KAMAN

Rotor Tips

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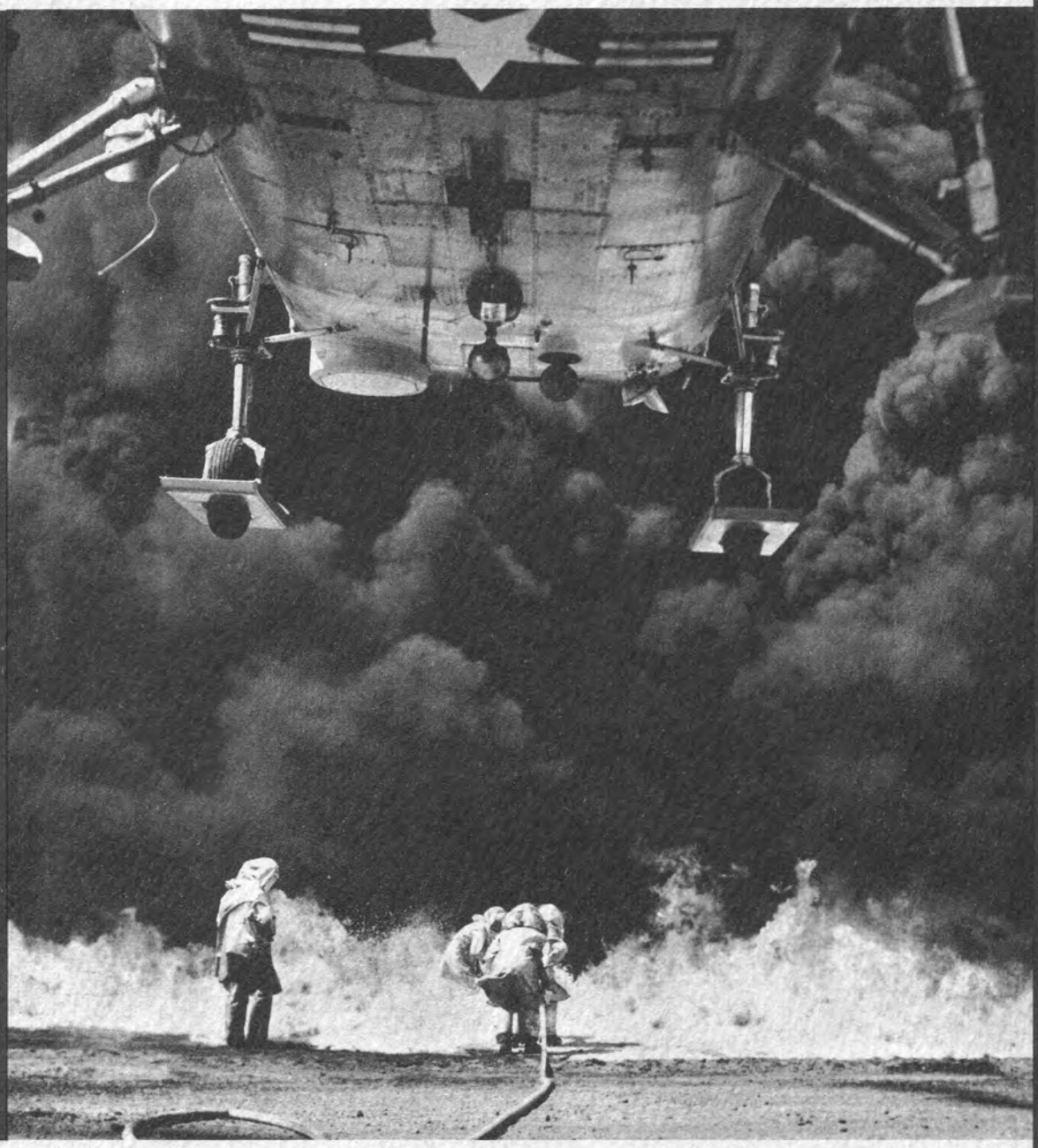

THE KAMAN AIRCRAFT CORPORATION

PIONEERS IN TURBINE POWERED HELICOPTERS

KAMAN

Rotor Tips

OCTOBER, 1961

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

IN THIS ISSUE

THE COVER

Personnel from the 401st Operations Squadron participate in fire-rescue drill at England AFB, La. The dramatic photograph was taken by A1/C E. J. Kennedy.

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PREPARE THE MAN

H-43B Training at Sheppard Air Force Base

By SMSgt. Dwight B. Sexton,
Instructor Supervisor,
H-43B Special Training Course.

The Air Training Command's new slogan, "PREPARE THE MAN," was thoroughly challenged by the training requirements for this new turbine-powered helicopter. Each major Command was scheduled for delivery and, as no maintenance personnel experienced with this type aircraft was available, the cry went out for immediate training.

In March of 1960, the way was cleared for training of Air Force maintenance personnel on the H-43B aircraft; Sheppard Air Force Base, Texas, was selected as the site. The purpose of the school was set forth as a familiarization course to orientate selected Air Force personnel in the maintenance of the H-43B. Selection of the students was left to the discretion of the Commands and organizations.

