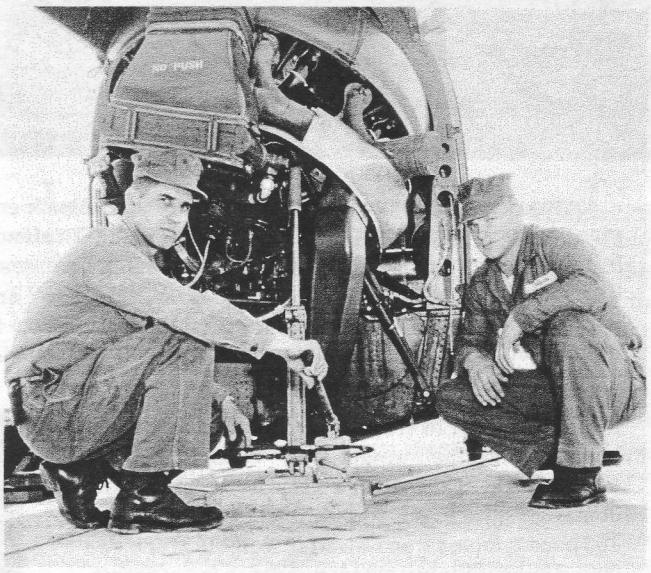
With the assistance of Gunnery Sergeant J. R. Sullivan, NCOIC of the metal shop, Sergeant Adams mounted a fuel pump inside an instrument packing can, mounted this can on a plywood backboard, then attached the necessary fuel lines and hydraulic connectors to simulate aircraft functioning. The relief valve can now be set in one easy operation.

This tester unit is now being used in VMO-2 and VMO-6 with good results. (USMC photo)

A mercy mission flown in an OH-43D by Capt G. F. Hartway and 1st Lt J. K. Ford from Sub Unit One, VMO-2, NAS Atsugi, Japan, recently saved the life of a newborn baby. The child, son of Mr. and Mrs. Kohji Tomioka, needed R/H negative type O blood and none was available in the area. Through the joint effort of the Navy and Marines, arrangements were made to fly 500 c. c. of the rare blood type to Shizuaka City.

The first leg of the flight was from Atsugi to Camp Fuji where the helicopter was refueled. Fuji was alerted for the OH-43D's arrival and the aircraft was on its way in six minutes. At Shizuaka, where a red cross was used to mark the emergency landing area near a fire truck and ambulance, the blood was turned over to the local medical people.

2,000 HOURS — An OH-43D (HOK-1) attached to VMO-2's Sub Unit One based at NAS Atsugi, Japan, recently logged its 2,000th accident-free flight hour to become the third helicopter of this type to obtain such a goal. This is the second time that VMO-2, which is stationed on Okinawa, has surpassed the 2,000th accident-free hour with an OH-43D——the first was in April, 1962. VMO-6, based at Camp Pendleton, Calif., first set the record in March, 1962. Shown are Col. Arthur H. Adams, right, commanding officer of Marine Air Group 11 at Atsugi NAS, and Henry J. Tanzer, KAC service representative, congratulating Sub Unit crew members after the flight. They are Sgt Arthur A. Jafraty, Cpl Ronald P. Sicina and 1st Lt James H. Marshall. (Official U.S.N. photo)



MERITORIOUS MAST — LCpl Edward P. Liss, left, and Cpl John D. Brown of VMO-2, Okinawa, were cited at Meritorious Mast recently by Col J. W. Ireland, commanding officer of MAG 16, for construction of this hydraulic jack which reduces the number of men required for an OH-43D engine change from six to one. The 20-pound unit is highly portable, can easily be airlifted and may be used in any type terrain.

Corporal Liss, an OH-43D mechanic, drew up the plans and Corporal Brown, a metalsmith, built the jack during a two-week period in addition to "performing their regular duties in an exemplary manner," according to the citation.

Drawings of the jack may be secured by writing: Engineering Officer, VMO-2, MAG 16, FPO, San Francisco. (USMC photo)

Timely Tips

Good Habit Saves Blades

During blade folding operations on the UH-2A, helicopter handlers should develop the habit of tugging briefly on the end of the support after it has been engaged in the fuselage receptacle. This action will insure that the fitting has locked securely into position. False attachment of the blade support strut to the fuselage could eventually allow the fitting to pop out which would allow the blade to swing freely into other components.

D. W. MacDonald, Service Engineer

Oil Leak Check

Here's one method mechanics can use when attempting to determine where an engine oil leak on an HH-43B is coming from, or the "why" of a sudden increase in oil consumption—if the inside of the tail pipe is sooty but there is no blue smoke, it is the #3 or #4 bearing housing. If the diffuser assembly exhaust is oil streaked, it is also the #3 or #4 housing. The presence of blue smoke usually points to possible deterioration of the #1 or #2 bearing carbon seal.

W. C. Barr, Field Service Representative

See, Feel, Hear

When connecting fuel and oil line quick disconnect couplings on the UH-2A or UH-2B, be certain that the connection is properly completed. This operation can be seen, felt and heard (the latter as a distinct click) when correctly accomplished. An incorrect connection can result in pressure build-up within the cooler and subsequent rupture of the cooler.

F. E. Allen, Service Engineer

Preventing FOD

To help reduce the possibilities of FOD (Foreign Object Damage) to the engine on the HH-43B, it is an excellent practice to use the interpylon walkway as a shelf for tool boxes, instead of the engine air inlet screen. Making use of the screen as a seat by personnel working in that general area should also be avoided since the screen assembly was not designed to hold such weight. In the past, several cases have been reported of bent and broken screens after being used as shelves or seats. In one case, a piece of screen broke off, and it is suspected that it was the direct cause of FOD to the engine.

J. M. Cahill, Service Engineer

Suitable Probe Prevents Damage

When being serviced, the main rotor blade damper assemblies (101264) on the UH-2A and UH-2B require probing of the filler port check valve to allow excess hydraulic fluid to escape. To prevent damage to check valve seat surfaces, probes of a suitable material such as an aluminum or brass, 5/64" diameter rod should be used.

D. W. MacDonald, Service Engineer

Don't Step, Save Trouble

Care should be taken not to step on the up-lock switch support bracket, P/N 9809-68R, located on the right-hand landing gear of the UH-2A. Recent reports show that if this bracket is bent or distorted, it may cause the plunger to miss the up-lock assembly when the landing gear is retracted. This, in turn, may cause the landing gear indicator to erroneously show an "unsafe condition."

W. J. Rudershausen, Service Engineer

Q's AND A's

If you have a question regarding Kaman Aircraft maintenance, send it along to Rotor Tips. The Service Department's analysts will be glad to answer it.

Q. (Applies UH-2A, UH-2B) WHEN SERVICING THE LIQUID SPRINGS ON THE LANDING GEAR, WHAT SIMPLE PRECAUTION SHOULD BE TAKEN?

A. Maintenance personnel should check the maintenance manual, or the decal on the landing gear, to determine the type fluid which should be used. The gear manufactured by Cleveland Pneumatic has a liquid spring, P/N 1005-500C, that must be serviced with silicon fluid, CPT 3801. This is produced by Dow Corning of Midland, Mich. The landing gear manufactured by the Dowty Corp. has a liquid spring, P/N 3283300, which must be serviced with mineral base hydraulic fluid, MIL-H-5606A. The two fluids are not compatible and therefore should never be mixed as this may cause seal deterioration which could nullify the action of the liquid spring.

W. J. Rudershausen, Service Engineer

Q. (Applies HH-43B, OH-43D, UH-43C) WHY IS IT IMPORTANT TO MAINTAIN PROPER AZIMUTH BAR SHIMMING WHEN CHANGING COLLECTIVE THRUST ROD ASSEMBLIES?

A. The shims are installed by overhaul activities to provide an exact proper relation between the azimuth bar and the spindle center line. Losing or incorrectly installing these shims results in an eccentric condition that causes loads to be amplified in the azimuth bar. The eccentric condition also causes cyclic stick shake. The azimuth should be sent to overhaul if the shims are lost or misplaced. Procedures for proper thrust rod assembly replacement are contained in the maintenance handbooks.

