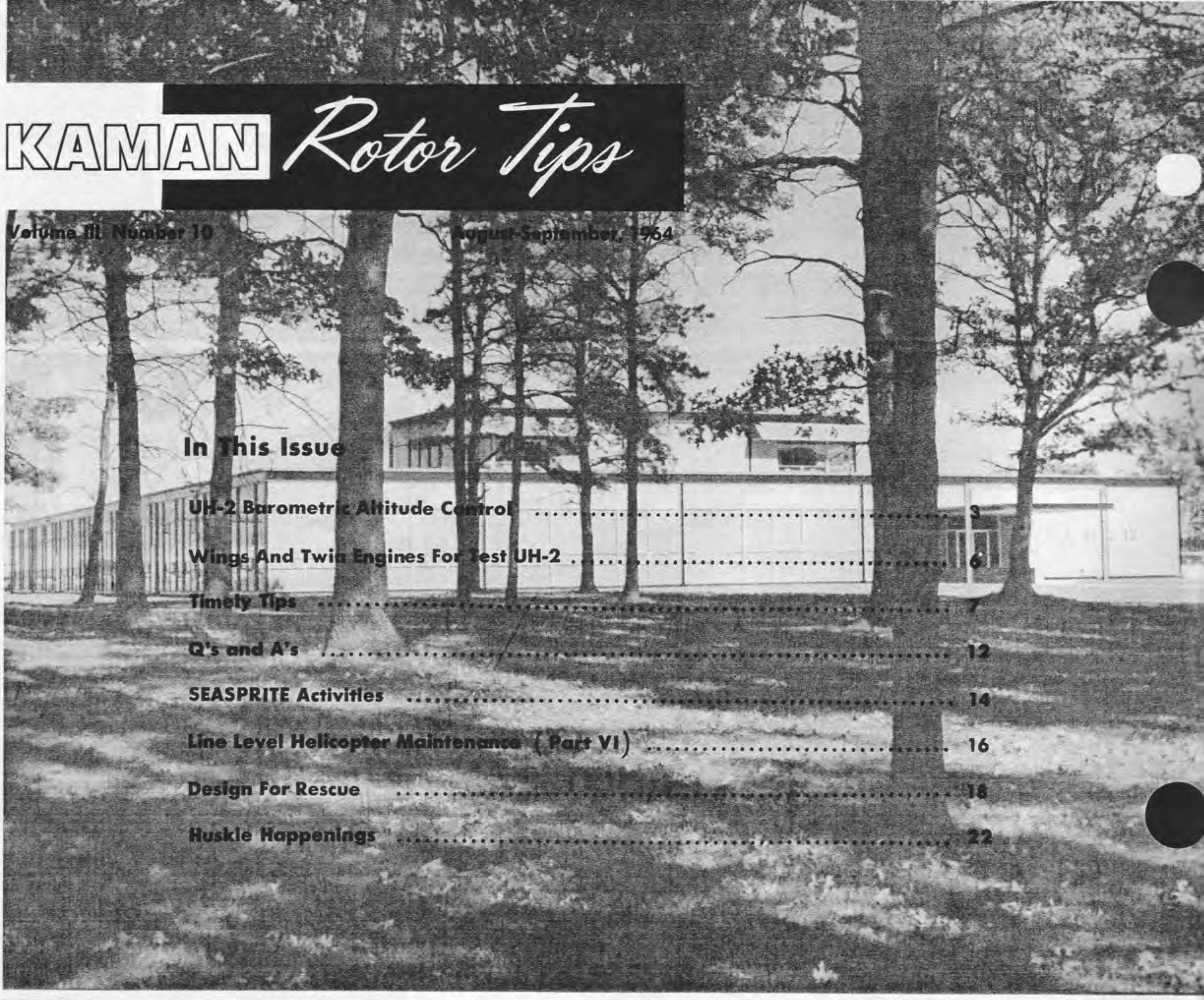
KAMAN Rotor Tips

KAMAN AIRCRAFT CORPORATION
PIONEERS IN TURBINE POWERED HELICOPTERS
AUGUST-SEPTEMBER
1964



KAMAN Rotor Tips

Volume III Number 10 August-September, 1964

In This Issue

THE COVER

HH-43B from ARS Det 1, Glasgow AFB, Montana, flies over raging flood waters while rescuing 59 survivors. Mission report on page 9. — Cover by Donald D. Tisdale, Service Publications.

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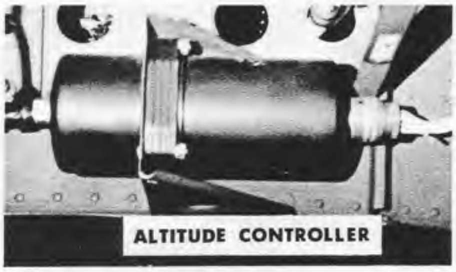
UH-2 BAROMETRIC ALTITUDE CONTROL



by Michael T. Fiaschetti
Service Engineer
Customer Service Department

The Automatic Stabilization Equipment (ASE) on the UH-2 SEASPRITE automatically maintains the attitude, speed and altitude during most phases of normal flight. The ASE also incorporates a feature which automatically synchronizes all input signals when the system is not in use. This prevents large, undesirable transients from disturbing aircraft attitude during system engagement and eliminates the need for manually nulling any input signals before system engagement. Such manual nulling is required with many other helicopters. The system is divided into four major channels corresponding to the four aerodynamic flight modes—pitch, roll, yaw and collective. The collective channel, which controls the helicopter's vertical motion, automatically maintains the altitude selected by the pilot by means of the Barometric Altitude Control mode (BAR/ALT) or the Radar Altitude mode (RAD/ALT). This article is concerned with the BAR/ALT mode, its operation, and trouble shooting. A similar article on the Radar Altitude Control will appear in Rotor Tips at some future date.

THE BAR/ALT MODE of operation provides a smooth riding helicopter even in unstable or gusty air. This has been accomplished by incorporating a "low-gain" system that does not respond immediately to "every little jump" or slight change in altitude experienced by the aircraft. Other channels in the ASE system do, however, employ "high-gain" systems that respond more quickly to a corrective signal. The BAR/ALT control functions at any operational altitude but its use is not recommended at altitudes below 50 feet or at airspeeds above 120 knots.

THE CONTROLLING TRANSDUCER in the BAR/ALT mode is the altitude controller, P/N B33601-00-001. This unit senses altitude changes by monitoring and detecting changes in barometric pressure. If the helicopter begins to lose or gain altitude after BAR/ALT has been engaged at a specific altitude, the undesirable change is detected by the controller which then transmits an "error" signal to the ASE amplifier, P/N 9616-10-04. The amplifier analyzes the error signal and transmits a "correction" signal to the collective channel servo valve on the ASE control actuator assembly. The actuator assembly, in turn, hydraulically changes the collective control stick position and the aircraft automatically returns to the engaged or preset altitude.

AUTHORITY OF THE ASE BAR/ALT SYSTEM can be overridden by the pilot at any time by simply applying pressure to the collective stick. If a small altitude change is desired, it can be attained by applying pressure to the collective stick until the new altitude is reached. Large changes in altitude can be accomplished in the same manner. However, they are best achieved by disengaging the collective control button on the collective stick, manually initiating the altitude change and re-engaging the control button at the new reference altitude. By pushing the annunciator OFF, the collective channel is disengaged and the channel synchronizes or "follows" to the new reference altitude. When the annunciator is pushed ON, the collective channel again has the authority and will maintain the UH-2 at the new altitude.

THE BAROMETRIC ALTITUDE CONTROL, like all man-made systems, is not trouble-free. The two primary malfunctions, usually detected and reported by the helicopter pilot, are: The BAR/ALT oscillates or hunts around the engaged altitude; the BAR/ALT climbs or drops on engagement. Usually, if the proper trouble shooting procedures are followed (Refer to NAVWEPS 01-260HCA-2-8 and trouble shooting sections of this article) the cause of either of these "gripes" may readily be found. The ASE amplifier, the altitude controller or the electro-hydraulic servo valve on the hydraulic actuator may all cause BAR/ALT malfunctions. Fleet experience indicates, however, that the majority of malfunctions are caused either by the collective servo valve or the altitude controller. Most of the trouble experienced with the servo valve is traceable to hydraulic fluid contamination.

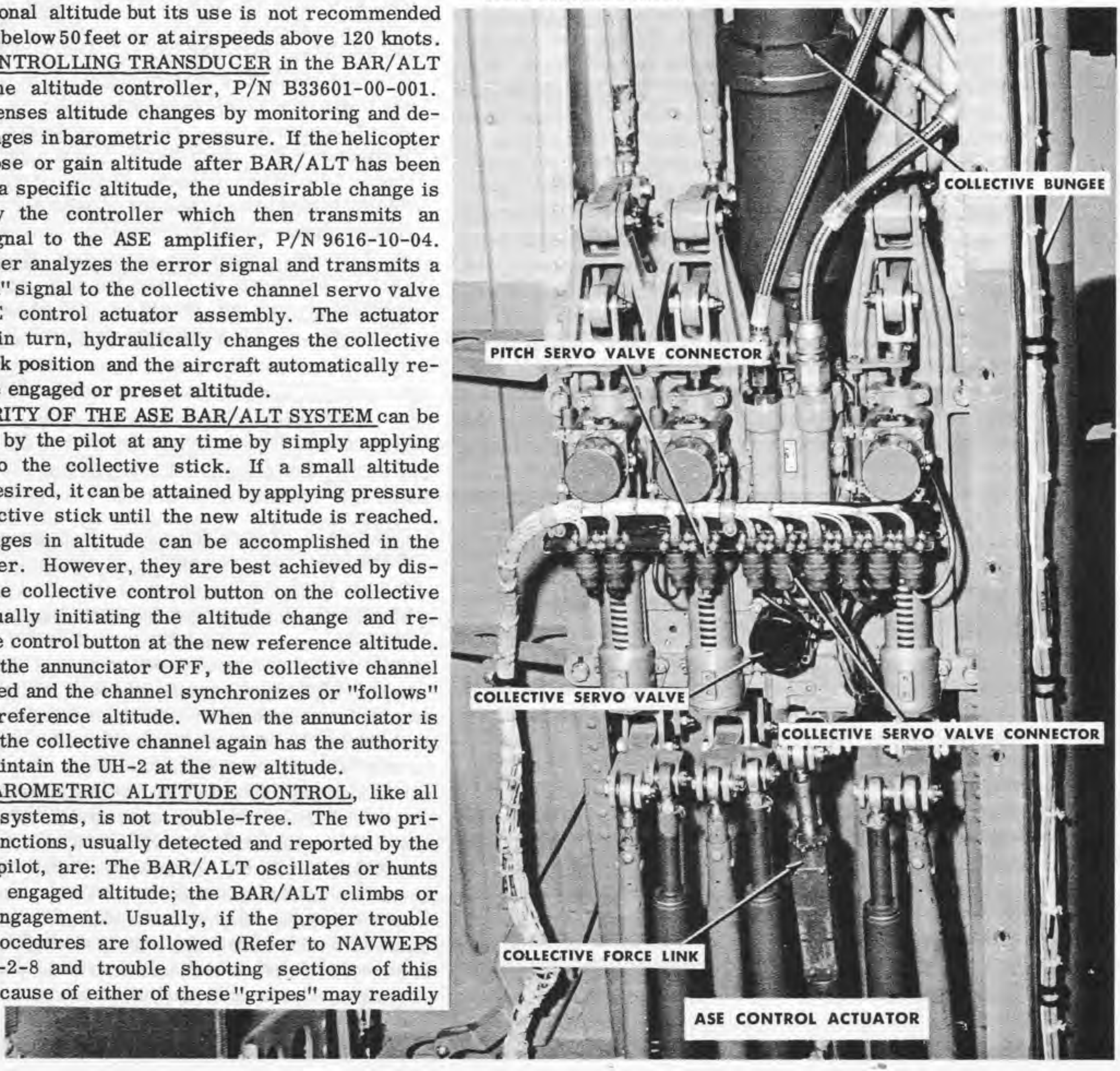
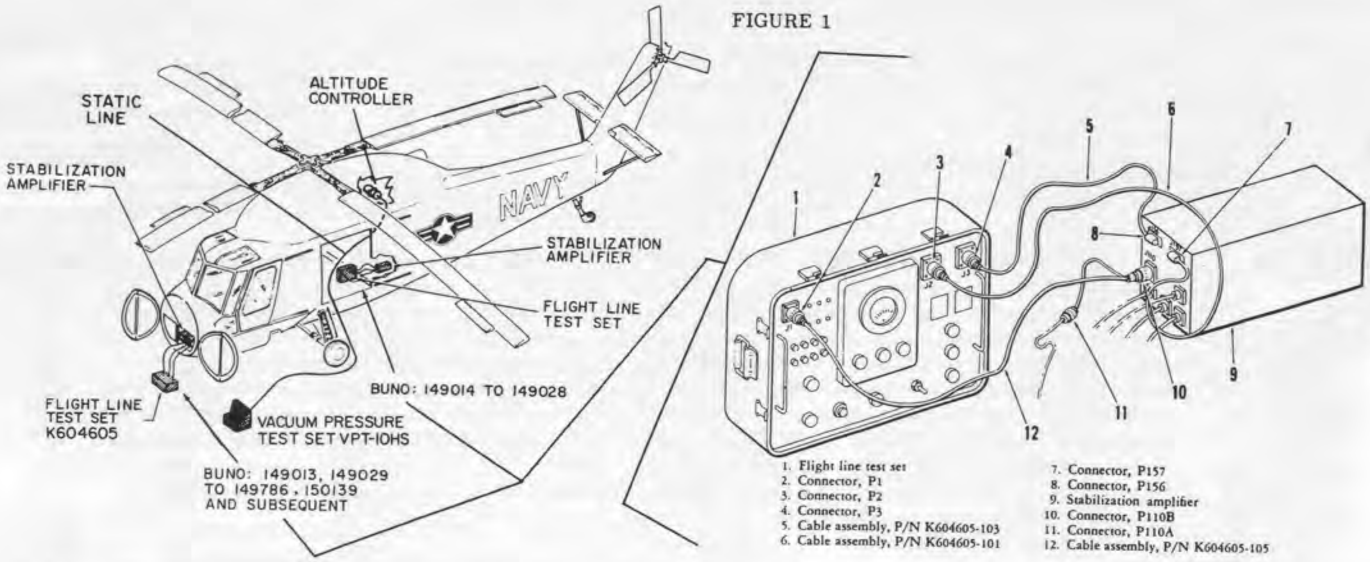