This being the first helicopter adopted by the Air Force which used the turboshaft engine as a power plant and also incorporated an intermeshing, counter-rotating rotor system, training of personnel became an immediate concern to all. The delivery dates and the graduation of trainees had to be coordinated and timed for the graduates and the aircraft to arrive at the organizations together.

Instructors were selected and trained at the Kaman and Lycoming factories. Equipment was purchased and modified into training aids and finally, on 23 March, 1960, the first class reported to Sheppard AFB for training. Because of the extreme need for maintenance men in the affected Commands, the maximum class size was set at 14 men each for three weeks.

These first classes were necessarily made up of line chiefs, flight chiefs, inspectors and mechanics. Each had a different job at home but, individually, they wanted to learn all they could about this new machine. The instructors soon learned that the word "WHY" was extremely comprehensive.

To meet the needs of the Air Force, the organization, and the man, the course was divided into two blocks of instruction with 15 days being devoted to engine maintenance and 25 days to aircraft and systems maintenance. As the students were required to hold a helicopter specialist rating before entering the school, fundamentals of mechanics and basic maintenance practices were eliminated from the course curriculum. Since man learns best by doing, the

ENGINE REMOVAL—A1C Alexander, Charleston AFB, S.C.; TSgt. Hyatt, Shaw AFB, S.C.; Mr. Grier, Instructor; SSgt. Adams, Pope AFB, N.C.; SSgt. Wilder, Instructor; A2C Morphis, Grand Forks AFB, N.D. (USAF photo)

BENCH RIGGING OF BLADE—SSgt. Montgomery, Charleston AFB, S. C.; SSgt. Degaetano, Paine Field, Wash.; TSgt. Perkins, Spokane Intl. Aprt., Wash.; A2C Morphis, Grand Forks AFB, N.D.; TSgt. Hunter, Instructor. (USAF photo)

INSPECTING THE N2 TURBINE—SSgt. Fox, Portland Intl. Aprt., Ore.; SSgt. Turner, Nellis AFB, Nev.; A1C Duncan, Seymour Johnson AFB, N.C.; Mr. Morrison, Instructor; A2C Cedillo, Forbes AFB, Kan. (USAF photo)

"meat" of the course consisted of practical work involving removing, installing and adjusting each major component, along with discussions on these procedures.

A "one-eyed" view of the course by the student would go like this:

In the first few days of block one, the student is taught the principles of jet engine operation and jet engine systems operation. During this time he begins the actual teardown of the engine. Using the technical order as his guide, he disassembles the engine, inspects each component and determines its condition. Now the real work starts! The three engines in the classroom are reassembled and each clearance and adjustment has to be made. These adjustments are required to be correct and this sometimes calls for two or three tries on the part of the student. Eventually the engine is completed in the build-up and the student beams proudly on his product when - BOOM! - in rolls the jet calibration tester and vibration analyzer. To the student it looks like a handy little roll-away tool box——until the instructor opens the lid. As one student said, "It's got more gadgets than the cockpit of a '52."

The Air Force feels that the man must be able to meet the situation regardless of where he is stationed. For the mechanic who has complete specialist assistance available, a knowledge of these instruments better prepares him for identifying the general trouble area and he also knows the specific specialist to call for. This is extremely important for the mechanic stationed in the "Boon Docks." His judgement must be accurate before he "cries for help" from the home base.

Finishing the engine, the student is really proud of himself. He has completed block one; he's a helicopter mechanic; and he now has a general knowledge of turbo-shaft engines.

Ground handling procedures and lubrication requirements are introduced in Day 16. Next comes airframe and landing gears, then auxiliary equipment, fuel systems, electrical and instrument systems. "Isn't there an end to this stuff?" he wonders.

The student is moved to a room which has a sign overhead declaring, "TRANSMISSION IS TAUGHT HERE." Maybe they can tell him how those two "danged" rotors turn in opposite directions and still not hit each other.

Transmissions, where all the meshing and intermeshing of gears take place... rpm s and reductions... torques and forces and pumps that put out three different pressures — for two days this goes on, and then he finds himself removing one of the two rotor heads.

In rotor maintenance he is taught the construction, inspections and critical areas where cracks or wear may occur. He removes bearings, droop-stops, folding locks

and springs, L-cranks and teeter pins, actuators and lag pins. "Lord," he asks, "why didn't Mr. Kaman (rhymes with Japan) name these things like those used on other helicopters?" He remembers the instructor saying, "This is called a synchropter configuration. It has synchronized, counter-rotating, intermeshing rotors." The student slowly shakes his head and reassembles the hub. All the while the instructor is saying, "Watch your adjustments. Check the color coding. The shaft rod phasing must be right!"

Day 27 dawns. It's 6:00 a.m. No breakfast. Missed the bus and slid into the seat just in time to answer "HO" to roll call. Two flights of stairs later, he is inspecting the fabric and spring constant area of the blade. He has asked questions on inspection, construction, daily and periodic maintenance and how to get that 150-pound "thing" on the aircraft without damage. All of these are answered and he finds that the maintenance isn't going to be so hard after all!

Without a change of breath, the instructor moves from the blades into servo flaps. How can such a small item do so much work? It changes its own angle of attack, causing a change in blade angle of attack and a resultant change in track or cone angle. "Does the Air Force really expect me to understand this?" he asks. Silently, he removes and inspects the flap assembly, checks everything over and puts it back on the blade.