W. J. Wagemaker, Service Engineer

Q. (Applies UH-2A, UH-2B) SHOULD THE SOLENOID RELAY, P/N RE120A/ARA-25, BE REPLACED WITH RELAY, P/N RE120/ARA-25, IN THE AN/ARA-25 SYSTEM?

A. No, these two relays are electrically the same but because of mechanical differences and mounting location in the aircraft, the two relays are not interchangeable in the UH-2 helicopter, especially in Buno 149029 and subs. The coax cables routed to the relay are designed to exactly fit the RE120A. When the RE120 relay is substituted, the coax cables must be stretched causing excessive tension.

M. T. Fiaschetti, Service Engineer

Q. (Applies HH-43B, UH-2A, UH-2B) WHAT PRECAUTIONS SHOULD BE TAKEN WHEN INSTALLING THE HOUSTON (H2025MA AND H2025MB) VENT VALVES IN THE FUEL CELLS?

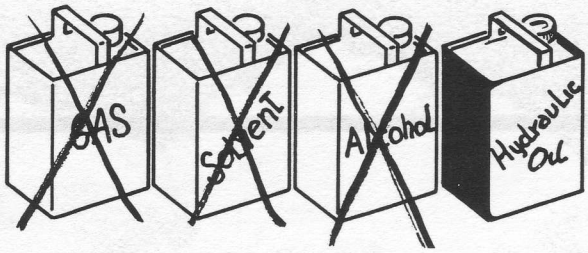
A. During installation, the float "can" should never be used as holding device for the valve while attaching the line to the valve or the valve to the tank. This may result in distortion of the "can" which encloses the float and subsequently bind the float. This will permit fuel to leak from the vents.

F. E. Allen, Service Engineer

Q. (Applies UH-2A, UH-2B) WHEN UNFOLDING BLADES TO THE FLIGHT POSITION, IS IT IMPORTANT WHICH LEG OF THE BLADE FOLDING STRUT IS RELEASED FROM THE FUSELAGE FIRST?

A. Yes, the short strut leg must be released first, then secured to the longer leg to eliminate dangling (reference NAVWEPS-01-260-HCA-2-1). Note, it is extremely important that a fellow crew member be assigned to hold the blade retainer line (rope) and be prepared to restrain the blade from swinging in either direction. Next, release the longer strut leg from the fuselage and walk the blade forward to its phased position. Failure to detach the short leg first will result in an over loaded fitting, capable of tearing the receptacle from the fuselage.

D. W. MacDonald, Service Engineer



Q. (Applies HH-43B, UH-2A, UH-43C, OH-43D) IS IT PERMISSABLE TO USE GASOLINE, JET FUEL OR SOLVENTS WHEN CLEANING O-RINGS IN THE BRAKE SYSTEM?

A. No, this is not permissable. Only clean hydraulic oil, MIL-H-5606, should be used to clean these seals. Using gasoline, JP fuel, or solvents will cause the O-rings to deteriorate and if these were reinstalled, could cause a brake malfunction.

W. J. Rudershausen, Service Engineer

Q. (Applies UH-2A, UH-2B) SHOULD A PILOT BECOME ALARMED WHEN THE ASE ENGAGE PANEL BECOMES WARM AFTER EXTENSIVE OPERATION?

A. No, this heat build-up is normal in the ASE engage panel. The panel holds four holding switches, P/N AT1226, and current flowing through these holding coils causes the heat build-up.

M. T. Fiaschetti, Service Engineer

Q. (Applies HH-43B, OH-43D, UH-43C) WHAT IS THE PROPER PROCEDURE FOR THE INSTALLATION AND ALIGNMENT OF THE AUXILIARY LANDING GEAR?

A. To insure a true vertical positioning of the auxiliary landing gear, the following procedure should be adhered to: (a) Jack the aircraft using the four fuselage jack pads in accordance with the Handbook of Maintenance Instructions. (b) Level the aircraft in accordance with handbook. (c) Install the auxiliary landing gear on the fuselage, and with a level, position the strut in a vertical position by adjusting the lateral and longitudinal struts. Secure the gear in this position after ascertaining that the safety limits of the struts have not been exceeded, as observed through the .221 inch inspection holes. These changes will be included in future revisions of the HMI.

J. M. Cahill, Service Engineer

Q. (Applies UH-2A, UH-2B) WHAT IS ONE METHOD OF FIELD TESTING THE MAIN ROTOR BLADE DAMPERS?

A. To test rotor blade dampers while on aircraft, grasp each blade by the tip end and cycle repeatedly from lead to lag position. During cycle period, any noted fluctuation of the fluid level gage would indicate an internal malfunction and dictate that the damper be replaced.

D. W. MacDonald, Service Engineer

Q. (Applies OH-43D, UH-43C, UH-2A, HH-43B) WHEN REINSTALLING TEFLON HOSE ASSEMBLIES, SHOULD EXTRA CARE BE TAKEN TO REPLACE THE HOSE IN THE SAME LOCATION AND HELICOPTER?

A. Yes, after being subjected to temperature and pressure, Teflon tends to retain a permanent "set." Bending or twisting the hose against this "set" will cause the hose to kink and eventually fail.

P. M. Cummings, Service Engineer

Q. (Applies UH-43C, OH-43D) WHEN REASSEMBLING THE MAIN WHEEL, IS IT NECESSARY TO TIGHTEN THE SELF-LOCKING NUTS EVENLY TO 83 POUND-INCHES?

A. To prevent the possibility of bolt or wheel-half failure due to local stress areas being developed, the nuts should be tightened evenly and opposite each other to a torque of 83 pound-inches.

J. M. Cahill, Service Engineer

Q. (Applies HH-43B) WHAT CAN BE A CAUSE OF ERRATIC DIAL INDICATOR READINGS WHEN MEASURING AZIMUTH BAR RUNOUT WITH THE RIGGING FIXTURE, P/N K704835?

A. Interference between the grease fittings on the L cranks and the plungers on the fixture can cause these erratic readings due to tolerance buildup of the parts. The easiest solution is to remove the grease fittings while using the fixture.

W. J. Wagemaker, Service Engineer

KAMAN SERVICE ENGINEERING SECTION—*E. J. Polaski, Supervisor, Service Engineering, G. M. Legault, G. S. Garte, Asst. Supervisors; N. E. Warner, A. Savard, W. J. Rudershausen, Group Leaders.*

PARACHUTING FROM THE UH-43C

An article written by two Air Force Sergeants which appeared in the April, 1962, issue of Kaman Rotor Tips has led to the formation of what is believed to be the first Navy paramedic team. In the letter below, Lt. R. D. LaChance, MC, USNR; describes the steps taken which led to the formation of a paramedic team at NAS Cubi Point in the Philippines. The team recently received the official approval of the Chief of Naval Operations.

31 October 1962

From: R. D. LaChance, LT MC USNR
To: "KAMAN ROTOR TIPS"

Subj: PARACHUTING FROM THE HUK (UH-43C)

1. Prompted by your recent article Parachuting from the HUSKIE by the Robins Air Force people, we here at NAS Cubi Point, Philippines, decided to try jumping from our HUK-1.

2. We are in the process of forming a Navy "Para-rescue Team" and are getting our jump training at Clark Air Force Base here in the Philippines, under the guidance of SSGT B. E. Davis. The type of aircraft which are available to us for training are quite limited and, because we have two HUK-1 aircraft here at the Naval Air Station, we were quite excited to read that it could probably be used for jumping.

3. Chief Parachute Rigger E. H. Woods, USN, and I decided we would give it a try. We proceeded in the same manner that was mentioned in the article, checking out the length of static lines, where they would fall after jumping, and making a few practice static line cargo drops. Everything appeared to be all right.

4. The seat and controls were removed on the left side, the floor panel put in place and secured with four locks. The static line was attached to the center floor ring on the inner side of the floor panel near the radio control panel.

5. We left Cubi Point with Cdr. P. W. Nicholas as our pilot and flew to Clark AFB where we picked up SSGT Davis. Flying at 60 knots and 1700 feet we placed ourselves individually in a sitting position in the door with our feet on the foot bar. From this position the blades overhead did not seem to pose any problem. The left landing gear did seem to loom out as quite a large obstacle, but as it turned out it was cleared with ease. It is felt, however, that, if an air-speed of greater than 60 knots were to be used, the landing gear could possibly interfere with the jumper.