FIGURE 1

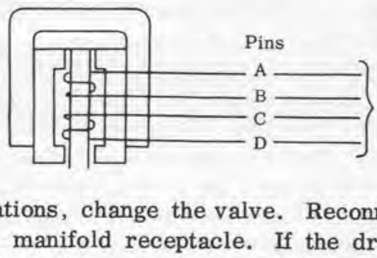


BAR/ALT TROUBLE SHOOTING – HYDRAULIC

A. Collective Servo Valve Check: (1) Connect the ASE Flight Line Test Set, P/N K604605, to the ASE amplifier as shown in figure 1. (2) Disconnect the collective bungee. (3) With electrical and hydraulic power applied to the helicopter, engage the ASE and BAR/ALT switches on the radio console between the pilot and copilot seats. (Before the ASE can be engaged, the hydraulic boost switch, located on the heat and miscellaneous panel in the overhead console, must be cycled and placed in the ON position and the 60-second time delay must be completed. The time delay is complete when the OFF flag on the copilot's remote attitude indicator disappears.) (4) Place the DEMODULATOR OUTPUT switch on the test set in the COLLECTIVE position. The two milliammeters on the test set are now monitoring the differential current being transmitted from the ASE amplifier to the collective servo valve. (5) Pull collective up midway of its full travel. (6) Observe the two demodulator meters, M1 and M2, while engaging the collective control button on the collective stick. The annunciator window should indicate ON. There should not be any drift or jump in the collective stick. If the collective stick does drift and the two demodulator meters are at their quiescent current—a condition where both M1 and M2 are indicating the same amount of current—either the servo valve is not properly adjusted or is malfunctioning. If the collective stick drifts or jumps upon engagement and the demodulator meters M1 and M2 do not indicate their quiescent current, proceed with the electrical trouble shooting procedures.

B. Collective Servo Valve Adjustment: If the stick is moving up, turn the servo valve adjusting slug counterclockwise until all movement stops. If the stick is moving down, adjust the slug clockwise until all movement stops. If the valve can be adjusted until all movement stops, adjust the slug so that the valve is in the center of its "dead-band" area. To position the valve in the center of the dead-band, adjust the slug until the actuator begins to move in one direction, then turn the slug in a counterclockwise direction until the actuator responds and starts to move in the other direction. This determines the dead-band area. Position the slug so it will be in the center of these two extremes. The collective stick may drift at an extremely slow rate. To detect this movement, turn the test set on and monitor the COLLECTIVE LVDT(Linear Variable Differential Transformer) by placing the voltmeter switch in position 12-COLLECTIVE SEL and the collective switch in position 4-SERVO POS LVDT. The voltmeter range switch should then be placed on the 3-volt range and the voltmeter function switch in the zero position. Any movement of the collective stick will cause a movement of the LVDT and the voltmeter will indicate the voltage corresponding to this movement. If a steel wrench is used, remove it from the valve slot after each adjustment as the steel may affect the servo valve magnet and cause erroneous adjustments. The most ideally suited tool for this application is a brass wrench. If the collective stick still drifts, remove the collective servo valve connector from its receptacle on the hydraulic actuator manifold. Using an ohmmeter, check the resistance of each coil in the valve—pins A and B, C and D. (See figure 2) The resistance of each coil should be 2830 ohms plus or minus 150 ohms. If the resistance does not fall within these

FIGURE 2



limitations, change the valve. Reconnect the connector to the manifold receptacle. If the drift continues, hydraulic fluid contamination of the servo valve should be suspected. Cycling the servo valve, as follows, may temporarily cure the drift:

(1) Disconnect the collective servo valve and pitch servo valve connectors from their receptacles on the hydraulic actuator electrical manifold. (2) Connect the collective servo valve connector to the pitch receptacle on the manifold. (Make sure to replace in proper receptacle after cycling is completed.) (3) Apply electrical and hydraulic power to the helicopter. (4) Cycle the HYDRAULIC BOOST switch and place in the ON position. (5) Engage the ASE and move the cyclic stick rapidly fore and aft several times to the full extremes of travel.

This procedure may clear a slightly contaminated servo valve but a fluid sample should still be taken and analyzed to determine the full extent of the contamination.

ARS Anniversary

The 29th of May marked the 18th anniversary of the Air Force's world-wide Air Rescue Service commanded by BrigGen Adriel N. Williams. An integral part of the Military Air Transport Service, ARS is a ready force in being—trained and on continual alert for instantaneous reaction to meet emergency requirements. Headquarters for this Command is at Orlando AFB, Fla.

To accomplish their mission, Rescuemen fly under the most adverse weather conditions and over the most inhospitable terrain on the face of the earth. Theirs is a mission inherently dangerous by its very nature and it is a mission which continues 24 hours a day. Disaster seldom chooses fair weather or convenient hours. Nevertheless, in 1958 and again in 1963, ARS won the coveted MATS trophy for the most noteworthy flying safety record in the entire command.

To carry out its complex mission, Air Rescue uses a variety of aircraft types. One of the mainstays is the amphibious HU-16 Grumman Albatross. Another is the four-engine HC-54 Douglas Rescuemaster—a veteran of many missions and dramatic saves. The HH-43B HUSKIE built by Kaman Aircraft carries the 1000-pound redball fire suppression kit. This helicopter is used primarily in the local base rescue mission and has been responsible for saving many lives since it joined the ARS inventory in 1961.

Cycling the servo valve can induce a temporary "fix," but the problem may occur again within a short space of time if sufficient contamination is present. To assist in dealing with this problem, an article on hydraulic fluid contamination—its causes, results and preventative measures—appeared in the April-May, 1964 issue of Rotor Tips. Additional copies may be secured by contacting your KAC field service representative or the Customer Service Dept., Kaman Aircraft Corp., Old Windsor Road, Bloomfield, Connecticut.

BAR/ALT TROUBLE SHOOTING – ELECTRICAL

Trouble shooting in this area will be confined to checking "black boxes." If more details are desired, refer to NAVWEPS 01-260HCA-2-8 where complete descriptions of the entire ASE system and testing procedures are provided.

Connect the K604605 test set to the ASE amplifier and the Vacuum Pressure Test Set, P/N VPT-10HS, to the altitude controller (see figure 1). Apply electrical power to the aircraft and perform the following tests.

A. Checking Electrical Portion As A Combined System: (1) Engage the ASE and BAR/ALT and push the collective control button on the collective stick. The annunciator window should indicate ON. (2) Increase the simulated altitude to 1000 feet with the VPT-10HS set. (3) Observe the demodulator meters, M1 and M2. M1 should increase and M2 decrease. The total differential current (the difference of the total current between M1 and M2) will be approximately plus and minus 2 milliamps. A decrease in altitude will cause M1 to decrease and M2 to increase. If no movement of the demodulator meters is observed, the system is malfunctioning. (Refer to section C below.)

B. Checking Collective Force Link: The collective force link transmits controlling signals to the ASE amplifier when pressure is applied to the collective stick. This is the unit that permits the pilot to override the system. The phase and amplitude of the signal determines the direction and rate of change that the amplifier will move the controls. If meter movement has been observed in step three of section A, (1) engage the BAR/ALT system. (2) Pull up on the collective stick while observing the demodulator meters. M2 should increase and M1 decrease. (3) Push down on the collective stick and M1 should increase and M2 decrease. When no pressure is applied to the stick, the demodulator meters should remain in the quiescent state. If other than these readings show on the meters, the problem can exist in either the collective force link or ASE amplifier.

To test the collective force link for continuity remove the electrical connector on the collective force link and perform a continuity check on the force link in the following manner: Place one probe of an ohmmeter on pin D and the other on pin E (see figure 3). When no pressure is applied to the collective stick, continuity should exist.

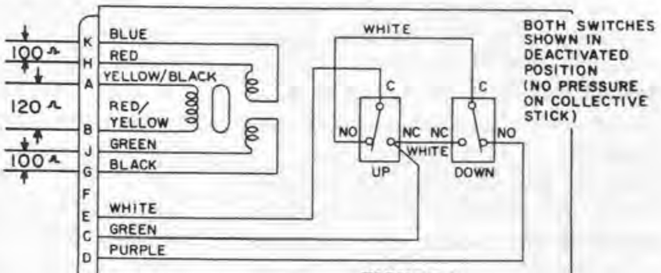


FIGURE 3

When the stick is moved either up or down, the meter should indicate an open circuit or lack of continuity. Remove the probe from pin D and place on pin C. When no pressure is applied to the collective stick, the ohmmeter should indicate an open circuit. When the stick is either pulled up or pushed down, the meter should indicate continuity. Place one probe of the meter on pin A and the other probe on pin B. The resistance between the two pins should be approximately 120 ohms. Place one probe of the meter on pin G and the other probe on pin J. The resistance between the two pins should be approximately 100 ohms. Place one probe of the meter on pin H and the other probe on pin K. The resistance between these pins should be approximately 100 ohms. If the proper indications are observed during testing in sections A and B, the electrical portion of the system is functioning properly and no further checks are required.

C. Checking Controller And Amplifier: Place the DEMODULATOR switch in the COLLECTIVE position. Throughout the following tests, neither M1 or M2 should indicate more than 0.5 milliamps from each other unless stated. If more than a 0.5 milliamp split is observed, disconnect the electrical connector from the altitude controller. If the split is still observed, replace the ASE amplifier. If the meters return to their quiescent state, replace the altitude controller. Place the voltmeter switch in position 12-COLLECTIVE SEL and the COLLECTIVE CHANNEL switch in position 8-MON ERROR. The voltmeter range switch should be placed in the 10-volt range and the voltmeter function switch in the zero degree position. These switches will remain in these positions unless otherwise mentioned.

(continued on page 21)

WINGS, TWIN ENGINES FOR TEST UH-2

KAC Conducts Research Programs

WINGED SEASPRITE —Kaman's 200-mph-plus UH-2 experimental helicopter with jet engine mounted on side and pair of wings added.

How will the UH-2 SEASPRITE perform with twin jet engines installed? Or if wings are added? Engineers and test pilots at Kaman Aircraft are busy coming up with the answers to these and other questions asked by their military customers. A recent U. S. Navy research and development contract from the Bureau of Naval Weapons calls for the design and evaluation of a twin GE T-58 Jet engine installation in the UH-2 in place of the present single engine. The new program is undertaken to analyze the advantages and evaluate the performance characteristics of twin engines in a compact utility helicopter. The contract amounts to $289,000 and calls for first flight of the aircraft by December 1964.

The SEASPRITE is the Navy's standard utility and rescue helicopter, presently on duty at Naval Air Stations and with ships of the fleet around the world. Years ago Kaman Aircraft and the Navy pioneered the application of gas turbine engines to helicopters. In the early '50's, under Navy contracts, Kaman designed, built and flew the world's first turbine-powered and twin turbine-powered helicopters. In addition to the UH-2, the company is also in production of HH-43B HUSKIE jet-powered helicopters for the United States Air Force.

KAC is adding wings to a jet-augmented UH-2 research helicopter under a contract received from the U.S. Army Transportation Research Command (TRECOM), Fort Eustis, Va. The UH-2 helicopter which has been in a TRECOM research program using the additional horizontal thrust of a GE J85 jet engine to investigate high-speed flight, is getting a set of wings for an extension of the high-speed test program.

The compound UH-2, having characteristics of both a helicopter and an airplane, is expected to produce useful data for the design of fast, maneuverable, vertical take-off aircraft for the Army's future needs. Prime objective is obtaining data on performance, stability and stresses of rotors at high speeds. The contract calls for flight testing to begin in September and to be completed by the end of 1964. It will take place at Kaman's Bloomfield, Conn., flight test facilities.