"Smoke break," calls the instructor. Everyone walks out to the coffee wagon and is handed a cup of "Texas" coffee. Holding his hand over the upwind side of the cup and bracing himself against the gale, the student carefully walks to the break area. The instructor is shaking everyone's hand. He must be leaving. No! The instructor is staying and we are moving—into rigging.

The new instructor carefully explains how the levers, bellcranks, input and output rods, the reverser and cyclic shifter affect each other. The seemingly endless stream of information continues to flow. Now it's programmers, station 77 and 97 bellcranks, viscous dampers and rigging pins. Remove the azimuth, tear it apart, inspect the tulip bearing. At the end of the day, with arms hanging limp from the overhead work of removing, installing and adjusting the azimuth, the student slowly walks to the bus stop. Leaning against the telephone pole he patiently awaits a ride to the barracks.

During the five days of flight controls he has learned the essentials necessary for the maintenance and trouble shooting of components in this system. The comparative simplicity of what at first appeared to be a complicated system still amazes him, but he feels he understands most of it. Field experience is all that is needed to make him a polished mechanic.

ENGINE DRIVE SHAFT ALIGNMENT CHECK—SSgt. Degaetano, Paine Field, Wash.; TSgt. Hyatt, Shaw AFB, S.C.; TSgt. Adams, Pope AFB, N.C.; Mr. Grier, Instructor. (USAF photo)

COCKPIT FAMILIARIZATION—Mr. Hawkins, Kirtland AFB, N.M.; Mr. Kenyon, Instructor; SSgt. Montgomery, Charleston AFB, S.C.; A2C Marcus, Portland Intl. Aprt., Ore. (USAF photo).

ROTOR HEAD REMOVAL—A2C Marcus, Portland Intl. Aprt., Ore.; A1C Alexander, Charleston AFB, S.C.; SSgt. Washington, Instructor. (USAF photo)

COLLECTIVE THRUST BEARING HEIGHT SETTING—Mr. Kenyon, Instructor; Mr. Hawkins, Kirtland AFB, N.M.; TSgt. Perkins, Spokane Intl. Aprt., Wash. (USAF photo)

DAMPER TIMING—SSgt. Adams, Pope AFB, N.C.; TSgt. Hyatt, Shaw AFB, S.C.; TSgt. Terrace, Instructor. (USAF photo)

ELEVATOR RIGGING—SSgt. Wilder, Instructor; A2C Morphis, Grand Forks AFB, N.D.; A1C Alexander, Charleston AFB, S.C. (USAF photo)

He enters the last lap of his training: engine change and inspection. The engine comes off easily and quickly. Preservation and depreservation is next, along with quite a discussion on oils and corrosive characteristics of parts.

Installing the engine is not as fast; it goes on easily enough, but adjusting for the alignment of the drive shaft takes more time. Each man must know this procedure thoroughly and must be able to do it without any mistakes. The engine has been installed and final adjustments are made during the runup. As this is completed, many of the potential troubles are discussed—trouble analysis soon gains the utmost respect of each man.

Only three days remain, but the student finds that in this review period more will be demanded of him than any comparable area in the school. During this time he will be required to demonstrate his ability to do all of those jobs on which he has received training. Although the requirements in these projects are rather stiff, the student feels that he has learned more here than any other part of the course. Actually, it is the only time that he is on his own and his complete knowledge of the aircraft is brought to light.

The last project is finished, the final test completed, and the instructor reviews the Tech Order Compliance changes and FIDs (Field Information Digests). As his name is called, each man steps forward and receives his certificate of graduation. His training is completed and, as he leaves for home, he feels he is capable of the job awaiting him there.

In this short discourse we have merely said that the complete aircraft is covered in teaching: Engine, 15 days; Systems, 9 days; and 8 days each on Controls and Inspections. Approximately 40 percent of the teaching is by discussion and the rest is practical projects performed by the student. The only text used is the techni-

GRADUATING CLASS—Front row, SSgt. Loving, Hill AFB, Utah; MSgt. Jones, Mountain Home AFB, Idaho; SSgt. Eberhart, Charleston AFB, S.C.; A3C Bednarz, Griffiss AFB, N.Y. Rear row, Mr. Grier, Instructor; SSgt. Parker, Seymour Johnson AFB, N.C.; SSgt. Wise, Charleston AFB, S.C.; A1C Jones, K.I. Sawyer AFB, Mich.; A1C Thompson, Kincheloe AFB, Mich.; SSgt. Wilder, Instructor. (USAF photo)

cal order. A full complement of special tools is on hand and each student is given a chance to use them. The instruction is handled by nine men, with five of these receiving their training at the aircraft or the engine factory. The training aids consist of one aircraft, three engines, a mockup of the reverser and directional control system, and various components used as bench items. A complete flight control trainer has been constructed and is now being introduced into the teaching. Background information for instruction is gained from the technical orders, Rotor Tips, and FIDs. Visits from the factory representatives help keep the information current with field requirements.