6. Chief Woods and I made four jumps apiece on that day (5 JUL 62) and found it to be a very easy aircraft from which to jump. On subsequent occasions we have continued to use this aircraft, and, to date, we have a total of forty jumps from the HUK-1. The fact that we can now use our HUK-1 to train has made our job here much simpler and we would like to thank you for publishing the original article by SMS SamNeira and SSGT Wayne Timbrook which was our inspiration for trying this bird.

7. We don't know if we are the first to use the HUK-1 for parachuting but if you have any information on this we would appreciate hearing from you.

Respectfully,
R. D. LaChance

In a second letter, answering a query from Rotor Tips for additional information, Lieutenant LaChance advises that the NAS Cubi Point paramedic team has received official Chief of Naval Operations approval and that he believes this to be the first such Navy unit to be formed. The lieutenant also advises that all of the members of the team have been designated qualified naval parachutists and the Naval Air Station has included the work of the paramedic team among its primary tasks and missions. Qualified parachutists will be sent from the United States to replace the present group in the normal process of tour rotation.

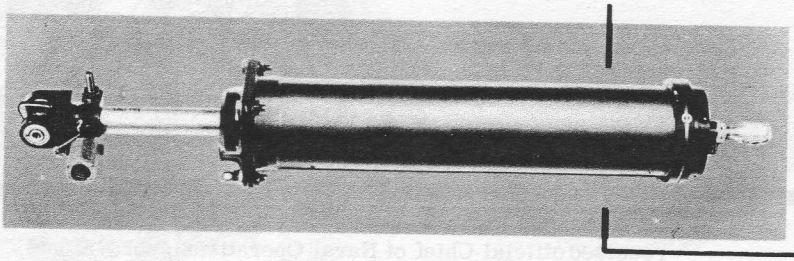
Lieutenant LaChance said that much of the above action has taken place because the team had been able to utilize the HUK-1 and that, so far, approximately 70 jumps have been made from the helicopter. The Sky-Diving Club at Cubi Point has also been successfully utilizing the HUK-1, he added. *(This article is furnished for informational purposes only. No jumps should be made, of course, without proper authorization.)*

TRIAL RUN—E. H. Woods, PRC, USN; left, and Lt R. D. LaChance, MC, USNR, try a "ground jump" before attempting the real thing. (USN photo)

NAS CUBI POINT PARAMEDIC TEAM—T. D. Carpenter, HM1; P. R. Duncan, PR2; Lieutenant LaChance; Lieutenant Davis and Chief Woods. (USN photo)

READY TO GO—Lt D. B. Davis II, MC, USN; H. Oldemeyer, AC3, and Lieutenant LaChance boarding UH-43C before making one of approximately 70 jumps. (USN photo)

FIRST FROM THE HUSKIE—SMSgt Sam Neira, left, and SSgt Wayne Timbrook, USAF, of Robins AFB, Ga. preparing to jump from HH-43B. Their article in Rotor Tips led to the formation of the NAS Cubi Point Paramedic Team. (USAF photos)



THE HH-43B COLLECTIVE LIMITER

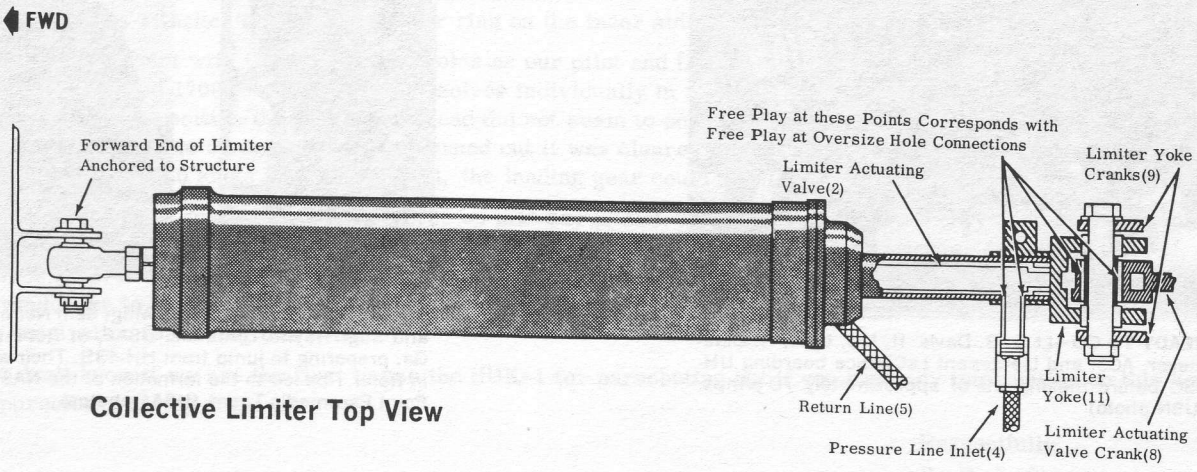
What it is . . . What it does . . . Troubleshooting

by William J. Wagemaker
Service Engineer
Field Service Department

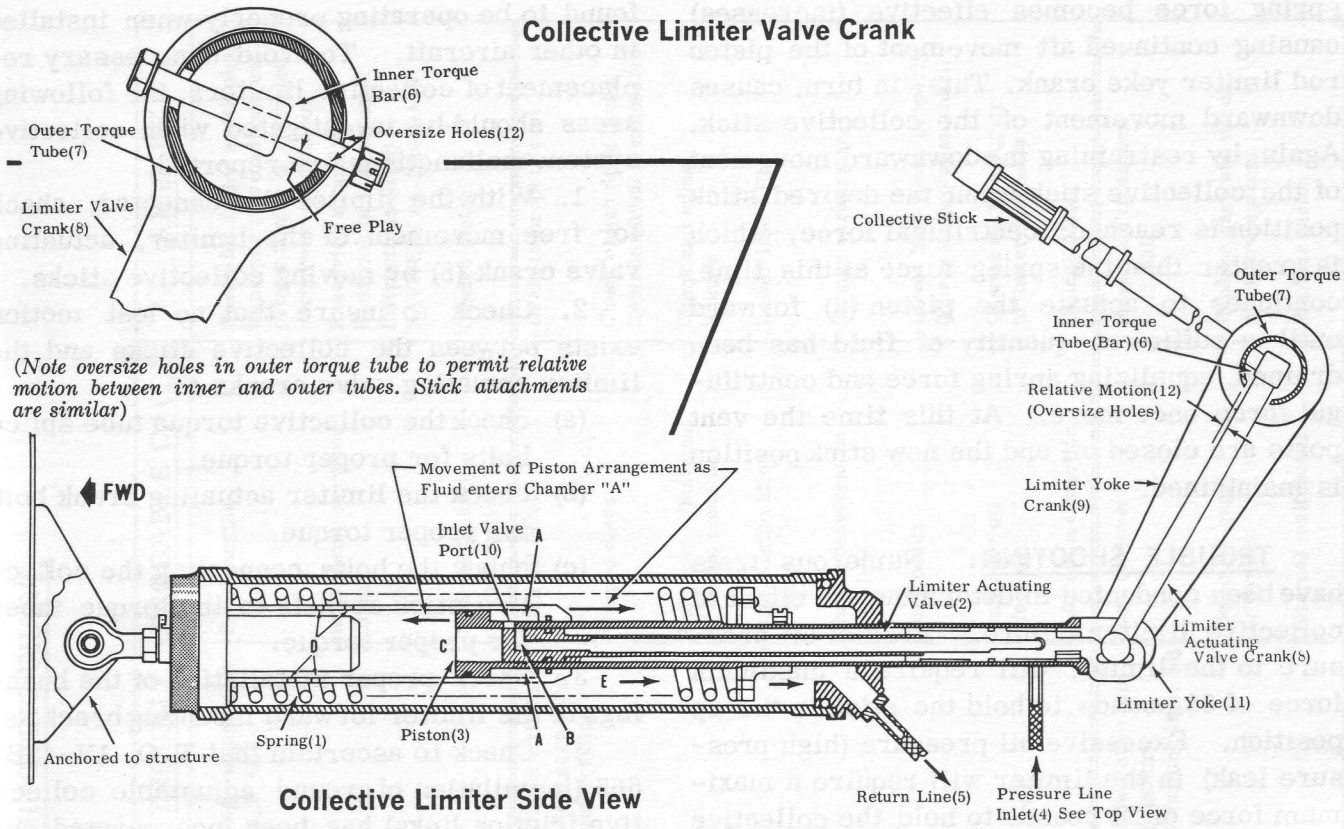
PURPOSE: The collective limiter in the HH-43B helicopter is provided to counteract the centrifugal force (CF) transmitted to the collective torque tube. In the HH-43B push-pull flight control system, movement of the servo-flap is accomplished through a long control rod located inside each rotor blade. These control rods generate a centrifugal force at operational rotor speeds, which tends to cause the collective sticks to rise. This force must be counteracted or balanced out to prevent uploads on the collective stick and resultant pilot discomfort.