The UH-2 with jet augmentation has repeatedly achieved true air speeds over 200 miles-per-hour during flight testing. It made its fastest level flight at a true air speed of over 216 miles-per-hour. Based on the results of the first phase of the program, Kaman and Army engineers believe that the air speed potential of an augmented UH-2 is over 250 miles-per-hour.

HUSKIE Used in FAA Test

USAF air crews at bases in the United States and many other parts of the world make their takeoffs and landings with the knowledge that, in the event of a mishap, HH-43B's manned by Airescuemen will be there to help. So far, since 1959, more than 50 persons have been saved from crash fires and at many of the bases, "scrambles" have become a common occurrence as the helicopters escort aircraft to landings whenever the need arises. At one base, for example, an Air Rescue Service unit scrambled 703 times in one year when emergencies were declared.

The Federal Aviation Agency is now conducting a series of research and development tests to determine how effective a helicopter would be in assisting civilian passenger rescue operation. During the next few months the FAA will deliberately crash two large transport aircraft and burn five others as part of the overall program to examine and combat the hazards presented by aircraft crashes and crash fires. FAA pilot John J. Ryan is flying the HH-43B used in the testing. An ex-World War II fighter pilot, Ryan has a total of 9,000 hours flight time, of which 2,000 are in helicopters. He first flew the HH-43B a year ago when attending the USAF Firefighting School at Stead AFB, Nev. The veteran pilot is shown with his wife, a former fashion model.

Timely Tips

Fuel Cell Installation (UH-2)

During installation of fuel cells, adherence to the following precautions may save valuable maintenance man-hours at some later date. The fuel cell fittings at the bulkhead supports and at the cell interconnects are equipped with self-locking helicoil inserts. Quarter-inch bolts are used at these fittings. The initial torque required to turn the bolts in may vary from approximately 25 to 70 inch-pounds. Unless maintenance personnel are aware of this, the helicoil locking friction may create the impression that the bolts are bottoming and that they are being torqued tight. This can very easily happen, especially at the interconnects where the bolts are installed from within the fuel cell entirely by "feel." NAVWEPS 01-260HCA-2-3 requires that 50 ± 5 inch-pounds torque be applied to the quarter-inch fuel cell fitting bolts. In order to insure proper and complete clamping pressure at the fittings, this 50 ± 5 inch-pounds must be over and above the turning torque. All the bolts at each fitting should first be installed and turned in several threads. They should all be "snugged" down gradually, approximately one-half turn at a time, by the cross-tightening (diametrically opposed) method, rather than in sequence. When the bolt heads are seen or felt to be drawn completely down, they should all be given an additional one-quarter turn and then torqued to the 50 ± 5 inch-pounds. This procedure will eliminate "leakers" at a later date by insuring that the proper torque has been applied and the pressure has been distributed equally around the fitting gasket.

H. Zubkoff, Service Engineer

Check Flex Shaft (HH-43B)

When an odor of smouldering rubber is reported, maintenance personnel should not dismiss the flexible blower drive shaft as a possible source. Considerable trouble shooting time may be saved by simple lowering the aft cabin ceiling doors and quickly checking the flex shaft for evidence of overheating.

F. E. Starses, Service Engineer

Fuel Quantity Readings (UH-2)

It is possible to connect the wiring harness incorrectly if the fuel quantity probes or cell covers are inadvertently changed and, as a result, fuel quantity readings will be erroneous. The incorrect positioning of the probes can also cause chafing against the bottom of the fuel cell or against adjacent internal plumbing. This can also lead to erroneous readings. It is suggested that the assemblies be marked so as to prevent any possibility of the probes being switched. (See June/July, 1964 issue of Rotor Tips, Q & A section.)

H. Zubkoff, Service Engineer

Flotation Gear Battery (HH-43B)

The flotation gear utilizes a ME-1 nickel-cadmium battery as its source of electrical power. For additional technical information and servicing instructions concerning the ME-1 nickel-cadmium battery refer to TO 8D2-13-1.

A. Savard, Service Engineer

Prevent Unnecessary Engine Change (UH-2)

An engine change was necessary recently because the oil scavenge line tube assembly, P/N 3900T16P01, from the No. 2 bearing broke loose inside the 6 o'clock strut in the rear frame of the compressor. Apparently, the failure was caused by overtorquing the coupling nut on the hose assembly connecting the tube and auxiliary sump. This, in turn, twisted and broke the tube assembly. To prevent this from occurring, two wrenches should be used when connecting the hose to the tube. Place one wrench on the tube fitting and the other on the hose coupling nut. Before installation, make sure the fittings are clean and free from burrs, nicks, scratches and distortion. Lubricate the threads with oil, MIL-L-7808. Tighten the coupling nut until the connector is seated. If there is any doubt that the connector has seated, loosen and tighten the coupling nut several times until it is certain that resistance encountered while turning the nut is due to the connector bottoming, or seating, and not caused by thread friction. With one wrench holding the terminal nut on the tube to keep it from twisting, turn the coupling nut approximately 1/3-turn (2 hex flats) with the second wrench. DO NOT OVERTORQUE.

H. Zubkoff, Service Engineer

Voltage Regulator (HH-43B)

The Bendix 1588-2E Voltage Regulator and Base is being replaced by the Bendix 1588-2F Voltage Regulator and Base. These parts are completely interchangeable.

A. Savard, Service Engineer

Spindle Replacement (UH-2)

Remember!!! With the incorporation of ASC No. 6, "main rotor flapping spindle replacement," the existing 120-hour inspection will no longer be required. (See page 2 of ASC 6.)

D. W. MacDonald, Service Engineer

Scroll of Honor

What is the Scroll of Honor? Who is eligible? How are awards determined? William H. Weaver, KAC Awards Administrator, Customer Service Department, supplies the answers and also explains the newly initiated "Kaman Mission Award."

The Kaman Scroll of Honor is awarded in recognition of outstanding pilot and crew performance while conducting a rescue or mission of mercy with a Kaman helicopter. Since its inception in 1955, more than 300 military pilots and crewmen (as well as several civilians) have been awarded this honor. As most readers know, each recipient receives a framed plaque and a Scroll of Honor Rescue lapel pin. In addition, the names of the pilots are inscribed on the permanent Scroll of Honor prominently displayed at Kaman Aircraft's Bloomfield, Conn. facility.

Attaining a place on the Scroll of Honor is not a routine accomplishment, for the Scroll was originated with the express purpose of paying homage to those men who have performed outstanding missions. Participation in a rescue or mission of mercy is not, by itself, sufficient qualification since such a mission is considered to be the fulfillment of one of the primary roles for which the pilot and crew were trained.

More specifically, a review board at Kaman appraises each mission nominated for the Award in terms of certain criteria. First of all, the mission must be a rescue mission or mission of mercy. In addition, the mission must call for an "unusually high degree of skill, courage and judgement" on the part of the pilot and crew while operating under difficult or hazardous conditions. In determining if accomplishment of a given mission qualifies for the Scroll of Honor, the review board takes into consideration many factors, among which are the following: night or restricted visibility en route; difficult or hazardous terrain en route; hovering with rotor blades in close proximity to trees, terrain, buildings, or other obstacles; required doppler approach to hover; extreme altitude and/or temperature where pilot technique and procedures are paramount; unusual weather conditions including high winds or severe wind gusts. The copilot will also be awarded the pilot Scroll when it is determined that he was as necessary to the success of the mission as was the pilot. Crew members, of course, will receive the crew Scroll on qualifying missions.

Kaman Aircraft has now instituted a new award called a "Kaman Mission Award" in recognition of the humanitarian service performed when any rescues or missions of mercy are accomplished. Effective July 1st, 1964, pilots and crew members participating in a routine rescue or mission of mercy will be eligible to receive a Kaman Mission Award which verifies that the named individual "has served meritoriously in a Kaman helicopter participating on a mission of mercy." Upon qualifying for this Award, the nominee will receive a plasticized wallet certificate, a rescue pin, and a place on the Kaman Mission Award list.

Nominations for either the Kaman Mission Award or the Kaman Scroll of Honor can be made through a Kaman Service Representative, the Commanding Officer, or by writing to the Director of Customer Service, Kaman Aircraft Corp., Old Windsor Road, Bloomfield, Conn. To insure an adequate and comprehensive review, complete details of the mission must accompany each recommendation for an award. K

HONORED—Major William J. Fitzgerald, commander of Det 3, EARC, Griffiss AFB, N.Y., presents Scrolls to HH-43B crew which undertook hazardous mission to evacuate wounded hunter. Left to right are: Capt Laurence W. Conover, pilot; SSgt Robert A. Johnson, SSgt James A. Wyatt, fire rescue technicians; and SSgt Robert A. Collins, pararescue and survival technician. (USAF photo)

Air Rescue Service Aids Flood Victims

HUSKIES FROM DET 1 RESCUE 59

Since its founding soon after World War II, the Air Rescue Service (MATS) has saved the lives of more than 11,000 persons and assisted hundreds of thousands of others. Latest incident to be added to the long list of humanitarian services performed by Airescuemen took place in Montana just a few days after ARS celebrated its 18th anniversary. During this mission HH-43B crews from Det 1, CARC, MATS, Glasgow AFB, Mont., encountered intense rain, high winds, heavy turbulence and made vertical confined-area takeoffs and landings above 6000 feet. Despite the conditions, detachment HUSKIES made 27 sorties and flew 57 hours; 59 survivors were airlifted to safety and 96 landings were made. Kaman Scrolls of Honor for the humanitarian services performed under hazardous conditions have been awarded to the personnel involved. The following was extracted from a mission activity report prepared by Capt Donald P. Litke, commander, Det 1.

1. During the period 9-13 June 1964, Det 1, Glasgow AFB, Mont., Central Air Rescue Center, participated in a domestic emergency resulting from flooding in northwestern Montana. The following is a summary of our actions taken in support of this mission.

2. At 2200 hours, MST, 8 June 1964, Capt Donald P. Litke was notified by LtCol Ivan M. Duncan, vice commander of Glasgow AFB, of a possible requirement to augment rescue forces in the Great Falls area. During the next hour, conversations between Captain Litke, Colonel Duncan, Major Bird at Hq Western Air Rescue Center, Glasgow AFB Command Post, Disaster Control Command Post at Malmstrom AFB, resulted in a firm request for deployment of both assigned HH-43B's, flight and ground crews and five medical technicians. Permission was granted by CARC (CRCOP-R), at 2300 hours and preparations were made for departure at first light.

3. At 0400 hours, MST, 9 June 1964, both assigned HH-43B's, departed for Malmstrom AFB. The aircraft were manned by the following personnel: Capt Donald P. Litke, RCC, Capt Bobby E. Walker, RCC, 1stLt Kenneth T. Fujishige, RCCP, SSgt James R. Tabor, heli mech, SSgt Will D. Jenkins, jet eng mech, DET 1, CARC; TSgt Thomas H. Miller, SSgt H. R. Hathaway, A1c William C. Shown, A2c Neal E. Worden, med techs, and SSgt C. V. Clifford, medic, 861 Med Group. Favorable winds allowed us to complete the 200-nautical-mile flight in two hours and five minutes and by 0700 hours we were refueled, briefed and ready for our first sortie.

4. An immediate requirement existed to airlift medical personnel and supplies to the Browning and Cutbank area. Captain Walker and his crew were dispatched on this mission. Enroute to Browning, he was contacted by a C-47 and vectored to a spot on the Marrias River where four adults and two children were stranded. Captain Walker airlifted them to higher ground and continued on his supply mission. JP-4 fuel was provided at Cutbank and Captain Walker operated from that area for the remainder of the day taking directions by telephone from the Disaster Control Command Post at Malmstrom AFB during each refueling stop. That entire part of the state was inaccessible except by helicopter, so Captain Walker's crew was called upon to fly a variety of missions. In addition to retrieving survivors from flood waters, they delivered insulin to two diabetics who had been without supplies for two days and airlifted over 1500 pounds of medical supplies, including typhoid serum to isolated areas. Captain Walker and Lieutenant Fujishige flew a total of ten hours and 45 minutes, recovering back at Malstrom AFB.

5. Those of us remaining in the Great Falls area spent our first day in a similar fashion. The Sun River from Gibson Dam, 75 miles west of Great Falls, to where it empties into the Missouri in Great Falls, had created a silt-laden sea 70 miles long and a mile wide. The small towns in its path, such as Vaughn, Sun River, and Simms, were completely inundated. The water was at roof top level in many places and still rising. My crew spent the majority of the day retrieving survivors from isolated high ground, bridges, roads and roof tops, landing when possible and using the hoist when not. Many small boats were evacuating personnel and we found that vectoring these boats to stranded personnel, was an extremely efficient method of evacuation. People who declined to be evacuated earlier in the day were more than willing to leave later as the water continued to rise. Our last sortie of the day included airlifting a civilian doctor to Augusta, 65 miles west of Great Falls, to treat a heart attack victim. My crew flew a total of nine hours and 35 minutes for the day and picked up 24 survivors. Totals for both helicopters for the day included nine sorties for 24 hours and 20 minutes flying time, 34 survivors recovered and 35 landings, 24 of which were on unprepared surfaces.