Any comments from field organizations concerning H-43B maintenance, which would be of benefit to the students, will be greatly appreciated. It is requested that all correspondence be addressed to - Headquarters, Sheppard Technical Training Center, Attention: TK, Sheppard AFB, Texas. K

THE AUTHOR

SMSgt. Dwight B. Sexton was born November 28, 1920 in Joplin, Missouri. He entered the Army Air Corps in August 1940 and is a veteran of 18 years service.

Sergeant Sexton has completed six helicopter training courses since he became a helicopter mechanic in 1950

He was assigned to the Helicopter Training Branch at Sheppard in 1957 and has been course supervisor of the H-43B helicopter mechanic specialized training course there since early 1960.

Quick Action

WEBB AFB, TEX. -- Two H-43B crews from the Helicopter Section here swung into action seconds after a mid-air collision in which two F-102s and a T-33 were involved. Three pilots bailed out and one F-102 landed safely at Webb. The crash site was about 12 miles north of the base.

One H-43B, which was piloted by 1st Lt. James L. Butera and 2nd Lt. Keith H. Ricks, was flying instruments at the time and immediately proceeded toward the scene. The alert H-43B with Capt. Thomas C. Seebo and 1st Lt. Larry C. Evans scrambled with the fire suppression kit. They were accompanied by A/1C Elbert E. Hillhouse and Mr. Louis Lattimer, firemen. About four miles from the crash area, Lieutenant Butera's helicopter (Rescue 3) reported spotting a parachute and was advised to aid the pilot while the alert 'copter took care of the burning aircraft. Captain Seebo's H-43B (Rescue 1) let off the firemen and fire kit at the F-102 site and then proceeded to pick up the other pilots who had bailed out. All three pilots who had ejected were in the base hospital within nine minutes after touching the ground. The H-43B crews immediately returned to the F-102 and found the firemen had extinguished the flaming fighter, saving it from total destruction. Later, as the crash convoy arrived, the 102 burst into flames again in the engine area, but they were quickly extinguished. Afterward, all parts, canopy, parachutes, seats, helmets, etc., were located by the H-43s. One of the helicopters flew only one hour on the mission and then returned to Webb AFB to cover the base rescue function. Giving close support to Flying Safety investigation teams, the other H-43B crew completed all photography and on-scene investigation with these teams. The accident occurred at 1030 and the last HUSKIE'S flight ended at 1700.

In another rescue mission at Webb, an H-43B crew consisting of Captain Seebo, Lieutenant Butera, S/Sgt. Donald Haines, helicopter mechanic; and S/Sgt. Charles R. Hardy and Airman Hillhouse, firemen; scrambled when there was an inadvertant bailout over the field from a T-33.

The aircraft landed without incident and the H-43B followed the chute of the other pilot down. He was on the ground less than 30 seconds and in the hospital being treated for a cut arm within two minutes of touch down.

A short while ago an H-43B manned by 1st Lt. William F. Glover Jr., Lieutenant Evans and S/Sgt. Morris L. Mixon, scrambled when a crash eight miles north of Webb was reported at 2113C. The aircraft was located at 2123C; one pilot had ejected when the plane came to rest, the other rode the aircraft in and was uninjured. Lieutenant Evans and Sergeant Mixon gave first aid to the pilot who had suffered a back injury while Lieutenant Glover returned for Captain Smith, medical officer; and A/1C Maier, medic. The two pilots were taken to the hospital at 2155C. K

DISTINGUISHED PASSENGER—An H-43B, recently delivered to the Colombian Government as part of the Mutual Assistance Program, was accepted at colorful and impressive ceremonies in Bogotá. Shown is Señor Alberto Lleras Camargo, President of Colombia, just before he was taken for a trip over the city in the turbine-powered helicopter by KAC Pilot Peter Russell. Adjusting the seat belt for the President is Edward Noe, company Field Service Representative.

MOUNTAIN-SIDE RESCUE—1st Lt. William Luther, H-43B pilot from McChord AFB, Wash., receives Kaman Scroll of Honor from Col. D. F. Smith, 325th Wing Commander, for hazardous rescue of injured woman. Others shown, left to right, are M/Sgt. Lawrence Seckley and 1st Lt. Robert Michelsen, who also received Scrolls, John Elliot, KAC Field Service Representative; and Maj. L. D. Wilson, Base Operations Officer, who accepted the Unit Scroll also presented by Colonel Smith. (USAF photo).

B-52 SEARCH AND RESCUE—A1/C Baudimo Baca and Capt. William M. Greener of Kirtland AFB, N.M., who flew in one of two H-43Bs on hazardous mission during which five B-52 crewmen were rescued, receive Kaman Scrolls of Honor from William Barr, KAC Field Service Representative. Similar Scrolls were presented to Capt. Ronald Hansen and T/Sgt. John Cicciu from Holloman AFB, N.M., who manned the other H-43B. (USAF photo)

Citation for H-43A Pilot

PERRIN AFB, TEX. -- 1st Lt. Tom W. Brunfield, Jr., attached to the Helicopter Section here, has been awarded a Citation for Outstanding Airmanship in recognition of the professional skill he showed when an F-102 crashed short of the runway.