DESCRIPTION: (Ref. drawings) The limiter itself is a cylindrically shaped, hydro-mechanical device utilizing spring force and hydraulic pressure. It is attached to, and controlled by, the collective torque tube assembly. Housed within the limiter are a spring (1) which balances the bulk of the centrifugal forces, an actuating valve (2) to direct hydraulic pressure, and a piston (3) arrangement which compresses the spring when actuated by the hydraulic pressure. The hydraulic pressure at 250 to 275 PSI is supplied to the limiter from one stage of the main transmission oil pump. The pressurized transmission oil flows through a line to the inlet fitting (4) of the limiter actuating valve. An accumulator (not shown) is used on the pressure line to maintain a smooth volume flow at constant pressure by absorbing minor pressure surges. A return line (5) allows vented fluid to return to the main transmission oil tank.

LIMITER OPERATION: As stated previously, the limiter is controlled by the pilot through the collective torque tube assembly (Ref. drawings). This assembly is made of an inner solid bar (6) and outer torque tube (7). The inner torque tube or bar connects the limiter actuating valve (2) to the pilot's and copilot's collective sticks through the limiter valve crank (8). The outer torque tube is connected directly to the spring (1) through the limiter yoke (11) and yoke crank (9). Relative (circumferential) radial motion or play between the inner and outer torque tubes is designed into the assembly, through the use of oversize



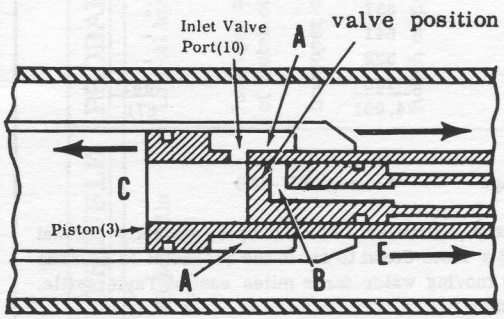
Collective Limiter Top View



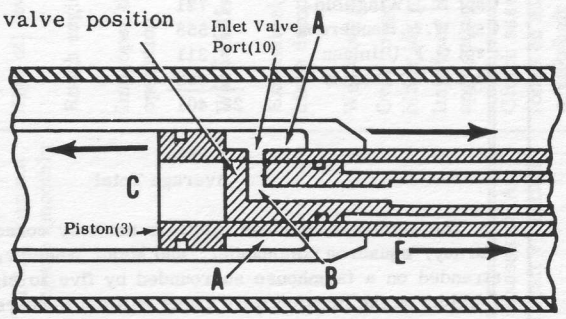
holes (12) in the outer torque tube, to permit the limiter to "sense" collective stick movement and to respond in the proper manner.

The spring (1) in the limiter produces a force great enough to overcome the centrifugal force at all normal rotor speeds. If rotors were engaged at maximum allowable RPM and with hands off the collective, the spring force is great enough to restrain or hold the collective sticks on the "down" stop and would do so if no hydraulic pressure were introduced. With upward movement of the collective sticks by the pilot, the limiter actuating valve (2) through movement of the inner torque rod is actuated forward, uncovering the inlet port (10) in chamber "A" and allowing pressurized fluid from chamber "B" to enter, compressing the spring (1).

Fluid will continue to enter chamber "A," as long as the pilot exerts an upward pressure at the stick. When the desired collective stick position is established and the stick is restrained from further movement, hydraulic action continues to compress the spring until the resultant spring force is equal to centrifugal force at a given rotor speed. The valve (2) then centers itself on the actuating valve crank (8) closing off the inlet port (10) and trapping fluid in chamber "A." Fluid pressure in chamber "A" is now equivalent to the differential between CF and spring force, stabilizing the collective stick at this position. Initial downward movement of the collective stick moves the limiter actuating valve aft, opposite to up-collective movement. This action relieves the trapped fluid in chamber "A" and bleeds to chamber "C." The fluid then returns to the reservoir via ports "D" to chamber "E" and return line (5). As the fluid is no longer trapped, it begins to drain off and the



Down Collective



Up Collective

spring force becomes effective (increases) causing continued aft movement of the piston rod limiter yoke crank. This, in turn, causes downward movement of the collective stick. Again, by restraining the downward movement of the collective stick when the desired stick position is reached, centrifugal force, which is greater than the spring force at this time, continues to actuate the piston (3) forward until a sufficient quantity of fluid has been drained, equalizing spring force and centrifugal force once more. At this time the vent ports are closed off and the new stick position is maintained.

TROUBLE SHOOTING: Numerous tests have been conducted to determine the effect of collective limiter failure. Loss of oil pressure to the limiter will require a maximum force of 50 pounds to hold the stick in the up position. Excessive oil pressure (high pressure leak) in the limiter will require a maximum force of 34 pounds to hold the collective stick in the down position. In both cases the maximum forces can be reduced by increasing or decreasing rotor RPM, depending on stick tendencies.

Collective limiter malfunction in flight will cause discomfort to the pilot, as mentioned earlier, but will not unduly jeopardize control of the helicopter. No such limiter failures have been reported in over 48,095 flying hours to date.

In the past, several limiters have been removed from aircraft which subsequently were found to be operating properly when installed in other aircraft. To avoid unnecessary replacement of collective limiters, the following areas should be investigated when collective system malfunctions are reported.

1. With the limiter disconnected, check for free movement of the limiter, actuating valve crank (8) by moving collective sticks.
2. Check to insure that no lost motion exists between the collective sticks and the limiter actuating valve cranks (8).
   (a) check the collective torque tube splice bolts for proper torque.
   (b) check the limiter actuating crank bolt for proper torque.
   (c) check the bolts connecting the collective stick sockets to the torque tubes for proper torque.
3. Check proper installation of the bushings in the limiter forward mounting brackets.
4. Check to ascertain that T.O. 1H-43B-565 (installation of ground adjustable collective friction links) has been incorporated and is functioning properly.
5. Insure proper functioning of the rudder lock solenoid valve.
6. Ascertain that the transmission oil pump is supplying adequate pressure to the limiter-at least 250 to 275 PSI.
7. Check to insure that the pressure inlet fitting moves freely in the slot in the guide bracket.