6. I will not go into day-by-day details of the remainder of the mission. Our sorties were similar to those of the first day except that as the flood waters stabilized, then began to subside, our mission leaned more towards medical supply and support than evacuation. However, the evacuation requirement had not completely ceased to exist. By Thursday and Friday word began to filter down from the mountainous areas west of Great Falls, of the

location of isolated persons. We flew three sorties into the mountains approximately 80 miles west of Great Falls and recovered six persons, who had been stranded up to a week. Captain Walker continued to spend most of his time in the Cutbank area, while I worked in the Sun River area. We were released by Colonel Budway early Saturday, 13 June, and returned to Glasgow AFB that morning. Our totals for the mission include 27 sorties for 57 hours and 20 minutes of flying time, 59 survivors airlifted to areas of safety and 96 landings, 65 of which were on unprepared areas.

7. I would like to comment on the performance of our two HH-43B's and our maintenance personnel. We had not one maintenance discrepancy during the entire mission. The only maintenance performed was normal preflight and postflight inspections and a phase inspection on both aircraft. The aircraft returned to Glasgow in commission without discrepancies. The combined outstanding performance of the HH-43B's and our maintenance personnel made the accomplishment of our mission possible. The HH-43B's were put to a rugged test under a variety of flying conditions. Conditions encountered included prolonged hovering both in and out of ground effect, high winds with associated heavy turbulence in mountainous areas, vertical confined area takeoffs and landings above 6000 feet and intense rain. While the majority of our flying was done under more favorable weather conditions, the HH-43B's proved that it could handle anything asked of it. K

Cliff Rescue By 54th ARSq.

by Capt John E. Duffy
Det 2, 54th ARSq.
Harmon AFB, Newfoundland

On Sunday evening 7 June 1964 at approximately 1900 hours, Detachment 2 54th Air Rescue Squadron, MATS, Harmon AFB, Newfoundland, received a request for assistance from the Provincial Park Service, relayed through the host Base Command Post. A 14-year-old girl had been stranded 200 feet from the top of a 1000-foot cliff while mountain climbing at a Provincial Park approximately 15 miles from the base. Ground rescue parties were climbing toward the victim but deteriorating weather conditions and oncoming darkness were complicating matters.

An HH-43B crew consisting of two pilots and two firemen was dispatched at 1915 hours and proceeded to the rescue coordination point where a landing was made and an evaluation and briefing conducted. The girl had been stranded for several hours and as far as could be determined, was uninjured. From this location she and the approaching rescue party were visible through the use of field glasses.

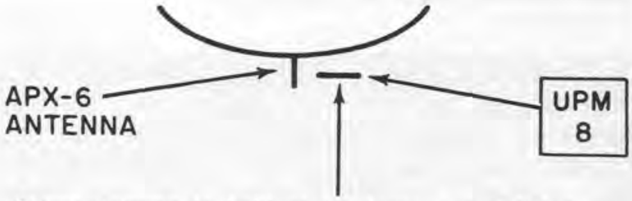
Owing to the very restricted areas available for hovering, existing weather conditions, and the unusual nature of the potential pickup, the rescue crew commander elected to utilize the copilot as hoist operator and scanner, the first fireman as front seat observer, and the second fireman as hoist assistant and rear observer. Takeoff, climb to the scene, and evaluation patterns were all routine. The helicopter was flown into pickup position when it was discovered that one of the rescue party had reached the stranded climber but that no further progress was possible and a helicopter pickup was necessary. Aircraft was hovered into position on the cliff and the rescue basket lowered. The steepness of the stone surface necessitated the use of almost all of the hoist cable in order to maintain clearance between the rotor tips and the rocks and bushes on the cliff. The girl was assisted into the rescue basket by the ground rescueman after which lift-off and hoisting operations were routine. Immediate examination disclosed climber to be without visible injuries and she was flown to coordination point. Second takeoff was accomplished in order to evacuate ground party before dark—by now they had reached top of cliff after a two-hour climb and were awaiting evacuation. After all personnel had been removed from the mountain, original survivor was flown to base hospital where she was released after examination.

Total time flown on mission: One hour and 15 minutes. Crew consisted of: Capt John E. Duffy, RCC; Capt Alex P. Lupenski, copilot; Mr. Claude H. Smith and Mr. Wilfred White, firemen.

Detachment 2 prides itself that all of its airborne firefighters assigned are Canadian Nationals and they fly beside U.S. military personnel on rescue missions. K

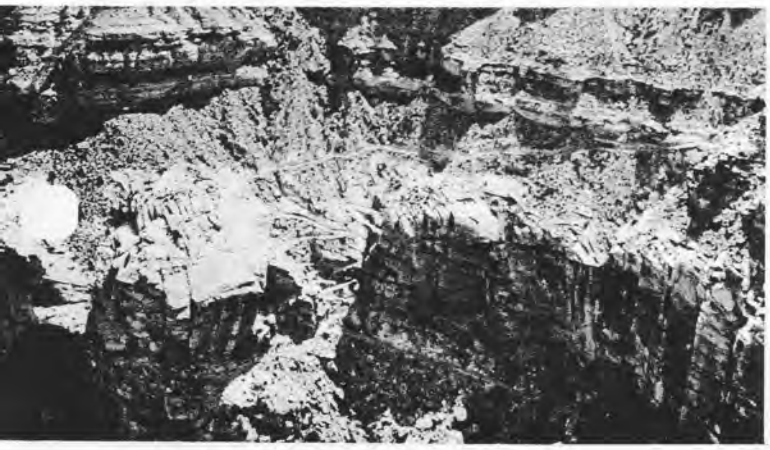
Timely Tip – (UH-2)

Use a "spare" antenna when giving the APX-6 an operational check and it won't be necessary to remove the floor plate to gain access to the Rec/Trans. Since the Tacan and APX-6 use the same type antenna, one of these antennas may be ordered for a shop rotating spare. This antenna can be connected to the UPM-8 tester and placed adjacent to the aircraft's APX-6 antenna. With both the UPM-8 and the APX-6 operating, radiation between the two antennas will be sufficient to make the necessary operational checks. The antenna attached to the UPM-8 may have to be varied in position in respect to the APX-6 antenna to find the position of maximum coupling. See drawing.



Spare antenna is held at 90 degrees to APX-6 antenna. Move antenna up or down to find point of maximum coupling.

Robert B. Kleinfelder, ATCS, HU-1 Avionics Shop,
NAAS Ream Field, Calif.



Det 15 Receives USAF Outstanding Unit Award

Members of ARS Det 15, WARC, were recently presented the Air Force Outstanding award for "exceptionally meritorious service" while operating and maintaining HH-43B HUSKIES at Luke AFB, Ariz., from 1 October 1961 to 8 July 1963. During this time, the unit scrambled 802 times with the fire suppression kit while responding to 900 aircraft emergencies. Fifteen evacuations were made from inaccessible areas such as the bottom of the Grand Canyon. In rescuing or evacuating a total of 29 persons from either crashed aircraft or inaccessible areas, the response of the detachment was, according to the commendation, "so prompt and effective that no lives were lost. The initiative, resourcefulness, and dedication to duty exhibited by members of Detachment 15, Western Air Rescue Center, reflect great credit upon themselves and the United States Air Force."

Taken on a recent mercy mission, the photos show the type terrain often encountered by HUSKIE crews from Luke. The detachment was called on for assistance when a woman suffered a fractured hip after being thrown from a horse while nearing the end of the 8-mile trail (see top photo, left) leading to the Supai Canyon floor. Supai is a branch of the Grand Canyon. The other photos show the rugged terrain, as seen from the climbing HUSKIE far above the rescue site, and the survivor being loaded into the HUSKIE. Aboard the HH-43B were Capt Dale L. Potter, RCC; Capt Andrew J. M. Archer, copilot; 1stLt Robert L. Gardner, second pilot; Capt Maurice O'Connor, flight surgeon; and CMSgt Glenn E. Moore, rescue crew chief. The 350 nautical-mile mission was accomplished in four hours and 30 minutes flying time. Due to the distances involved the helicopter was refueled at Prescott, Ariz., and two 50-gallon drums of fuel were loaded into the HH-43B for use upon arrival at the bottom of the Canyon. A letter of appreciation received from the survivor's husband afterward read, in part—"I should like to pay tribute to your service and particularly to the following men who participated in the rescue operation: Capt Charles Kay, who made the arrangements; Captain O'Connor, the doctor; Captain Potter, the pilot; Captain Archer, the copilot; Lt Gardner, and Sgt Moore. These men are to be commended for their graciousness, willingness to serve, and for the expeditious manner in which they performed their duties..."

OUTSTANDING UNIT—Shown are members of ARS Det 15, WARC, MATS, Luke AFB, Ariz., who recently received the Air Force Outstanding Unit Award. Left to right, front row, are: Capt D. L. Potter, RCC; Capt C. R. Kay, det 15 commander; Capt A. J. Archer, RCC; Capt H. D. Salem, RCC and 1stLt R. L. Gardner, RCC. Middle row, A3c J. O. Maull, admin specialist; A1c W. R. Medsker, TSgt R. J. Hallman, SSgt R. W. Howard, A1c G. H. Smith, A1c W. R. Dunbar, A3c W. E. VanAsdlan, rescue crew chiefs; and CMSgt G. E. Moore, maintenance supervisor. Back row, SSgt Joe Wood, A1c J. L. Stamper, firefighters; A2c T. J. Bruce, A2c R. A. Powell, A2c J. A. Vultaggio, TSgt G. E. Melby, medics; SSgt C. N. Nickel and SSgt W. N. Basnight, firefighters. (USAF photo)

Kaman Scrolls of Honor have been awarded to those who participated in this mission. **K**

Q's AND A's

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

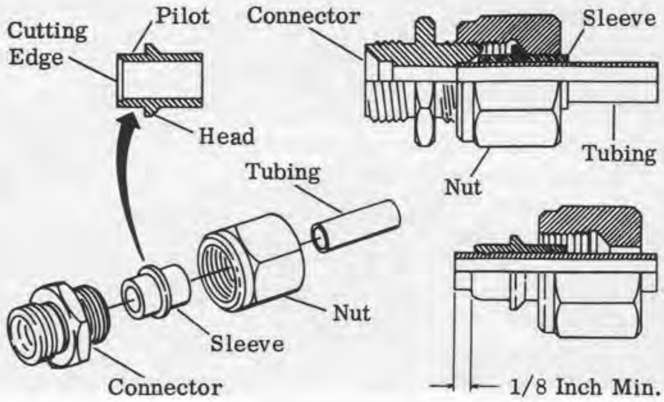
Q. (Applies UH-2) WHAT CAUSES CHAFING OF THE FUEL CONTROL CABLE IN THE FAIRLEAD AT STATION 151.0?

A. Insufficient cable tension. To correct this, a recently revised cable tension adjustment procedure, based on temperature, should be used. Experience has shown that the throttle cable, which is routed through the left side of the forward nacelle area under the transmission mount, can chafe in the fairlead at station 151.0 if insufficient cable tension exists. A loose cable will rest on the bottom of the fairlead where vibration results in a continuous minor bending of the cable as it repeatedly strikes the fairlead. This ultimately results in failure of the cable. The corrective action provides for sufficient tension regardless of temperature variation. This will allow the cable to pass through the center of the fairlead instead of resting on the bottom. The following cable tension vs temperature table has already been added to the HMI. The accompanying additional instructions will be included in a subsequent revision.

TEMPERATURE F.°	C.°	CABLE TENSION plus 20 lbs. minus 0
160	71.1	105
130	54.5	93
100	37.8	81
70	21.1	69
40	4.4	57
10	-12.2	45
-20	-28.9	33
-50	-45.6	21
-65	-53.9	15

The cable tension should be measured and adjusted in accordance with the above table after the helicopter has been kept in a hangar or in an outdoor shaded area for a minimum period of 1/2 hour. If tension adjustment must be made with the helicopter parked in direct sunlight, the tolerance should be increased to plus 30 pounds, minus 0 pounds. After cable tension has been properly adjusted, the position of the cable in the fairlead should be checked. The cable should pass through the fairlead without contacting it. If the cable does contact the fairlead, the fairlead should be repositioned. Since the fairlead is riveted to a sheet metal clip, the rivets should be removed, the fairlead located so that the cable passes through the center, and the fairlead riveted to the new location.

H. Zubkoff, Service Engineer



Q. (Applies UH-2) WHAT PROCEDURE SHOULD BE USED IN FABRICATING TUBE ASSEMBLIES WITH FLARELESS TYPE FITTINGS SUCH AS THOSE USED IN THE HYDRAULIC SYSTEM ON THE RESCUE HOIST?