Lieutenant Brunfield took off in an H-43A with a crash rescue team and fire suppression kit when the emergency was declared. He intended to hover at the approach end of the runway, but saw the F-102 crash and burst into flames about a quarter of a mile away. Lieutenant Brunfield flew immediately to the scene, made his approach and let out the team which had the kit in operation within 90 seconds from the time the plane crashed and came to rest.

The lieutenant's citation said that, even though the F-102 pilot could not be saved because of the position of the aircraft, "it in no way detracts from the professional skill exhibited by Lieutenant Brunfield." K

Marines Airlift Injured

CAMP PENDLETON, CALIF. -- Capt. Richard E. Skinner, HOK-1 pilot from VMO-6, Camp Pendleton, Calif., and his crew chief, Sgt. Charles R. Hern, recently evacuated two persons who were injured when their light plane crashed in rugged desert country, 60 miles east of Twentynine Palms.

The two Marines, both recipients of Kaman Scrolls of Honor for another rescue several months ago, took off for the crash scene a few minutes after the squadron's duty officer received the emergency call and reached the downed plane one hour and twenty minutes later. A five-minute refueling stop was made at the Twentynine Palms Marine Base. The injured men were then airlifed to the hospital for medical aid.

Captain Skinner and Sergean Hern received Scrolls of Honor after they flew their HOK-1 through fog and over mountainous territory to evacuate a marine seriously in- in an accident. K

OPERATION "GREEN LIGHT"

....SPECIAL TO KAMAN ROTOR TIPS

CAMP PENDLETON, Calif., --- Operation "Green Light", a giant-sized amphibious landing exercise held here recently took Marine Observation Squadron-Six and its Kaman HOK-1's through grueling tests comparable only to combat operations.

The combined Navy-Marine Corps landing exercise, involving 40,000 men and 70 ships, began in May off the California coast. On May 20 the 1st Marine Division stormed ashore along a 20-mile stretch of beach at Camp Pendleton.

VMO-6 operated from a makeshift airstrip on the beach as the division got a firm hold and pushed the Hawaii-based 4th Marine Regiment "aggressors" inland. Command liaison, aerial photography, artillery and Naval gunfire spotting were most necessary in the early stages of the landing.

Major A. W. Barden's 100-man squadron was declared "overun" by exercise umpires two days later and spent the remainder of the Camp Pendleton phase flying from the base airfield.

The final eight-day phase of "Green Light", conducted in the Mojave Desert near Twentynine Palms, Calif., was perhaps the most trying. Since the squadron's arrival there May 27, they were harassed by gusty, 20-30 mph. crosswinds, making lightweight OE operations especially hazardous.

The north-south runway, scraped from a dry lake bed by the 7th Engineer Battalion, was bordered on the east by a mountain range. The resulting high and low pressure areas caused some unpredictable winds. Often, OE pilots were forced to ignore the runway and land on the open desert to take advantage of wind direction.

Flight operations began May 28 before dawn as the desert war got underway. After the first mission at 4:45 a.m. by Capt. Robert D. Myers, the dry lake airstrip, called "Deadman's Lake International" by the Leathernecks, was a beehive of activity.

Constant demands for aerial photography and visual reconnaissance in the vast wasteland totaled more than 70 flight hours in 38 missions on the first day.

An early morning plane launch was almost a pleasure as the crisp night air cooled the desert floor, but the vacation atmosphere was shortlived. The torturous sun soon made its appearance over the Bullion mountains in the East and the desert became an inferno as windblown sand covered anything in the open.

Perhaps the toughest job in the squadron was that of the aircraft mechanic. He labored hour after hour in the stifling heat to keep his battle-weary aircraft in flying condition. His only break came when the craft was away on a mission. Then he could take a short rest under a shade tent near the runway.

Under the maintenance supervision of Capt. Joe B. Tyler, engineering officer; and MSgt. John M. Schmidt and GySgt. Lawrence L. Carmichael, line chiefs; the aircraft were kept in excellent condition, totaling more than 1000 flight hours during May.

The squadron's usefulness was not limited to aerial reconnaissance and photography, however. Transporting a chaplain from one desert area to another for Sunday services and delivering ice cream from rear area freezers to sun-parched frontline infantrymen were not uncommon tasks. K

Story by Sgt. Cecil Stibbens
1st Marine Division Correspondent

USMC Photos
By LCpl. E. A. Koutz

HAZARDOUS SAND—Inspecting rotor heads for desert sand is Pfc Russell A. Creamer, HOK plane captain from San Leandro, Calif. Exposed parts had to be wiped clean before each flight.

REQUIRED CLEANING—The desert operations made complete engine cleaning a necessity. Here, Pfc Benjamin F. Higginbotham, Little Rock, Ark., cleans the HOK fan and clutch assembly with solvent.

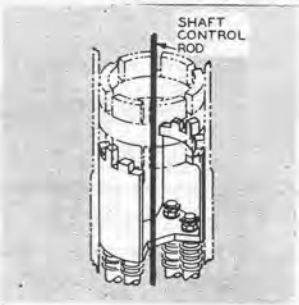
EASY—The exposed engine of the HOK made inspection and maintenance simple for these VMO-6 mechanics.