Only when these possibilities have been exhausted should the limiter be suspect as cause for system malfunction. K

A total of 28,401 flying hours---that's how many have been accumulated by the nine instructor pilots attached to the 3638th Flying Training Squadron (Heli) and flying in the HH-43B section. Here's the breakdown according to a report submitted at the request of Stanley Balcezak, KAC service representative at Stead AFB, Nev.:

NAME	TOTAL TIME	TOTAL HELICOPTER	HH-43B	H-43A
Lt Col F. M. Carney	4,368	1,890	539	-
Maj H. P. Wheeler	5,101	1,658	684	-
Capt F. M. Donohue	2,102	1,847	537	-
Capt J. E. Lamoreaux	2,699	1,895	267	480
Capt J. W. Kelly	2,909	1,850	459	-
Capt B. J. Wingfield	2,721	2,337	337	-
Capt W. L. Henderson	2,558	2,197	641	-
Capt G. F. Ullmann	3,311	2,789	522	-
Capt D. W. Thomas	2,632	1,994	105	391
	28,401	18,477	4,091	871
	3,155 Average Total	2,053 Helicopter Average	551 Average HH-43B	

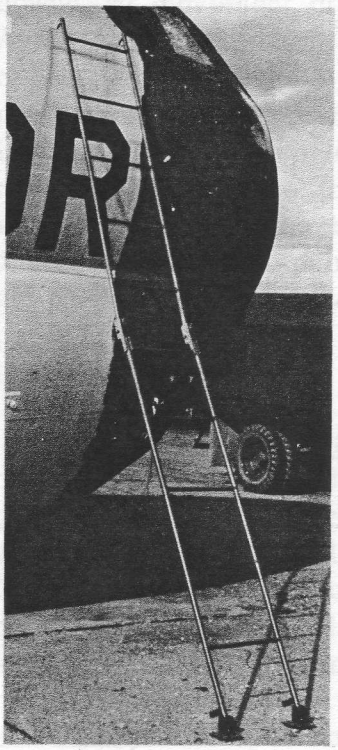
The activities of these pilots is not only concerned with instruction, however. For example, recently Colonel Carney, squadron commander, and Major Wheeler, flew two HH-43B's from Stead to aid in the rescue of 14 persons stranded on a farmhouse surrounded by five to eight feet of swiftly moving water three miles east of Taylorsville. Copilots on the mission were Capts William Henderson and David Thomas.

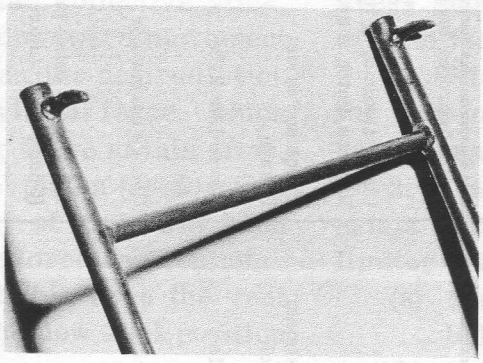
OH-43D/UH-43C CLUTCH TROUBLE-SHOOTING CHART

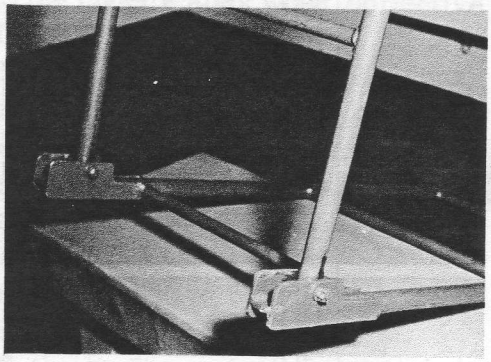
TROUBLE	PROBABLE CAUSE	REMEDY
Clutch fails to engage	Low oil level	Refill to proper level
	Improper adjustment of clutch control	Check and adjust clutch control linkage
	Improper oil viscosity	Change from type of oil or viscosity being used to an acceptable alternate
	Rough engine	Check engine spark plugs, valve adjustment, magnetos, carburetor, adjust stuck primer valve
	Internal leakage or malfunction	Replace clutch
	Improper technique	See Flight Manual NAVWEPS -260HBA-1
Clutch does not engage smoothly	High oil level	Drain to proper level
	Rough engine	Check engine
	Improper throttle operation	Check throttle linkage Check carburetor for sticking, accelerator pump, and butterfly valve
	Warped discs	Change clutch
	Excessively tight inter-blade dampers	Adjust dampers
	Weak lag springs	Change springs
	Over torqued rotor blade lag pins	Retorque to proper torque
	Improper throttle application	Operate in accordance with Flight Manual
Excessive Aircraft vibration	Clutch assembly loose on engine crankshaft	Swing out engine, inspect splines, cones, and tighten clutch retaining nut

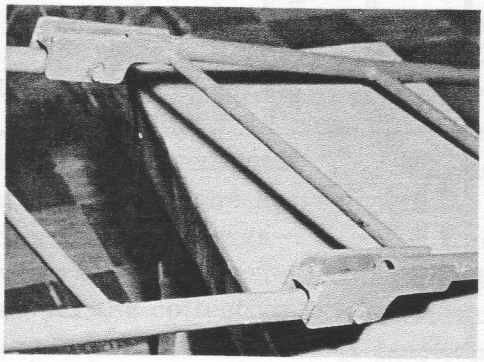
TROUBLE	PROBABLE CAUSE	REMEDY
High engagement R.P.M.	Rough engine	Check for fouled spark plugs, improper valve adjustment proper timing of magnetos, carburetor adjustment
	Improperly serviced clutch	Reservice according to Handbook of Maintenance Instructions (HMI) NAVWEPS 01-260HBA-2
	Internal leakage or malfunction	Change clutch
Clutch fails to disengage during autorotation	High oil level	Drain to proper level
	Warped discs	Check clutch drag limits Replace clutch if excessive
	Improper adjustment of clutch control	Check and adjust linkage
	High Engine Idle RPM	Lower Idle RPM
	Engine deceleration too slow	Change carburetor
	High cones	Lower both cones properly (Check autorotation chart)
	Improper oil viscosity	Change oil to a higher or lower viscosity
	Internal malfunction	Change clutch
Low clutch oil pressure (Warning light on)	Low oil level	Reservice in accord with HMI
	Defective gage or system	Replace gage and check pressure system
	Internal malfunction	Replace clutch

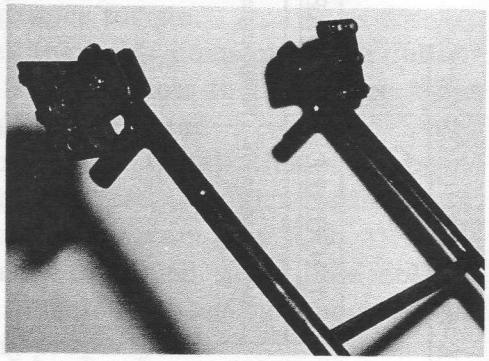
Design For RESCUE—











CRASH ENTRY LADDER—This crash-entry ladder was designed by 1st Lt. Walter J. Zimmerman of Det. 42, EARC, Dow AFB, Maine and built by the Field Maintenance Welding Shop at the base. It is designed for use with larger aircraft, such as the KC-97 and B-52 but may be used equally well on smaller aircraft. Special features of the ladder are a non-skid foot which prevents slippage on all surfaces, a hinge for folding which locks "off center" when the ladder is extended, and hooks for impaling the unit on an aircraft. The ladder weighs approximately 35 pounds, and has been found easy to handle in practice fires. (USAF photos)

1. The length of the ladder can be varied to meet local requirements. The hinge may be omitted from ladders six feet or less in length. Instructions are for a ten-foot ladder.

2. Select four pieces of 1 inch OD steel tubing 5 feet long (1/2 ladder length), and nine pieces of 3/4 inch OD steel tubing 16 inches long.

3. Drill holes 13/32 inches in diameter 1-1/2 inches from the ends of two pieces of 1 inch tubing for the sides of the bottom section and 1 inch from the ends of the remaining two pieces for the top section.

4. Lay sections out on a flat surface with holes parallel to the surface. Measure 14 inch lengths on the tubes, and weld rungs to sides. Make certain that all holes are parallel to the rungs before welding.

5. Cut four hinge side plates from 3/16 inch plate and weld the side plates to the top of the bottom ladder section. Position these sections carefully.

6. Bolt top section to hinge plates. It may be necessary to spread the hinge sections slightly, or grind the sides to allow the top section to move freely.

7. Cut stop plates 1 inch x 1-1/4 inches from 3/16 inch plate. Position these plates to allow the top section to stop at a five degree forward angle from the bottom section. Make certain that the stop plates on both hinges contact the top ladder section evenly.

8. Cut parts for the feet from 3/16 inch plate, drill 1/4 inch holes in the bottom plate, weld parts together, and attach to ladder with bolts.

9. Grind points on 16 bolts, 1/4 inch in diameter and 3/4 inches long. Attach to feet with bolts.

10. Shape hooks from 1/2 inch diameter steel rod. Grind sharp points on the ends, and harden by quenching. Drill a 1/2 inch diameter hole through the rear wall of the top section tubes, insert hooks and weld.