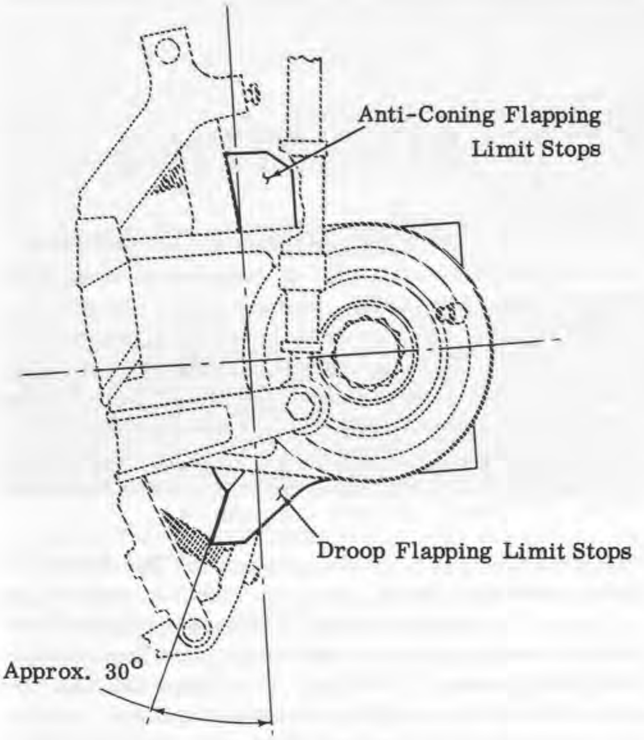
A. Fabrication of such tube assemblies, see drawing, requires the following: PRESETTING (1) Cut the tube square within ± 1/2 degree. Deburr inside and outside of tube. (2) Slide the nut and then the sleeve onto the tubing. The pilot of the sleeve must point toward the seat of the connector. Lubricate threads with hydraulic fluid. (3) Bottom the tubing firmly on the connector seat. Turn the tube slowly, but firmly, by hand while tightening the nut with a wrench until the cutting edge of the sleeve grips the tube. (4) At this point tighten the nut 1/6 turn. (This applies to all sizes and type of tubing.) (5) Disassemble tubing from connector and check the position of the sleeve. At least 1/8-inch of tubing must protrude from the front of the sleeve pilot. The sleeve may rotate but must not move forward or backward on the tube. (6) If the sleeve moves forward or backward, or if any damage beyond a slight collapse of the tube at the ring is evident, discard the tube assembly. FINAL ASSEMBLY (1) Lubricate threads with hydraulic fluid and install on the helicopter. (2) Tighten the nut until a rise in torque is noted. Then tighten nut 1/6 turn beyond this point. (3) If leakage is present, tighten the nut an additional 1/6 turn. NOTE: Before tightening a leaking flareless fitting, disassemble and inspect for presence of foreign matter, distortion or defective parts.

W. J. Rudershausen, Service Engineer

Q. (Applies UH-2) WHAT PROCEDURE SHOULD BE USED WHILE RIGGING THE K616099 PITCH LINK?

A. Rigging of the pitch link requires not only adjustment to the proper length but also a freedom of "rod roll" through extreme tail rotor control movements. To determine that rod roll exists: (1) Move the rotor blade controls via the rudder pedal cockpit controls to the extreme right pedal position. (2) At the same time disengage the K616138 flapping lock latch and flap the blade to the extreme position inward. (3) With blade and controls held in this position, check the K616099 pitch link for free rod roll. (4) Flap the blade to the extreme opposite position and again check for pitch link rod roll. (5) Apply full left rudder pedal control and repeat steps (2) through (4). If no clearance exists for rod roll, readjust rodend alignment as required. (6) Repeat the above procedure for each pitch link assembly.

D. W. MacDonald, Service Engineer



Q. (Applies UH-2) WHAT PRECAUTION SHOULD BE TAKEN WHEN INSTALLING THE K618312 CROSS ASSEMBLY IN THE RETENTION AREA?

A. Make sure the cross is not inadvertently placed upside down. Positioning of a retention cross upside down has no adverse effect on the blade flapping angles during flight, but static blade-to-fuselage ground clearances are considerably reduced. To assure correct cross-to-retention assembly, check the angle of the upper and lower protruding flapping limit stops on each side of the anti-coning and droop stop bumper recesses. When the cross assembly is installed correctly, see drawing, the upper stops point vertically and the lower slant down and outward at an angle of approximately 30 degrees.

D. W. MacDonald, Service Engineer

Q. (Applies HH-43B) IS IT NECESSARY TO SERVICE AN OIL COOLER FAN ASSEMBLY DRAWN FROM SPARE STOCK?

A. Yes it is. Oil cooler fan assemblies have hollow input shafts which could allow loss of oil during shipment. For this reason, spare fan assemblies are provided to field level maintenance activities in an unserviced condition. It is the responsibility of the installing activity to properly service the fan assembly in accordance with TO 1H-43(H)B-2.

F. E. Storses, Service Engineer

Q. (Applies UH-2) ARE THE PILOT AND COPILOT CYCLIC STICKS COMPLETELY INTERCHANGEABLE?

A. No, they are not completely interchangeable. The sticks can be switched, but if this is done, secondary electrical functions are lost. If the copilot's stick is installed in the pilot's position, the pilot's cyclic trim override and hoist control will be inoperative.

A. Savard, Service Engineer

Q. (Applies UH-2) WHAT SAFETY PRECAUTION SHOULD BE TAKEN WHEN WORKING IN THE VICINITY OF THE AN/ARC-39 ANTENNA INSTALLATION IN THE INTERIOR OF THE AFT FUSELAGE?

A. Insure that the protective rubber boot, P/N MS25171-1S, is installed on the stud end of the antenna lead through insulator, P/N MS25054-1A. When operating the AN/ARC-39 HF receiver-transmitter, a high voltage condition exists on the stud end of the antenna insulator. If the protective boot is missing, a possible personnal hazard exists at this point.

J. E. Kucka, Service Engineer

Q. (Applies UH-2) WHAT IS THE PRIMARY OBJECTIVE WHEN RIGGING THE EMERGENCY THROTTLE ACTUATOR AND HOW IS THIS ACCOMPLISHED?

A. The primary objective is to adjust the actuator limit switch stops so they coincide with the throttlerack stops. This is important if actuator failure or malfunction of the fuel control emergency system is to be prevented. The actuator must automatically stop when the throttle rack is fully closed (IN) and/or when it is fully open (OUT). New actuators are normally adjusted to a travel of 45 degrees. The limit switch stops should never be adjusted to increase this range. Actuator travel of 33 to 38 degrees is usually required to completely open the throttle valve by fully extending the throttle rack, and to close the throttle valve by fully retracting the throttle rack. The travel must, therefore, be reduced on all new actuators. This is accomplished by counterclockwise rotation of the adjusting screws. One complete turn of the adjusting screw equals approximately 1.5 degrees actuator travel. Decreasing the actuator travel range must always be done in equal increments at each end of its travel in order to retain the adjusted travel as closely as possible in the center of the original 45-degree range. For example: Decreasing actuator travel from 45 to 38 degrees, a total of -7 degrees, should be done by decreasing both limit switch stops 3.5 degrees instead of decreasing only one by 7 degrees. Always position the actuator at, or close to, center before attempting to adjust the limit switches. Failure to observe this precaution will result in damage or permanent distortion of the limit switch. This also applies if it is necessary to increase the actuator travel due to installation or rigging of a used actuator. The new actuators, P/N 3124169, have a scribed or a white line across the end of the shaft. When this line is straight up and down, the actuator is centered. The actuator arm should be installed with the split in the arm aligned with the center position reference line across the end of the shaft. When installing a new actuator, it must be positioned on the support bracket as far forward as possible in order to prevent chafing against the fuel line directly inboard from the actuator. A rigging check must be accomplished whenever the fuel control, the actuator, the actuator arm or the linkage is replaced or removed and reinstalled. Always check afterward to see if adjustments are required.

H. Zubkoff, 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, W. A. Saxby, C. W. Spencer, Group Leaders.*

Squadrons Report On

SEASPRITE ACTIVITIES

HAPPY ENDING—A jet pilot who landed in a heavily wooded area six miles from NAS Cecil Field, Fla., after ejecting from his crippled plane found himself back at the air station just 24 minutes after declaring the emergency. Shown are Lt Thomas R. Sceurman, UH-2 pilot; and Owen L. Taylor, ADRAN, who made the speedy trip. Lieutenant Sceurman landed the helicopter in a small clearing surrounded by high trees, a tower and power lines to make the pickup. (Official U. S. Navy photo)

USS TICONDEROGA....UH-2 detachment from HU-1, NAAS Ream Field, Calif., rescues sailor who fell overboard at night and floated 40 minutes without survival gear. LT(jg) H.W. Gregory, pilot; Lt(jg) C.R. Trail, copilot; E.D. Dactler, ADRI, and D.A. Clark, AMH2, crewmen....SEASPRITE crew rescues F8 pilot who ejected underwater after landing mishap. Aboard UH-2 are Lt(jg) F.C. Reihl, Lt R.G. Jewett, copilot; Dactler and J.A. Shanks, ADJAN, crewmen.

USS ENTERPRISE....UH-2 crew from Det 65, HU-2, NAS Lakehurst, N.J., rescues survivor after plane crashes on takeoff. Lt(jg) C. Thomas, SEASPRITE pilot, hovers over survivor floating face down in water and helo crewman C. Mitchell, AN, drops into sea, cuts parachute loose, and places rescuee in sling. Survivor hoisted aboard by G. Fox, AN, and helicopter speeds back to ship for urgent medical assistance. Mitchell and other survivor of crash picked up by destroyer.

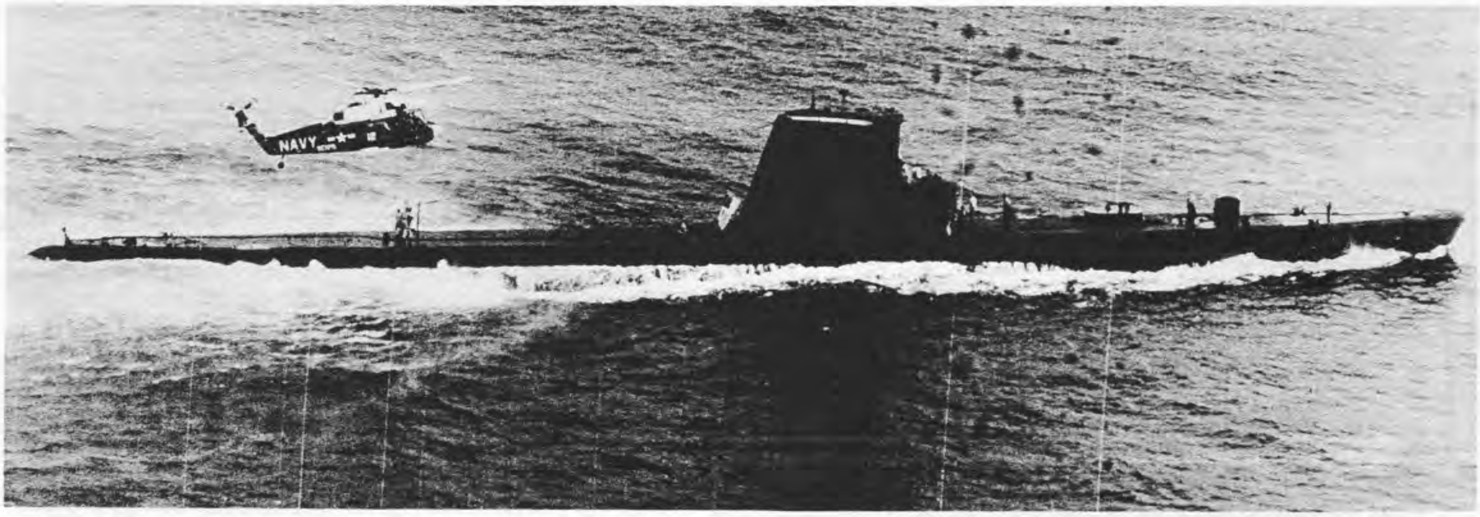
NAS NORFOLK, VA....Civilian aboard cabin cruiser stranded in pounding surf hoisted to safety by crew of UH-2 from Det 1, HU-4, NAS Lakehurst, N.J. Rescue made in near darkness and hampered by whip antenna aboard boat and rescuee's failure to use hoisting sling properly. Aboard SEASPRITE are LCDR Joseph R. Priestly, pilot; Lt(jg) John A. Morse, copilot; and E. E. Stringfellow, ADR2, crewman.

USS ROOSEVELT....SEASPRITE from Det 42, HU-2, rescues pilot from Mediterranean after plane experiences flameout. Crewman E.B. Jordan, AE3, jumps from chopper into sea to help survivor clear parachute. Both hoisted aboard helicopter by B. Simmons, AA. UH-2, piloted by Lt Howard Shehan, flying plane guard when incident occurred. Rescue is 645th made by squadron.

NAS MIRAMAR, CALIF....UH-2 crew from NAS Miramar, Calif., rescues pilot of fighter plane which exploded 35 miles from Oceanside. Lt J.R. Gore, SEASPRITE pilot; LtCdr J.O. Brockman, copilot; P.N. Goodrich, AMHC and H.L. Marshburn, AMS2, crewmen.

NAS ATSUGI, JAPAN....UH-2 crew from Det 1, HU-1, on instrument hop sights pilot who ejected from crippled fighter. Follows chute to landing spot in heavily wooded area and makes pickup from clearing. SEASPRITE pilot, Lt J.D. Spafford; copilot, Lt(jg) L.W. Beguin; crewmen, R.A. Blanchard, ADR2.