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. HOW CAN THE FLUORESCENT PAINT (MIL-P-21600) BE REMOVED WITHOUT DAMAGING THE FIBERGLAS? (Applies H-43A, H-43B)

A. A special formula is listed in Military Specification MIL-P-21600 for developing a fluorescent paint remover. If this formula is used, there will be no impairment of the lacquer undercoat or damage to the fiberglas. Use of regular paint remover will result in roughing-up of the surface and bonding separation. — R. S. W.



Q. WHAT ARE SOME CAUSES OF AZIMUTH BAR-TO-HUB CONTROL ROD WEAR? (Applies HOK-1, HUK-1)

A. In addition to improper rod crossover, wear of the azimuth bar-to-hub control rods can be caused by incorrect installation of the spring pack, P/N K350179-3, as required by ASC No. 102 for installation in the HUK and HOK helicopters. When the spring pack is positioned other than 90° to the opening in the bottom of the transmission shafts it will interfere with the control rods and eventually cause wear. Reference should be made to proper installation instructions in ASC 102 and handbook NAVWEPS 01-260HBA-2. Figure 2-30A and 2-30B of the referred handbook shows the proper spring pack installation. —W. J. W.

Q. WHAT IS A POSSIBLE CAUSE OF NOISE INTERFERENCE IN THE AN/ARC-34 UHF RADIO? (Applies H-43B)

A. If the multi-speed switch, P/N AE-47-2, malfunctions so that the starter-generator circuit remains energized after effecting an engine start, the starter-generator will then supply unfiltered and unregulated DC voltage to the 28 volt essential bus. This condition can appear as noise in the AN/ARC-34 radio when it is operated from this unfiltered and unregulated voltage. — P. A. G

Q. DOES THE OIL PRESSURE RELIEF VALVE IN THE OIL PUMP GOVERN THE OPERATING OIL PRESSURE OF THE TRANSMISSION SYSTEM? (Applies HOK-1, HUK-1, H-43A, H-43B)

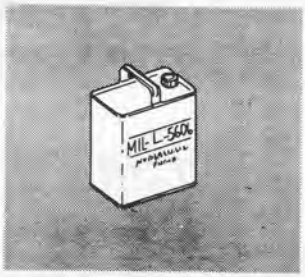
A. No. Under normal operating conditions the operating oil pressure is governed by the size of the oil jet orifices. The larger the orifice, the lower the oil pressure and vice versa. The only function of the relief valve is to prevent the oil pressure from exceeding max. operating pressures due to lower temperatures and/or passage restrictions. — C. W. J.

Q. IS IT MANDATORY THAT THE P/N K774680-3 OR -7 DRIVE SHAFT ASSEMBLY BE REPLACED FOLLOWING A ROTOR OVERSPEED CONDITION? (Applies H-43B)

A. Shaft replacement is not always required; it depends on the circumstances under which the overspeed condition occurred. If a power-on overspeed is effected whereby both engine and rotors overspeed between 111-117 percent, either in flight or on the ground, the drive shaft must be replaced in accordance with Special Inspection, Section V, T. O. 1H-43B-6. If, however, a rotor overspeed existed in autorotation, power off, the drive shaft assembly does not exceed rpm due to the slip clutch feature in the input pinion assembly of the transmission. Under this circumstance it is not necessary to replace the component. — R. A. B.

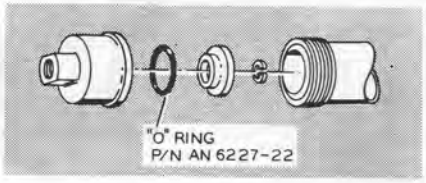
Q. WHY IS IT NECESSARY TO POSITION THE LOADING SLOTS ON THE AZIMUTH COLLECTIVE THRUST ROD BEARING, P/N K101062-11, SELF ALIGNING RING, OPPOSITE FROM THE NORMAL LOAD DIRECTION DURING REPLACEMENT? (Applies H-43B)

A. In use, the thrust rod bearing self-aligning ring is loaded in one direction only, by centrifugal force. It is necessary to position the loading slots away from the load direction to ensure a smooth load path and to increase the bearing area absorbing the thrust load. Pending release of the next T.O. 1H-43B-2 revision, reference can be made to FID B-31 for detailed instructions when assembling the azimuth thrust bearing. — W.J.W.



Q. LUBRICATING OIL IS USUALLY A YELLOWISH BROWN IN COLOR, WHILE THE HYDRAULIC OIL USED IN KAMAN HELICOPTERS IS RED. IS AN INDIVIDUAL CHECK ALWAYS A POSITIVE MEANS OF IDENTIFICATION? (Applies HOK-1, HUK-1, H-43A, H-43B)

A. This is not a positive identification unless a careful side-by-side comparison is made. Some MIL-L-7808 oil, manufactured by the Celanese Chemical Co., is now carried in the supply systems. This is a lubricating oil similar in appearance to the MIL-L-5606 hydraulic oil used in the oleo struts and brake systems. When the two are compared closely, it is found the Celanese MIL-L-7808 oil is a lighter shade of red; by itself it could easily be mistaken for hydraulic oil. Introduction of lubrication oil into hydraulic systems may cause seal deterioration and subsequent malfunctioning. To prevent error, always check the MIL number on the oil container before using. — C.W.J.