11. Make hook shrouds from two pieces of 1 inch OD tubing 2-1/2 inches long and position on the bottom of the ladder as shown, to allow hooks to enter freely. Weld to ladder.

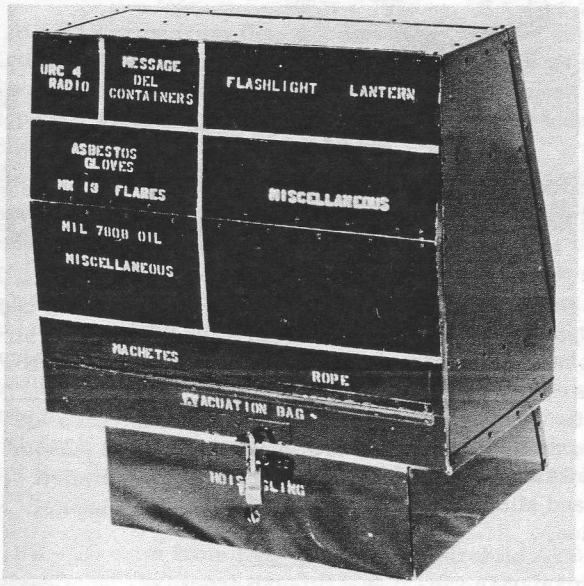
12. Coat rungs with "Non-Skid," which is a preparation used on aircraft walkways.

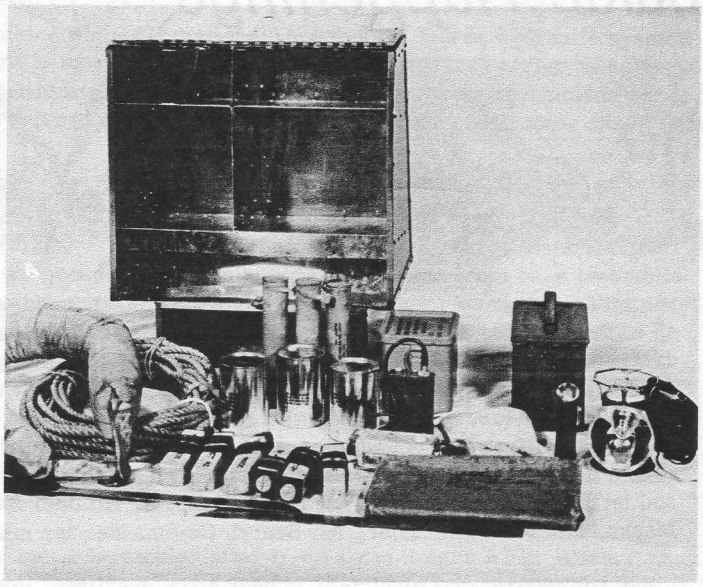
13. Prime and paint ladder. (Color as desired)

LIST OF MATERIALS

1 inch OD steel tubing - 20 feet
3/4 inch OD steel tubing - 12 feet
3/16 inch steel plate - 4 inches x 20 inches total
3/8 inch diameter x 2 inch long steel bolts and nuts, 4 ea.
1/4 inch diameter x 3/4 inch long steel bolts and nuts, 16 ea.
3/8 inch ID washers, 8 ea.
1/2 inch diameter steel rod - 6 inches
"Non-Skid" as required

Blueprints of the ladder, and storage box on the following page, may be obtained by contacting Det. 42 at Dow Air Force Base.





EQUIPMENT STORAGE BOX—This box was developed by Det. 42 for the storage of rescue equipment aboard HH-43B (H-43B) helicopters. Its advantages are listed below. (USAF photos)

1. The equipment box utilizes a minimum of available space, since it is positioned behind the copilot's seat, between the controls tunnel and left side of the aircraft. This position also makes the box readily accessible to all crewmembers. Since it is positioned well forward, it helps keep the aircraft center of gravity forward of the aft limits. The box weighs less than commonly-used footlockers.
2. The box provides neat, orderly compartments for all equipment required by ARSM 55-4, plus ample room for extra equipment. The box is secured with a padlock to prevent loss and pilferage. Equipment is protected from oil and grime which accumulates when the items are exposed.
3. The entire box may be quickly and easily removed, to facilitate maintenance requirements and configuration changes. It is secured in the aircraft with cargo straps attached to existing cargo tiedown rings. Indentations in the bottom compartment accommodate litter poles.

"How's the hunting?", is perhaps the most familiar question circulating throughout Michigan's game packed Upper Peninsula this time of year.

For the HH-43B crew members of detachment 24, Central Air Rescue Service at Kincheloe Air Force Base this seasonal question has an unusual meaning. Their answer is given in terms of how many lost hunters they have searched for, found, rescued and airlifted during the hunting season.

An Air Defense Command installation located approximately 25 miles below the Canadian border and one of the most popular deer hunting areas in Michigan, Kincheloe is annually called upon by U.S. and Canadian officials alike for assistance in missing persons search operations.

The base responds most frequently through its tiny tenant, detachment 24 CARC (MATS) under the command of Capt Henry P. Fogg. In addition to the HH-43B HUSKIE helicopters of the detachment, Maj Robert Heesen, Kincheloe's Search and Rescue coordinator, can call upon a volunteer search team of 30 experienced woodsmen serving in the Air Force at Kincheloe.

During the current hunting season Kincheloe has participated in six major lost hunter searches in cooperation with Michigan's State Police and Conservation Department. Two of the missions were carried on at night, and all have been successful.

Through the media of local newspapers, radio and TV stations, Kincheloe continues to caution hunters on safety precautions and survival techniques. The Air Force has advised all hunters to enter the woods prepared to spend a wet and cold night.

The base's Ground Safety office has made long strips of international orange parachute cloth available to airmen on the base who intend to go hunting. The strips can be seen clearly in the woods and snow, both by fellow hunters and airborne search crews.

As Michigan's hunting season continues, so do the missing person searches conducted by the Air Force at Kincheloe. Viewing their own rescue activities, men of detachment 24, at the base shrug off praise from the local communities and say it's all part of their job. A job well done and much appreciated by more than several hunters, who perhaps once failed to admit there was a possibility of becoming lost.

KINCHELOE CHIEFTAIN

Huskie Happenings

...ARS Detachments 42, Dow AFB, Maine; 44 at Westover AFB, Mass.; and 45 at Pease AFB, N.H.; participate in five-day search and support operation after the crash of B-52. Downed aircraft spotted by Maine Fish and Wildlife Dept. pilot about eight miles east of Greenville, Maine. Three HH-43B's used to search for wreckage and survivors in initial phases of search, and later ferry men and equipment to crash site. Thickly-forested area in which crash occurred dotted with 3,000-foot mountains. Temperatures reach -32 degrees and 40 to 50-knot winds create severe turbulence in the area. Two of nine crewmen aboard B-52 survive crash. Piloting HUSKIES are Capt Jerome R. Luttinger and lst Lt Freedman of Det. 44; Capt Lucian F. Hallett and lst Lt James Ellis, Det. 45; lst Lt Walter J. Zimmerman and Mitchell E. James, Det. 42. Capt. Glenn M. Marks, Det. 42 commander, Air Search Commander for mission.

...Base fire department lays foam over runway and HH-43B from Det. 52, Charleston AFB, S.C., scrambles after F101 blows tire on take off. HUSKIE intercepts and follows plane which touches down then veers to left of runway. Nose gear collapses but no fire and no injuries. HH-43B rotor downwash used to clear foam from runway. Aboard helicopter are Capt H.A. Lee, Lt. L. Salmans, Sgt Parker, Sgt Chunn and A1c Berry.

...ARS Det. 24, CARC, Kincheloe AFB, Mich., teams up with Provincial Police of Canada to recover body of Canadian trapper who died in woods. HH-43B crew also flys Canadian police officer to cabin where trapper's wife notified of husband's death. Woman, ill and without sufficient food supplies, flown by chopper to town. Crew of HUSKIE consists of Capt's H.P. Fogg, Paul J. Darghty and A2c Robert L. Love.