COMMENDATION—Charles H. Kaman, KAC president, presents Scrolls of Honor to Lt Ralph M. Helm, UH-2 pilot, and Daniel J. McAlee, AMSAN, crewman, for 100-mile night flight to transfer injured sailor from destroyer to carrier. Watching is their commanding officer, Cmdr E. F. O'Brien of HU-2. Five other squadron members, still aboard ship, will also receive Scrolls for participating in this or similar hazardous flights. Shown in other photograph is presentation of Scroll to LCdr Joseph W. Gardner, HU-4 standardization officer, who piloted a SEASPRITE 250 miles through heavy overcast and freezing rain to evacuate a sailor with acute appendicitis from a ship at sea. Left to right are: Cdr A. A. Tonkovic, commanding officer of HU-4; Commander Gardner and Paul Whitten, KAC service representative. (Official U.S. Navy photographs)



NAS ATSUGI - A stricken sailor with an unknown object in his throat and obstructing his breathing was recently transferred from the submarine USS Bugara (SS-331) to Yokosuka Naval Hospital by an Atsugi-based helicopter.

The Bugara was operating approximately 140 miles off the coast of Japan when it requested a "mercy flight" for the sailor. Det 1 of Helicopter Utility Squadron One responded and dispatched a turbine-powered UH-2 SEASPRITE to the submarine. The sailor was hoisted aboard the helo and flown to Yokosuka where he was successfully treated by Navy doctors.

Shown is the SEASPRITE hovering over the submarine while the transfer is being made and the crew who manned the helicopter during the flight. Left to right are: LtCdr Stanley L. Bird, pilot; Lt (jg) L. D. Presnell, copilot; Lt B. B. Cabell, doctor, USN Medical Corps; Frank L. Coombs, ADRC, crewman; and H. G. Lightbody, HM3. (Official U. S. Navy photographs)

FOD FACTS

How good are you at finding FOD? To check yourself, study the photograph and then see the inverted answer. Most of our readers should have little trouble spotting the loose objects which could cause foreign object damage if ingested into the engine. The "FOD FACT" photograph in the next issue of KRT won't be quite as easy as this one.

The rag, bolt and chewing gum wrapper on the floor of this hoist compartment are all potential FOD material. The helicopter is a UH-2 but FOD awareness should, of course, be extended to the HH-43B and all other jet-powered aircraft. These comparatively small items, if drawn into the air inlet, could damage an engine and possibly cause an in-flight power failure. ALWAYS CHECK YOUR WORK AREAS FOR FOD!

Line Level Helicopter Maintenance

by Robert J. Myer
Customer Service Manager

Part VI

The topic of trouble-shooting was dealt with in the last issue of Rotor Tips under the heading of Non-Routine Maintenance. We now consider adjustments and rigging which fall under the same heading.

Adjustments and Rigging

A thorough understanding of the theory of operation of a device is most helpful before attempting to adjust or rig it. Unfortunately, human nature being what it is, most of us dislike spending the time required to study related manuals or instructions, even though experience has proven that much time would be saved and frustration avoided by so doing. When the object being worked on is an aircraft or a component thereof, the element of safety is even of greater consequence, especially if the aircraft is a helicopter.

The helicopter systems most related to performance and subject to adjustment and rigging are the flight controls, rotors, and power plant controls. The lower or non-rotating flight controls are similar to their fixed-wing counterparts in that they are set to specific "throws" and "neutral" positions. Variation from these criteria can result in insufficient travel or binding; incorrect relationship in the functioning between two or more interlinked systems; uncomfortable stick and pedal flight positions; roughness; and noises. The interdependence of the upper or rotating control system and the rotors is such that they are best discussed together. These systems govern the output control and blade tip path track of the rotors which are directly related to helicopter performance. Helicopter power plant control rigging, especially when turbine engines are involved, is quite critical. Idling settings must be low enough to permit rotor disengagement and high enough to insure against inadvertent cut-out or flame-out. The proper ratio of power control with changes in collective settings must be attained as well as adequate power throughout the entire flight regime to meet performance requirements.

Misrigging or maladjustment of upper helicopter controls or rotors can result in roughness due to blades being out of track; insufficient control, which can result in a flight safety concern; incorrect autorotation rpm; and generally poor flight performance. Misrigging or maladjustment of power plant controls as indicated earlier can result in cutting-out or inadequate power. In addition, especially as related to turbine engines, improper settings can cause "over temps" or "over speeds" which necessitate premature engine replacement.

Proper rigging and adjustment is essential for good performance. Good performance not only benefits the operator by providing the desired flying characteristics, but reduces abnormal loads and out-of-limit conditions which if ignored can adversely affect component lives and increase maintenance problems. How do you obtain these benefits? —by a thorough understanding of the theory of operation and mechanism of the component being adjusted or rigged; by close adherence to instructions provided in applicable manuals; and cooperation between mechanic and pilot. (This subject will be amplified later.)

On the practical side, a reminder is in order to insure that all connections are properly secured and safetied after adjustments are made. Due to the obscured locations of some parts of control systems and power plant installations, this is an item that is easily overlooked and can have dire consequences.

For those who question the establishment of this topic under the category of non-routine maintenance, it is agreed that, like component replacements, it could easily fall under routine maintenance, depending on the circumstances. The non-routine category was determined as the better choice inasmuch as much rigging and adjustment is accomplished as a result of operational "crabs." This brings us to a final word of caution. Once a component is properly adjusted, including those making up such a complex machine as a helicopter, major changes are highly unlikely. Performance does vary as a result of atmospheric enviroment changes and is to be expected and corrected as required. Minor changes also develop as a result of linkage wear, blade finish condition and power plant age. There are also occasional differences of opinion between "helicopter drivers" which require pacification. However, repetitive changes, especially in the same direction, can be a warning of impending failure! Such a condition should be thoroughly analyzed before additional adjustments and operation are permitted!

Inasmuch as rotor blade tracking is one of the more common line-level rigging and adjustment requirements peculiar to helicopter operations, let's consider the subject at this point.

Helicopter rotor blade "tracking" is somewhat controversial in the military and industry, especially as related to the method to be employed. As with fixed-wing aircraft propellers, the basic requirement is a reference point against which the path of different blades can be measured. Due to the possible aerodynamic variations, it is necessary to "track" helicopter rotor blades while turning at specified operational speeds, usually at the low collective pitch setting. This requires the utmost of caution and, preferably, much properly-supervised experience when the tracking reference device used is the commonly known tracking flag. The degree of concern varies with the condition of the ground surface on which the job is being performed, the size and height of the rotor blades and the prevailing wind conditions. The respective manufacturers' instructions should be thoroughly understood and followed. A few general recommendations are:

1. Have qualified test pilot or highly experienced pilot in the respective model aircraft at the controls.
2. Apply contrasting color grease pencil or chalk to the blade tips.
3. Mechanic should consider direction of blade rotation and plan to position himself so that he is generally facing the direction of the blade tip path rotation. In the event of inadvertent loss of flag control, it will then be carried away from mechanic's body.
4. Adjust flag to have mid-point of material at approximate height of blade tip path at specified operational speeds and collective control paths.
5. Get signal from pilot when ready to track.
6. Approach helicopter with top of flag at ample outboard angle to insure against premature blade contact.
7. Select resting point of flag staff at spot on the ground just outside of blade tip path and attain a comfortable stance.
8. Hold flag material either in line with radius of rotation or slightly canted with direction of blade rotation to get better indications; avoid tearing material, and reduce possibility of loss of flag control with excessive engagement.
9. Slowly and steadily move top of flag toward blade tips, pivoting about lower end resting on pre-selected point on the ground until contact is made with all blade tips. Attempt to get only one contact per blade to avoid conflicting marks.
10. Withdraw flag and check marks.
11. It is usually desirable, especially when tracking high rotors, to have a second man stationed some distance forward of and facing the man holding the flag to help judge and insure that the flag height is correct.
12. Direction and extent of adjustment is usually available in the respective model maintenance directive.

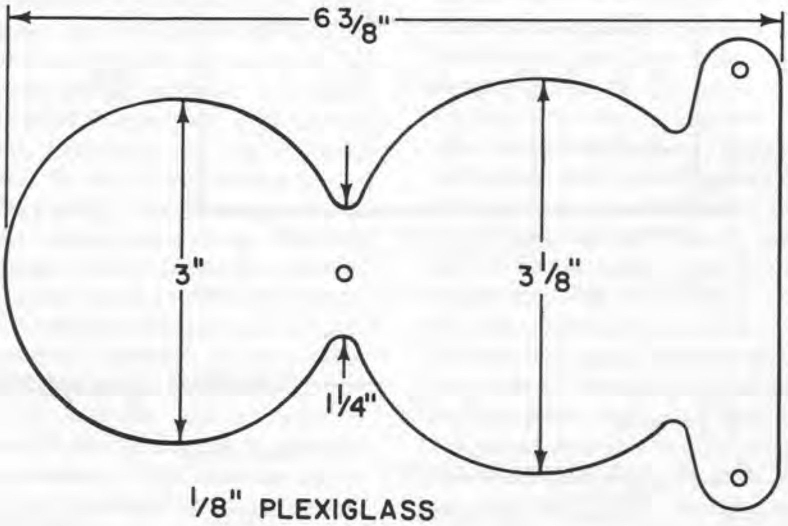
Other methods of helicopter rotor blade tracking are: (a) flag unit attached to pivot point on aircraft structure to accommodate extremely large models. (b) a brush on the end of a pole to transfer marking substance to the lower blade (primarily suited for two-bladed rotors); (c) visual with experience (used on two-bladed rotors having contrasting color tips); (d) electronic devices that convert light beam interruptions or capacitance variations into vertical height differential.

In the case of the light beam system, an indexing device must be secured to the rotor shaft to establish a reference blade. This is provided as a built-in feature on some models. Another feature provided on Kaman helicopters is in-flight manual and automatic tracking systems which can also be used to facilitate initial ground track.

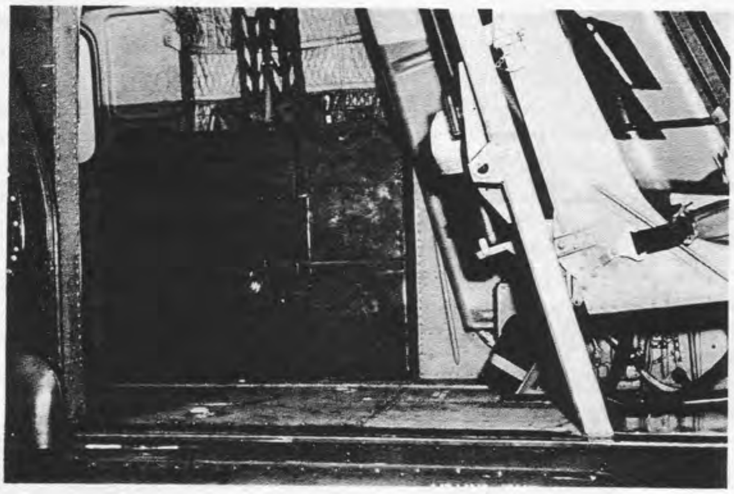
Tail rotor tracking may or may not be required depending on the model. Special procedures and devices are usually provided when tracking is required. Most of the above noted main rotor recommendations apply, especially those related with flag-to-blade tip contact. The requirement for use of caution is amplified by the higher tail rotor speeds and usually lower ground clearance. K

Timely Tip - (UH-2)

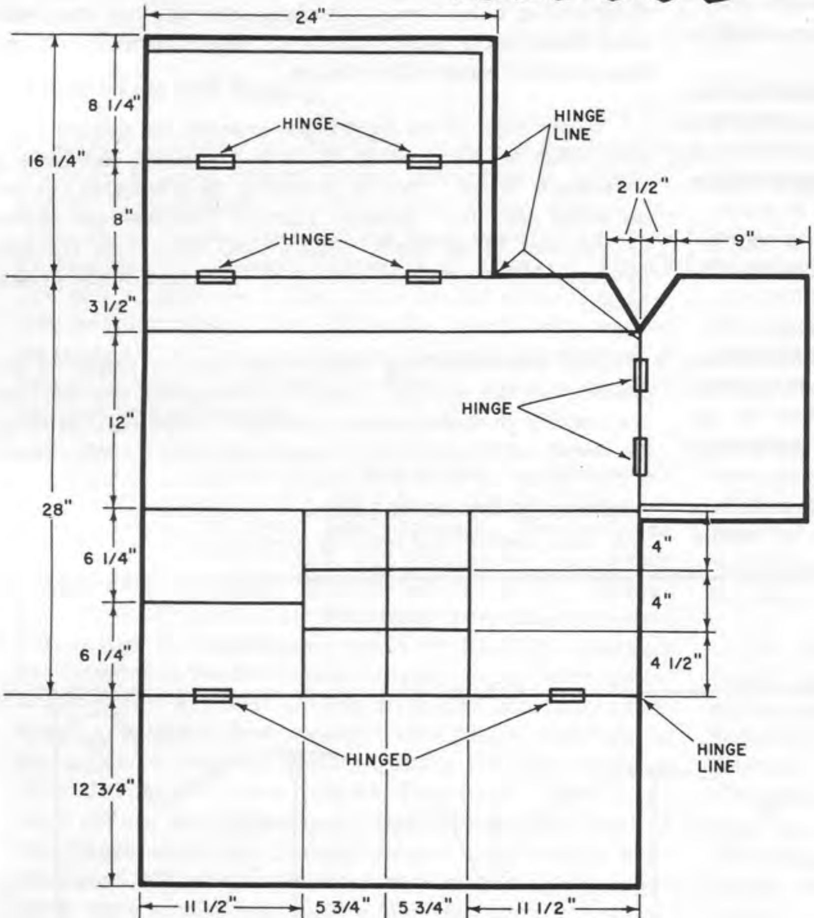
Extra protection in the form of cutout (see drawing) plexiglass plates have solved the problem of broken glass in the ASA-13A computer control reported in the June-July issue of Kaman Rotor Tips. Whenever a computer is installed in the helicopter, the protective plate is installed on the computer. When the computer is removed from the aircraft for repair, the plate is removed before the unit is sent to AMD.