Q. WHAT IS ONE CAUSE FOR A WEAK OR SLIPPING ROTOR BRAKE? (Applies H-43B)

A. A weak or slipping rotor brake can be caused by air leaking from the accumulator through a damaged or faulty O-ring under the cap at the air end of the actuator. If a recharge of the accumulator does not correct the weak rotor brake and it is known that the air valve is functioning properly then the O-ring (P/N AN 6227-22) should be replaced. Disassembly instructions are listed in Section IV, T.O. 1H-43B-2. — W.J.W.

Q. WHAT CORRECTIVE ACTION SHOULD BE TAKEN WHEN IT IS FOUND THAT THE IGNITER PLUG IS RUBBING AGAINST THE EDGE OF THE THROUGH-HOLE IN THE COMBUSTION LINER? (Applies H-43B)

A. The usual corrective action is to loosen the igniter mount screws and adjust the mount slightly until chafing is eliminated. Tighten the mount screws and move the plug slightly to ensure that it doesn't chafe, then lockwire the screws and complete the igniter installation. This action normally completes the fix. If chafing is not relieved, realign the combustion liner, housing and fire shield. Consult Section IV, T.O. 2J-T53-6 for assembly instructions. Contact between the igniter and the combustion liner shortens igniter life and decreases operational efficiency. To prevent this condition, always check during assembly of the hot section to be sure components are assembled in the correct sequence and with proper alignment.

CAUTION: Never use a file, ream or other tool to enlarge the igniter through-hole. Altering the dimension of this orifice may change the design stress or result in eventual fire damage to the burner components. — A.A.W.

KAMAN SERVICE ENGINEERING SECTION—*R. J. Myer, Supervisor, Service Engineering; E. J. Polaski, G. S. Garte, Assistant Supervisors.*
ANALYSTS—*R. A. Berg, A. D. Cutter, P. M. Cummings, P. A. Greco, C. W. Jenkins, G. M. Legault, J. McMahon, C. J. Nolin, A. Savard, W. J. Wagemaker, N. E. Warner, A. A. Werkheiser, M. Whitmore, Jr., R. S. Wynott, W. H. Zarling.*

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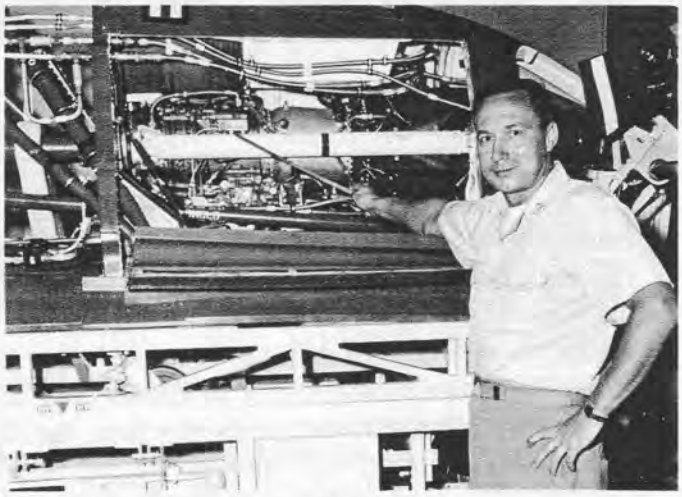
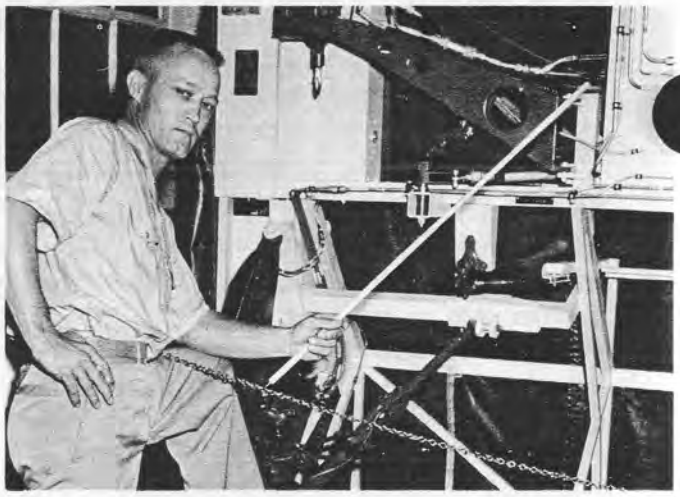
LAKEHURST



TURBINE ENGINE of the HU2K-1 is explained by Chief Niemotka.



NEW RESCUE HOIST—The HU2K-1 is pointed out by Chief Waldrop.

Helicopter Training Unit Has Detachment Here

Naval Air Mobile Training Group based at Memphis, Tenn. has established a Detachment here. Detachment 1070 which is skippered by A. P. MacCracken, AEC, will teach the new allweather utility helicopter, the HU2K-1 Seasprite.

Instructors with Detachment 1070 are, A. P. MacCracken, AEC, and D. W. Glaeseman, AE1, electrical systems instructors. The navigation system will be taught by L. Darr, ATC and W. R. Hoyle, AT1. Teaching the power plants section will be A. J. Niemotka, ADC, and J. C. Brandon, AD1. F. H. Brightman, AMC, and S. E. Waldrop, AMC, will teach the hydraulics and airframes section.