...Pilot of T-33 flying near Dow AFB, Maine, spots burning house, advises Base Operations. ARS Det. 42, EARC, dispatches HH-43B with fire suppression kit to determine if anyone trapped in building. Chopper, piloted by 1stLt's Walter J. Zimmerman and Mitchell E. James and with SSgt Clifford R. Langley as crew chief, arrives at scene as civilian firefighting equipment pulls up. Occupants of building had escaped unharmed. FSK released near house and rescue technicians, SSgt Louis A. Mason and A1c Roy K. Shippey, disembark and offer assistant. No attempt made by civilian firemen to save structure, burning out of control. HH-43B returns to base.

Practice Pays Off

Soon after ARS Det. 34, CARC, Biggs AFB, Texas, received its HH-43B's, Capt Price S. Summerhill, the commander, held a practice drill to give the alert crew practice in getting the HUSKIE off the ground under scramble conditions. The practice went "like clockwork" and the aircraft was recocked and prepared for routine alert duty.

Captain Summerhill's foresight paid off immediately. As the alert crew, 1st Lt Billy J. Johnson, 1st Lt Marcus H. Coody, A2c Larry D. Varvel and A1c O.M. Roche, headed for the ready room---the Operations phone rang. A small aircraft was down in the rugged Delaware Mountains about 80 miles east of Biggs!

The HH-43B took off and headed for the crash scene. While en route they were offered assistance by a C-123 piloted by LtCol Thomas Broughton of the 95th Bombardment Wing which was on a local flight. Both aircraft searched the fog-covered area for approximately 20 minutes, then the downed aircraft, a Luscombe piloted by a sergeant from Davis-Monthan AFB, Ariz., was spotted on a steep mountain slope. The pilot had been in the cold and fog for approximately six hours. The hoist was used to bring him aboard the HH-43B where he was treated for severe bruises by Airman Roche, medical technician. The HUSKIE then returned to base, mission completed.

Maintenance Section Lauded

"Outstanding" is the word Capt Dale R. Tyree, commander of Det. 41, Loring AFB, Maine; uses when describing the maintenance section headed by CMS Robert T. Hamilton. The captain backs up his contention with the following:

A. On 22 January 1963 the combined hours of the two HH-43B's assigned exceeded 1500 hours. One had 831.3 and the other 670.4.

B. From 1 October 1961 to 22 January 1963 the unit had flown 861 hours in the HH-43B.

C. From 1 October 1961 to 22 January 1963 the unit had averaged 55 hours per month.

D. In two months (June, July 1962) the unit flew 180.3 hours in the HH-43B.

E. In three months (June, July, August 1962) the unit flew 232.6 hours in the HH-43B.

F. The unit has two pilots who as of 22 January 1963 had over 700 hours in the HH-43B (one had 700 hours and the other 740 hours).

...HH-43B crew from Det. 42, Dow AFB, Maine; scrambles when Air National Guard plane looses hydraulic system. HUSKIE intercepts plane at touchdown and follows as it rolls to end of runway, overruns arresting barrier and plunges into snowbank. Capt Glenn M. Marks, HH-43B pilot; positions fire suppression kit and lets rescue technicians out of chopper. Pilot and radar observer from plane evacuate and are delivered to Base Operations by helicopter exactly six minutes after ringing of crash alarm.

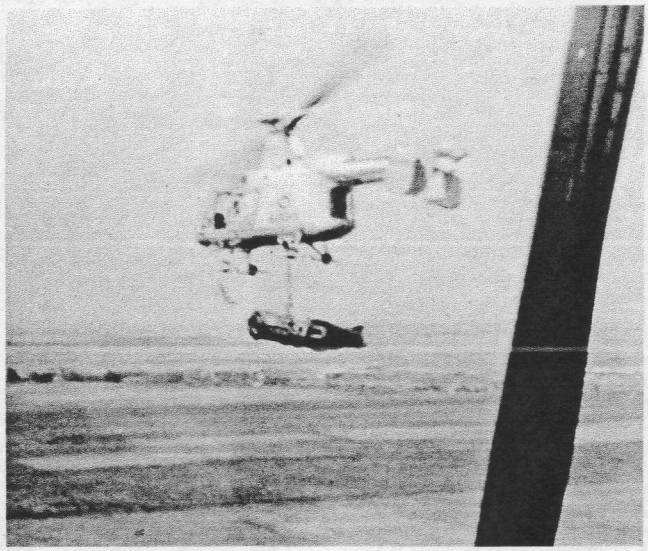
...HH-43B crew from Det. 52, EARC, Charleston AFB, S.C., consisting of Capt R. H. Coan, Capt H.A. Lee, A1c L. M. Autry and A2c E. L. Shea, joins Coast Guard in search for two teenage boys missing on fishing expedition near Isle of Palms. Youths located in Coast Guard search area....ARS Det. 24, Kincheloe AFB, Mich., dispatches HH-43B to aid ground parties in search for airman from base lost while on hunting trip. HUSKIE airborne at 0155, arrives at search area at 0210 and starts search for campfire. Visibility four to five miles in snow showers, winds 8 to 10 knots gusting to 15. Bright fire sighted at 0220 and lost hunter located in thick woods. Helicopter hovers at 100 feet to clear trees, visibility poor as snow showers prevent use of floodlights. After hover established, flood lights turned on and crew chief directs helicopter down into opening in trees until 75-foot hover established. Medic lowered by hoist to instruct hunter in use of sling. Survivor hoisted to aircraft and sling lowered for medic. While pickups being made, HH-43B hovers in confined area for 25 minutes. Capt Roy E. Bergstrom, pilot; Capt John F. Patterson, copilot; A2c Everett N. Kendrick, crew chief; SSgt Thomas M. Osborn, medical technician.

...HH-43B crew from Det. 6, WARC, Fairchild AFB, Wash.; scrambles after U-6A from Geiger AFB, Wash., crashes near civilian airport in Idaho. HUSKIE flys two of five crash survivors on 25-minute trip through fog and over mountains to Moscow, Idaho, hospital. Helicopter later called upon at 1930 hours to air evacuate other three survivors who required immediate specialized attention and facilities not available at Moscow. HUSKIE pilot, 2ndLt Marvin A. Cleveland, elects to take off despite marginal weather and makes hazardous round trip between Moscow and Fairchild despite fog encountered. Lands at base with survivors at 2150 hours. Taking part in the missions with Lieutenant Cleveland are 1stLt Robert N. Schannep, copilot; SSgt Billey E. Harrison, crew chief; MSgt James D. Murray, medical technician and Capt Harold L. Roberts, flight surgeon....48th Air Rescue Squadron at Eglin AFB, Fla., receives two HH-43B's. HUSKIES to be used in direct support of test programs and other activities conducted at Eglin.