HU-1 Avionics Shop, NAAS Ream Field, Calif.



Design For *RESCUE*—



SAR GEAR BOX FOR UH-2

Richard A. Curtis, ADR2, of Station Operations, NAS Atsugi, Japan, designed this equipment storage box at the suggestion of Lt George W. Crowell, SEA-SPRITE pilot. Plans for a similar box developed by an ARS unit at Dow AFB, Maine, appeared in the April, 1963 issue of Rotor Tips. The Atsugi box weighs approximately 150 pounds and is located behind the control tunnel of the copilot's seat. It is secured by line from the handles to the seat support brackets. Contained in the box are: TOP SHELF - 2 blankets; CENTER SHELF - 2 MK6 smokelights, 2 MK9 smokelights, 2 hot suits, 2 hot helmets; BOTTOM SECTION, TOP SHELF, LEFT - 1 rescue sling; BOTTOM SHELF, LEFT - 2 rescue hatchets, 1 poncho, 1 rescue code board; CENTER TOP, LEFT - 2 pharyngeal airways; CENTER TOP, RIGHT - 2 shroud cutters; CENTER MIDDLE, LEFT - 2 cable cutters; CENTER MIDDLE, RIGHT - 2 Chicago grip assemblies; CENTER BOTTOM, LEFT - 2 emergency hooks; CENTER BOTTOM, RIGHT - 2 red lens flashlights; RIGHT SHELF - 2 battle lanterns, 75 feet of Manila line.

CURRENT CHANGES

		Issue Date
AFC	No. 14 - RELOCATION OF INLET SCREEN.	6/30/64
AFC	No. 18 - LANDING LIGHT CONTROLS.	7/15/64
AFC	No. 21 - Modification of MAIN ROTOR RETENTION STRAP SHOE.	6/22/64
AFC	No. 37 - Modification of HOIST BOOM SUPPORT FITTING.	6/19/64
AFC	No. 45 - Modification of ENGINE BLEED AIR SHUT-OFF VALVE.	6/19/64
TCTO-3R12-2-502	- Installation of ROTOR BLADE CONTROL ROD GUIDE - SHAFT AND HOUSING ASSEMBLIES P/N 774504.	7/1/64

A. J. Leonaitis, Service Publications

During this mission an HH-43B from Aerial Survey Team 7, 1370th Photo-Mapping Wing, Air Photographic and Charting Service, conducted a two-day, overwater search for the survivors from an outrigger canoe which capsized 50 miles from Port Moresby, New Guinea. The mission called for pin-point navigation and considerable ingenuity in meeting problems which arose during the mission. One HUSKIE crewman voluntarily left the safety of the helicopter to aid the survivors. Personnel involved have been awarded Scrolls of Honor.

HUSKIE FROM AST 7 RESCUES 8

Three children and five adults who had spent three days and nights in the Coral Sea on a capsized and half submerged canoe were rescued by an HH-43B attached to AST 7, Port Moresby, New Guinea. Capt John A. Firse was pilot, Capt Robert Y. Meetze, copilot; SSgt William A. Pearson, flight mechanic; and TSgt John W. Collins, medical technician. The search, made under direction of the Australian Department of Civil Aviation (DCA), was initiated on Easter Sunday afternoon and continued the next day until the survivors were located 20 miles at sea, more than 80 miles from where the canoe capsized when struck by a five-foot swell. Only the bottom of the two logs from which the canoe and outriggers were constructed were above water. As they drifted helplessly upon the open sea, the survivors suffered from shock, exhaustion and severe sunburn.

The helicopter crew thoroughly searched 50 miles of the coastal area northwest of Port Moresby, the planned route of the canoe, and its island destination. They were returning from the search area when DCA advised a Cessna had sighted the survivors (1100 hours), and had dropped a life raft containing food and water. DCA requested that the helicopter pick up the survivors. The helicopter was refueled before proceeding to the survivors' assistance. An operational check was made on the rescue hoist, and it was found to be inoperative. Sergeant Pearson quickly trouble-shot the system, found the malfunction, and made a temporary repair which enabled the pilot to operate the hoist. It remained inoperative at Sergeant Pearson's crew position. The repair and refueling of the helicopter was accomplished expediently by Sergeant Pearson, and the aircraft was airborne again within 30 minutes.

Overwater navigation enroute to the rescue area was accomplished by Captain Meetze, who made frequent checks on the drift, groundspeed and track of the aircraft. He guided the helicopter directly to the survivors' location. He also computed the fuel requirements of the mission and provided the pilot with the maximum time that could be expended in the rescue area during hovering operations, which require a much higher rate of fuel consumption. To reduce the hazards of overwater flight by a single-engine aircraft, the helicopter was provided escort by an RB-50 throughout the rescue operations.

The crew overcame two serious problems during the rescue. One—they were not proficient in utilizing the hoist as a means of picking up survivors, for no requirement exists in their specific operations. Second—the pilot did not have a desirable visual reference to hover over water. Crews in Air Rescue Service normally use floating smoke bombs which provide reference for the pilot. Crew ingenuity quickly solved the latter problem by utilizing a technique similar to a Ground Controlled Approach (GCA). Sergeant Pearson relayed verbal directions in altitude and azimuth to Captain Firse throughout the hovering operation. This was the equivalent of hovering on instruments. Captain Meetze monitored the aircraft's engine instruments and altitude, and the accuracy of the verbal directions given to the pilot by Sergeant Pearson, while the pilot devoted full attention to flying the aircraft.

Even though the hoist and sling operation is an emergency means of rescue, Sergeant Collins volunteered to be lowered in it to assist the weakened survivors. He was putting himself at the mercy of the adverse elements of an open sea with no assurance that he could be safely retrieved by the helicopter. However, after a number of attempts and several dunkings in the sea, Sergeant Collins was safely lowered into the raft. In comparison, it was like trying to drop a cigarette into the narrow mouth of a soda bottle from three feet.

The calm efficiency of Sergeant Collins instilled confidence in the survivors. Thus relaxed, they were quick to grasp his instructions for using the sling. He promptly prepared each survivor for the sling ride into the aircraft, permitting the children to go first. Meanwhile, Sergeant Pearson continued to give verbal directions to Captain Firse, who was simultaneously flying the helicopter and operating the hoist controls. Sergeant Pearson did an outstanding job of speedily getting the survivors safely into the helicopter and out of the sling. When Sergeant Collins was safely aboard the aircraft again, it was noted that less than 15 minutes elapsed during the complete retrieving operation. Sergeants Pearson and Collins gave water and administered first aid to the survivors, while enroute to the Port Moresby airport. There the survivors were taken to a local hospital for further professional treatment. K

1000-Hour Pilot Awards

The names of seven more pilots have been added to the growing list of those who have received desk set awards from Kaman Aircraft for logging 1000 hours in helicopters produced by the company. They are: Capt Daniel M. Thomsen of ARS Det 6, EARC, MATS, Andrews AFB, Md.; Capt Warren K. Davis of Det 5, WARC, McChord AFB, Wash.; Capt Thomas C. Seebo of Det 18, WARC, Webb AFB, Texas; Capt Clifford E. Brandon of Det 16, WARC, Williams AFB, Ariz.; Capt James H. Black, Jr., 54th ARSq, Thule AB, Greenland; Capt Harry A. Jones of Det 10, AARC, Aviano AB, Italy; and Capt Albert E. Hooper, Jr., 58th ARSq, Wheelus AB, Libya. In left photo, Captain Brandon detachment commander, receives congratulations after 1000th-hour touchdown from "hopefuls" Captains Tom Brumfield, Donald Donk and Bruce Purvine. Each recently joined the "HUSKIE 500 Club." Capt Beryl E. Warden Jr., and Capt Carlton R. Damonte, who qualified recently, are shown receiving the Kaman awards from Col Richard L. Ault, 3615th Pilot Trng Wing, Craig AFB, Ala. Captain Warden is in right photo, Captain Damone in bottom photo. Both are members of ARS Det 11, EARC, MATS, at Craig. Det 11 which is commanded by Capt Maurice G. Kessler, claims to be the first LBR detachment to have 50% of its assigned pilots with over 1000 hours of H-43 time. (USAF photos)

KAC Evaluates Helo Safety Controls

The Kaman Electronic Systems Division has been awarded a contract by the Army for evaluation of automatic safety controls in helicopters. Under the new contract the Division will analyze the advantages of systems which electronically sense engine failure and immediately makes proper corrective actions. With modern turbine engines, which operate very quietly, it can take a pilot precious seconds to recognize and determine an engine failure.

Kaman Aircraft has also received a contract from the Army Transportation Research Command for research and development of a Dynamic Anti-resonant Vibration Isolator (DAVI). DAVI, which was invented at Kaman, is a shock and vibration mount which operates on a new dynamic principle and has features that could solve some of the most pressing shock and vibration problems in military vehicles such as aircraft, helicopters, tanks, trucks and ships. In feasibility tests of an experimental working model conducted at Kaman, the DAVI was found to be over 99% effective in isolating vibration frequencies far beyond the range of effectiveness of conventional isolators.

Under a contract from the National Aeronautics and Space Administration, Kaman is also studying a Gyroscopic Vibration Absorber. The company will analyze the physical and mathematical properties of the recently discovered potential of a gyroscope to absorb vibrations in aircraft and space vehicles. Prior to the award of the NASA contract, Kaman made preliminary analysis of the design characteristics and design parameters of the GVA (Gyroscopic Vibration Absorber) concept and successfully tested experimental working models.

Marine Mercy Mission

Capt George E. Pratt, USMC, of VMO-2, MCAF, Futema, Okinawa, was awarded a Scroll of Honor recently for the night helicopter evacuation of a seriously injured civilian from the jungle on Mindoro Island, P.I. Darkness was fast approaching when Captain Pratt, in an OH-43D, heard a call on Guard channel from a forward air controller on the ground. A civilian had a badly lacerated leg and needed immediate medical attention. The captain proceeded to the area and was vectored into the landing zone by the lights of a jeep. The trees in the area were from 100 to 150 feet high but, with radio help from the ground, he was able to land and evacuate the injured man to a field hospital.

BUSIEST DETACHMENT?

The question was asked in the February/March issue of Rotor Tips after Det 54, EARC, MATS, Moody AFB, Ga., reported the unit scrambled 643 times in response to aircraft emergencies. An answer comes from Det 16, WARC, Williams AFB, Ariz., which is commanded by Capt Clifford E. Brandon. The unit scrambled 703 times during 1963 and flew a total of 690 hours. Is this the LBR record for '63?

continued from page 5

<u>To test the altitude controller's inductive bridge output:</u> (See figure 4) (1) Simulate an altitude of 500 feet with the VPT-10HS set. (2) Increase the simulated altitude to 1000 feet. The voltmeter should indicate approximately minus 6.8 volts. (3) Decrease the simulated altitude to zero feet. The voltmeter should indicate approximately plus 6.8 volts. As the altitude controller reaches the simulated altitude, the voltmeter indication should decay to a null. If the signal increases or decreases to the 6.8 volt value but fails to null after it is known that the simulated change in altitude has been reached, either the ASE amplifier or the altitude controller is malfunctioning. If the voltmeter does not indicate any change in voltage when a change in altitude occurs, the problem can be assumed to be with the altitude controller. When the controller is suspected of having a malfunction in this or any other test, a resistance check should be made (see figure 4).

<u>To test the altitude controller's climb rate generator:</u> (1) Place the COLLECTIVE CHANNEL switch in 9-CLIMB RATE. (2) Increase the simulated altitude to 1000 feet. The voltmeter should indicate approximately plus 4.2 volts. (3) Decrease the simulated altitude to zero feet. The voltmeter should indicate approximately minus 4.2 volts. This signal will also decay to a null when the simulated altitude change has been reached by the controller. If the voltmeter indicates the prescribed voltage, it can be assumed that the rate generator is functioning properly. If, however, the voltmeter does not register the desired readings, the malfunctioning unit can be either the altitude controller or the ASE amplifier.

<u>To test the "feedback" signal from the ASE amplifier to the altitude controller:</u> (This is the signal that "drives" the controller back to a null after an altitude change.) (1) Place the voltmeter switch in position 13-ALT MON SYNC AMP. (2) Place the voltmeter function switch in the 90-degree position and the range switch in the 30-volt range. (3) Simulate 500 feet with the VPT-10HS test set. (4) Increase the simulated altitude to 1000 feet. The voltmeter should indicate approximately plus 23 volts. (5) Decrease the simulated altitude to zero feet. The voltmeter should indicate approximately minus 23 volts. If the proper readings are not registered by the voltmeter and the resistance of the altitude controller is correct, change the ASE amplifier. If the resistance of the controller is found to be incorrect between pins G and H (see figure 4), change the altitude controller. Check the resistance between pins 7 and 9 on the ASE amplifier's J156 with the controller's electrical connector <u>disconnected.</u> The resistance should indicate infinity. If a short is indicated, change the ASE amplifier.

<u>To test the control servo in the altitude controller:</u> Place the COLLECTIVE switch in position 5-BAR ALT SYNC CT and the voltmeter in the 10-volt range - 0 degree function. Utilizing the VPT-10HS test set, simulate an altitude of 500 feet. Engage ASE, BAR/ALT and the collective control button on the collective stick. M1 and M2 should be at their quiescent value. Increase the simulated altitude to 1000 feet. The voltmeter should indicate approximately 7.0 volts. M1 should increase and M2 should decrease. Upon ASE disengagement, the voltmeter reading should decay to a null and M1 and M2 should return to their quiescent state. While the simulated altitude is still at 1000 feet, engage the BAR/ALT system. M1 and M2 should remain at their quiescent state as long as the altitude remains constant. Reduce the simulated altitude to 500 feet. M1 should decrease and M2 should increase. When ASE is disengaged, the two meters should return to their quiescent state. If these signals are not observed, perform a resistance check on the controller between pins S and P, P and R, S and R, and M and N. Values are indicated in figure 4. If these resistance values are found to be correct and the malfunction is still present, it can be assumed that the ASE amplifier is the problem. **K**

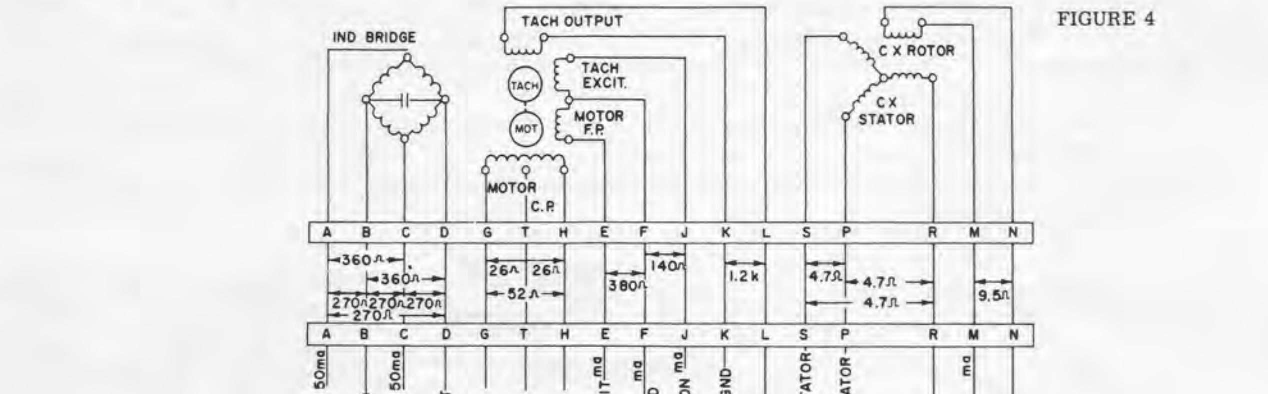


FIGURE 4

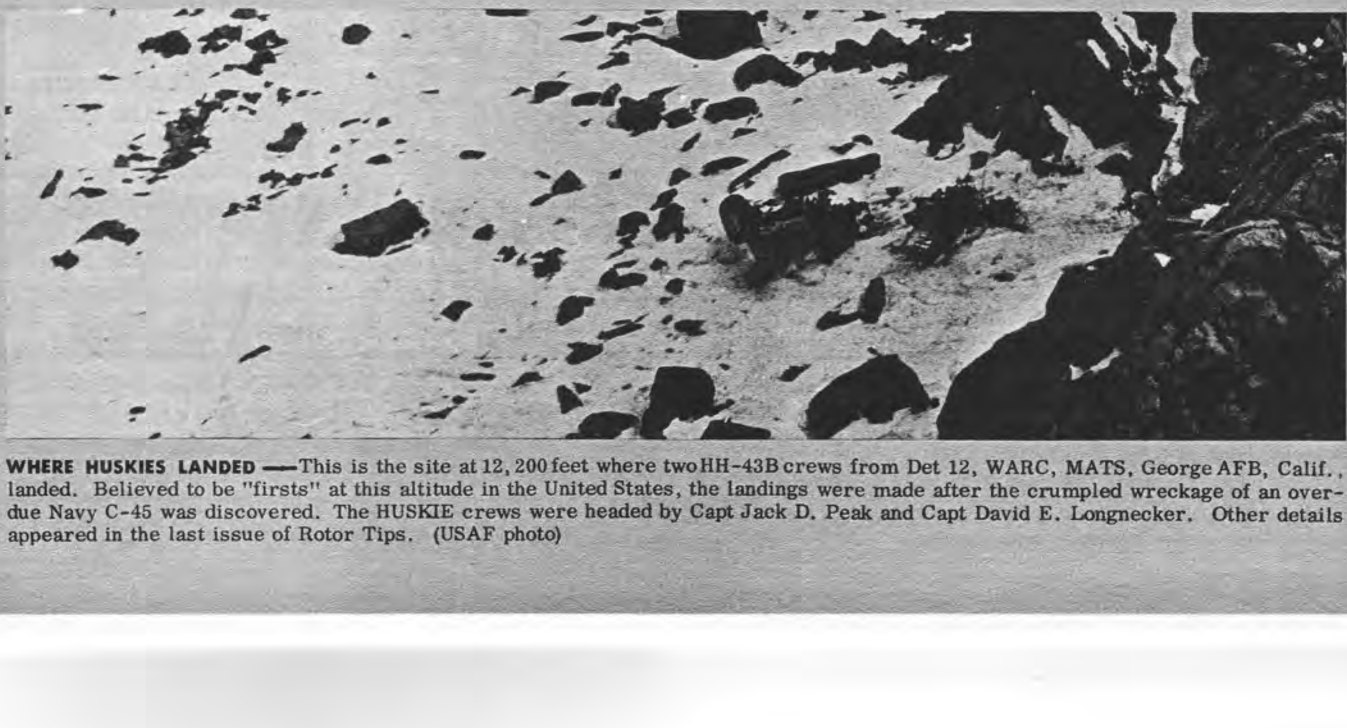
Huskie Happenin

...Medals for hazardous rescue of two boy scouts from ledge deep within narrow canyon awarded to HH-43B crew from Det 3, WARC, MATS, Kirtland AFB, N.M. Capt Roy K. Baliles, pilot, receives Distinguished Flying Cross, SSgt James B. Norris, crewman, Airman's Medal; Capt Bruce C. Hepp, copilot, and SSgt Alsidez Rodriguez, crewman, Air Medals. Searchlight rescue at dusk made in severe turbulence with rotor tips arching "within inches" of tree tops. Sergeant Norris lowered to narrow ledge and uses rope to pull boys to safety of another ledge from which he helps them work their way off cliffside. Brig Gen Adriel N. Williams, Air Rescue Service commander, presents DFC to Captain Baliles and Air Medal to Capt Hepp and Sergeant Rodriguez. Airman's Medal presented Sergeant Norris by Maj. Gen. John W. White, commander of Kirtland's Air Force Special Weapons Center.

...HH-43B crew from AST 4, Asmara, Ethiopia, airlifts seriously burned airman from isolated site. Flies 160 miles, 50 over water, to island in Red Sea to make pickup and return. Aboard HUSKIE are Capt Clarence C. Lunt, pilot; lstLt Maximilian C. Falk, copilot; and SSgt Thomas F. Howard, crew chief.... HUSKIE crew from AST 4 also removes injured airman from lonely HIRAN station. Aboard helicopter are Capt James R. Lisko, pilot; Capt Lunt, copilot; and A1c Arlin E. Parsons, crew chief.... Less than ten minutes after parachuting from jet fighter, pilot is rescued from ocean by HH-43B crew from Det 1, 36th ARS, Misawa AB, Japan. Aboard alert HUSKIE are lstLt David E. Mullen, RCC; lstLt Donald D. Metzinger, copilot; SSgt Dale C. Curtis and A2c Charles F. Hill, firemen; A1c Lester S. Wright, medic. In second helicopter launched to help in search are Capt Dennis M. Chase, RCC; Capt Ronald A. Clyde, copilot; A1c H. E. Barber, crew chief.

...HH-43B crew from Det 15, WARC, MATS, Luke AFB, Ariz., scrambles when RF-101 crashes at auxiliary field during Desert Strike exercise. Aircraft fire extinguished with FSK and pilot flown to hospital. Aboard HUSKIE are Capt Harold D. Salem, pilot; Capt Dale L. Potter, copilot; SSgt Walter R. Basnight, A1c Edward Martinez, firefighters; and Capt Edward Conley, doctor.

...Two HH-43B's from 36th Air Rescue Sqdn, MATS, at Tachikawa AB, Japan, join in rescue efforts after country experiences worst earthquake since 1923. Fly in 10 paramedics with medical supplies to city of Niigata. LtCol Robert R. Dyberg, squadron commander, flies over area in HH-43B and relays messages to C-54 circling overhead. From there reports transmitted to Air Rescue Center at Fifth Air Force Headquarters.... Capt Dennis M. Chase, Det 1, 36th ARSq., Misawa AB, Japan; covers three emergencies in one sortie with HH-43B. Transport plane which had declared emergency protected by hovering HUSKIE with FSK but landing made without incident. Immediately afterward, Captain Chase turns attention to fighter aircraft when pilot becomes ill while taxiing but no need for helicopter assistance. Then F-102 narrowly misses making wheel-up landing but recovers in time. Again, helicopter standing by for action if needed. ...Pakistan Air Force HH-43B launches when PAF aircraft ground loops during attempted emergency landing in isolated field north of Chaklala. Pilot flown to hospital in HUSKIE.... HH-43B from Peshawar AFB utilized to film welcome given to Sheikh Abdullah by citizens of Rawalpindi. As procession wends way over nine-mile route from Chaklala Airport, helicopter circles overhead. First time such filming done in case of visiting dignitary.



WHERE HUSKIES LANDED —This is the site at 12,200 feet where two HH-43B crews from Det 12, WARC, MATS, George AFB, Calif., landed. Believed to be "firsts" at this altitude in the United States, the landings were made after the crumpled wreckage of an overdue Navy C-45 was discovered. The HUSKIE crews were headed by Capt Jack D. Peak and Capt David E. Longnecker. Other details appeared in the last issue of Rotor Tips. (USAF photo)

TUSLOG HUSKIES — In left photo, Lt Max C. Falk and SSgt Harry T. Smith show a TUSLOG 153 HH-43B to pupils from the Cigli AB, Turkey, dependent school during Science Week program. In right photo, simulated aircraft fire is staged for visiting Izmir firemen as part of a community relations and information program. Briefings on equipment, rescue operations and the capabilities of the HH-43B were also given. (USAF photos)

HUSKIE WITH THE HUSKIE—Problem of recovering HH-43B downed in rugged Colombia, S.A., terrain after roll-over accident is easily solved by utilizing another HH-43B to remove fuselage and other components. Both aircraft are attached to the Colombian Air Force.

JOB WELL DONE—Dramatic photo shows hovering HH-43B from ARS Det 6, EARC (MATS), Andrews AFB, Washington, D.C., hoisting survivor of boating accident to safety from rock in middle of swift-running Potomac River. The HUSKIE crew scrambled after canoe capsized and one of the two occupants made his way to shore and called for assistance for his stranded companion. Aboard the helicopter were: Lt Darvan E. Cook, pilot; SSgt Robbie N. White, fireman-hoist operator; and SSgt Robert D. Bobbitt, medic. Total flying time including a trip to the hospital with the rescuee, was 25 minutes. (USAF photo)

SAFETY AWARD —Capt John M. High, ARS Det 6 safety officer, receives MATS Flying Safety award from BrigGen Clair L. Wood, commander of Andrews AFB, Washington, D.C. The detachment was given the award for the second consecutive year for compiling an outstanding flying safety record. Gol Grover J. Dunkleberg, right, commander of EARC, presented the plaque to General Wood. The detachment provides full rescue coverage for Andrews and also flies orbit mission over all Presidential or distinguished visitor flights. In 1963, Det 6 crews scrambled on 412 aircraft emergencies, 135 special missions and flew 54 sorties in support of host base activities. (USAF photo)

NEW RECORD ?— The three HH-43B's shown may have set a new Air Force record. The helicopters, which are attached to ARS Det 5, WARC, McChord AFB, Wash., have all passed the 1000-hour flying mark. Detachment personnel believe their rescue unit is the first to have all three HUSKIES pass the magic number. Capt Edwin A. Henningson, detachment commander, credits SMSgt Henry J. Luty and his crack maintenance team with making the feat possible. (USAF photo)

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NAS Miramar, Calif.
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