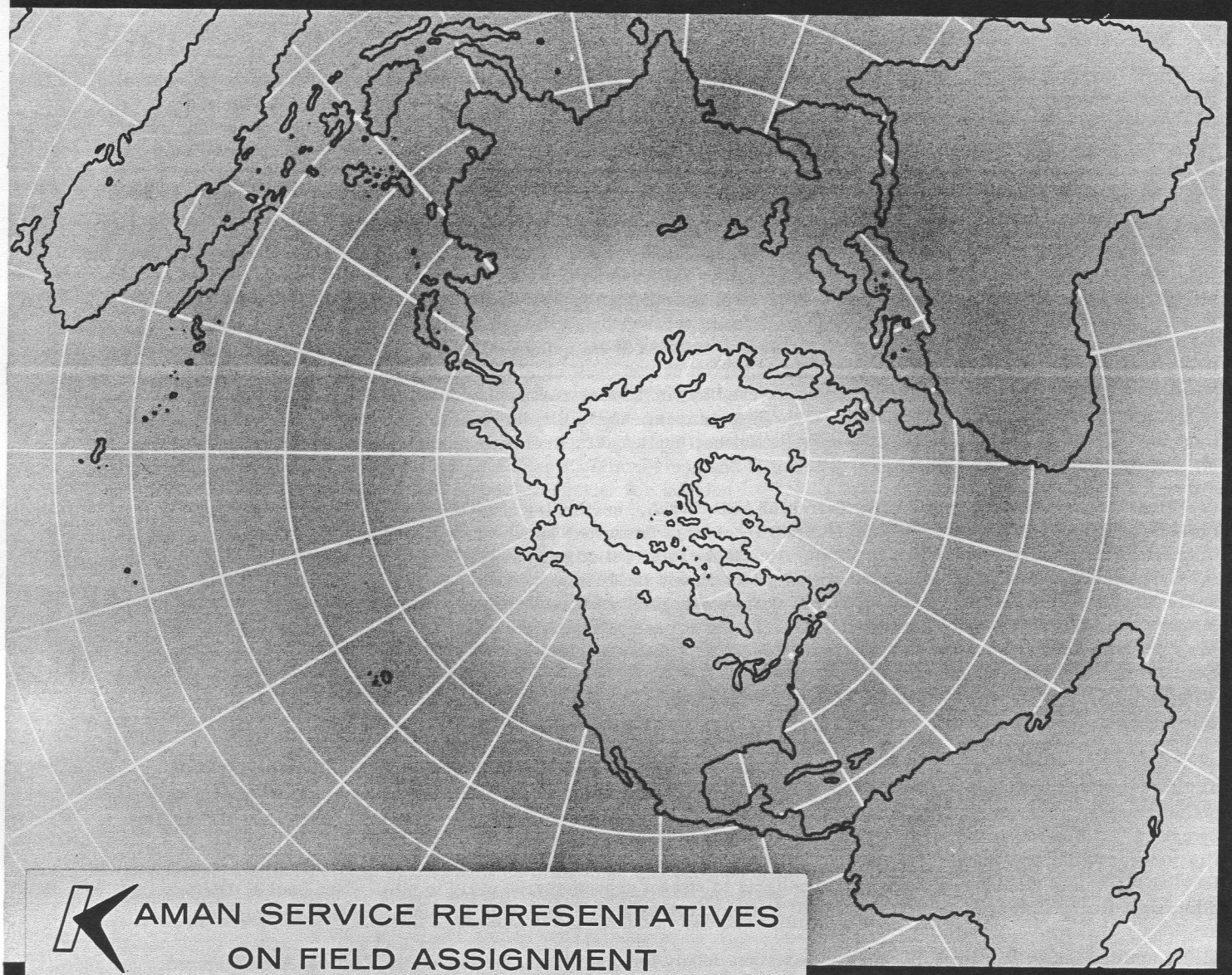
...Two HH-43B's delivered to Det. 28, CARC, Randolph AFB, Texas, recently to replace H-43A's. Unit commended in base newspaper for efficiency shown in past utilization of piston-powered helicopter....HH-43B crew from Det. 24, Kincheloe AFB, Mich., takes off at 2200 after notification by base SAR officer that two airman on a hunting trip were lost in thickly wooded area about four miles from Kincheloe. Within few minutes, small fire spotted, checked and lost hunters located. HH-43B hovers at tree-top level about 75 feet from ground and uses floodlights to attract ground search party to site. Capt Paul J. Darghty, pilot; Capt Henry P. Fogg, copilot; SSgt Basil I. Gray, crew chief; SSgt Jackie L. Acup, medical technician.

...Committee led by MajGen J.H. Moore, assistant deputy for operations, Headquarters Tactical Air Command, views fire suppression demonstration by crew of HH-43B attached to ARS Det. 49, EARC, at Seymour Johnson AFB, N.C. Twenty-minute demonstration includes alerting and arrival of HUSKIE at practice accident scene and rescue of "pilot" while helicopter hovers overhead using rotor downwash to keep flames from cockpit of crashed plane. ...Name of Capt W. T. Leslie of Stead AFB, Nev., entered among those pilots who have logged 500 or more hours in HH-43B. Captain Leslie had 535 hours in HUSKIE as of Oct. 1, 62.

SCROLL OF HONOR—Mr. R. C. Boyd, KAC technical representative, presents Scroll of Honor to crew members of ARS Det. 51, EARC, Myrtle Beach AFB, S. C. The scroll was presented for the crew's dramatic helicopter rescue of two men from an ill-fated shrimp boat. Crew members are, l to r, TSgt S. A. Chestnut, crew engineer, and Captains Daniel M. Thomsen and Charles W. Roberts. (USAF photo)



THE EASY WAY—After a fighter plane crashed in a flooded rice paddy the Royal Thai Air Force took this means of recovering the 2,500-pound engine. Neither cars or trucks could approach the crash site due to water and mud. HH-43B pilot was Capt. N. Nopairt, Major Chulard, commanding officer of 63rd Rescue Sqdn., RTAF; copilot, and MSgt Chanit, crewchief.



KAMAN SERVICE REPRESENTATIVES ON FIELD ASSIGNMENT

DONALD P. ALEXANDER
ARS Orlando, Fla.

STANLEY M. BALCEZAK
Stead AFB, Nev.

WILLIAM C. BARR
Cannon AFB, N. M.
Reese AFB, Texas
Vance AFB, Okla.
Webb AFB, Texas
Kirtland AFB, N. M.
Biggs AFB, Texas

R. C. BOYD
Charleston AFB, S. C.
Myrtle Beach AFB, S. C.
Seymour Johnson AFB, N. C.
Shaw AFB, S. C.
Brookley AFB, Ala.
Craig AFB, Ala.
Moody AFB, Ga.
Maxwell AFB, Ala.

JOHN D. ELLIOTT
Kingsley Field, Ore.
McChord AFB, Wash.
Paine Field, Wash.
Portland Int'l Airport, Ore.
Hamilton AFB, Calif.

RICHARD FAIN
DONALD BEASLEY
NATC, Patuxent River, Md.

HORACE F. FIELD
Burma

DARRELL HEICK
Libya

GAROLD W. HINES
Davis-Monthan AFB, Ariz.
George AFB, Calif.
Luke AFB, Ariz.
Nellis AFB, Nev.
Williams AFB, Ariz.

JOSEPH T. JONES
Edwards AFB, Calif.
NAS, Corpus Christi, Texas
Sheppard AFB, Texas

JACK L. KING
WAYNE ZARLING
DONALD LOCKRIDGE
ROLF SCHWARZ
HOMER HELM
NAAS Ream Field, Calif.

JOHN R. LACOUTURE
O&R, NAS North Island, Calif.
Midway Island
NAS Barbers Pt., Hawaii
VMO-6 Camp Pendleton, Calif.

ROBERT LAMBERT
Germany

THOMAS C. LEONARD
K. I. Sawyer AFB, Mich.
Kincheloe AFB, Mich.
Selfridge AFB, Mich.
Wurtsmith AFB, Mich.
Duluth AFB, Minn.
Grand Forks AFB, N. D.
Minot AFB, N. D.
Truax Field, Wisc.

BILL MAGNAN
NS, Mayport, Fla.
NAS Cecil Field, Fla.
O&R, NAS Jacksonville, Fla.

WILLIAM C. MORRIS
NAS, Norfolk, Va.

DOMINIC L. RAMONDETTA
England AFB, La.
Laredo AFB, Texas
Perrin AFB, Texas
Randolph AFB, Texas
Laughlin AFB, Texas

RICHARD A. REYNOLDS
Dow AFB, Maine
Loring AFB, Maine
Pease AFB, N. H.
Westover AFB, Mass.

DAVID M. RUSH
FRANK McINNIS
PAUL WHITTEN
GORDON FICKES
FRANK BOBER
NAS Lakehurst, N. J.

RAY G. RUSSELL
VMO-1 MCAF Jacksonville, N. C.

JACK E. SMITH
Thailand

DONALD TANCREDI
Okinawa

HENRY J. TANZER
NAS Atsugi, Japan
NAS Agana, Guam
NAS Cubi Point P.I.
NAS Sangley Pt. P.I.
Shin Meiwa Ind. Co., Ltd.
Toyonaka City, Japan

TERRELL C. TURNER
Fairchild AFB, Wash.
Glasgow AFB, Mont.
Malmstrom AFB, Mont.

RAYMOND A. VOKES
Colombia

ROBERT I. WILSON
Dover AFB, Del.
Griffiss AFB, N. Y.
Suffolk County AFB, N. Y.
Andrews AFB, Md.

CUSTOMER OPERATIONS SECTION

R. L. BASSETT, Asst. Service Manager; G. D. EVELAND, UH-2A Coordinator;
W. G. WELLS, Asst. Supervisor, Field Service Representatives. R. W. SPEAR, Asst. Supervisor, Training