NAMTD 1070 will offer a course in Basic Electronics to station personnel. This course will be primarily for non-rated personnel working in the electronics field. All commands will be notified when the course is due to start.

High speed, long range search and rescue, together with utility and liaison duty with the fleet is the primary mission of the HU2K-1 Seasprite. The Seasprite is built by the Kaman Aircraft Corporation of Bloomfield, Conn. The Seasprite is scheduled for initial Fleet delivery in the early part of 1962.

The HU2K-1 with pilot and copilot can effect long range rescue of four persons. As an alternate mission the HU2K-1 can accommodate two litters and four passengers in addition to the pilot. When being used for carrying troops, 12 persons can be seated in the cabin to the rear of the pilot and copilot. Cargo can be carried externally on a cargo hook having a capacity of 4,000 pounds. For rescue missions, a 600 pound capacity hydraulic hoist swings outboard thru doors in the starboard fairing near the pilot's position permitting him a direct view of rescue operations. The rescue door is large enough to admit a survivor tied to a one man life raft.

Designed initially for shipboard operation, the overall envelope size of the HU2K-1 permits elevation thru the smallest cruiser hatchway without the necessity of tail boom folding. With the ability to fold all rotor blades back in the horizontal plane, the HU2K-1 requires a minimum of hangar deck space. The light weight of the aircraft permits movement of the helicopter aboard ship without the need for special tow bars or equipment.

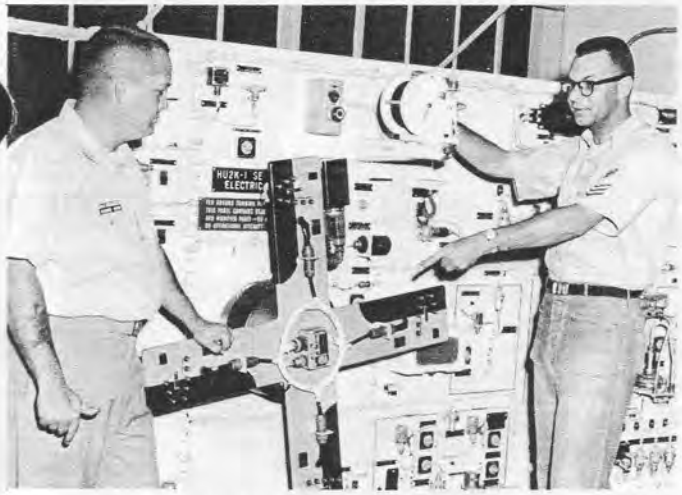
Important all mission safety factors for over water operation are the EMERGENCY flotation provisions incorporated in the HU2K-1. To permit safe exit of all occupants in the event of an emergency landing at sea, the water tight hull provides necessary flotation while inflatable sponsons provide lateral stability up to a 30 degree turnover angle. The sponsons are inflated by solid propellant firing thru a liquid ammonia cooling agent to fill the bags in 2½ seconds.

Automatic Stabilization Equipment (ASE) and dead reckoning navigation equipment are installed in the HU2K-1 to assure maximum flexibility for search and rescue work, utility operation, and alternate antisubmarine warfare missions during all weather flying conditions. Coupling

SPECIALISTS—Members of NAMTD 1070, Naval Air Mobile Training Group; who will conduct HU2K-1 training at NAS Lakehurst, N. J. Left to right, F. H. Brightman, AMSCA; D. W. Glaeseman, AE1; A. J. Niemotka, ADCJA; S. E. Waldrop, AMCHA; A. P. MacCracken, AEC, Assistant Area Representative; W. R. Hoyle, AT1; L. Darr, ATCA. J. C. Brandon, AD1; is also a member of the group. (Official Photograph, USN)

TATION BREAK

Naval Air Station Lakehurst, N. J.



THE ROTOR DE-ICING system of the HU2K is discussed by Chief MacCracken and Glaeseman.

MODEL CONTROL PANEL is explained to Hoyle (in driver seat) by Chief Darr. (Official Photographs, USN)

of the ASE and various instruments provides complete hands-off flying. In addition the HU2K employs the latest Doppler Navigation System.

Fully retractable main landing gear, while contributing to the aircraft's high speed characteristics, were designed primarily to avoid interference with either the hoist cable or the survivor during rescue operations. The gear retracts smoothly into wells in the lower fuselage with no wheel protrusion. Complete retraction or extension is accomplished in two seconds. The landing gear actuation handle is located adjacent to the pilot's collective stick permitting him to drop gear and collective in one motion in an autorotative landing.

The HU2K-1 has a single rotor and a single tail rotor powered by a General Electric T58-6 free turbine engine. This engine develops 1,050 shaft horsepower military rated and 875 shaft horsepower normal rated. A four-bladed main rotor system utilizes servo flaps on the outboard trailing edge of each blade. This represents the initial application of these servo flaps to a single rotor helicopter design, and insures rotor stability and ease of handling. A three-bladed tail rotor is fitted on a steamlined pylon at the aft end of the fuselage.

The HU2K-1 has 44-foot diameter main rotor blades with offset flapping hinges and an aerodynamic servo flap control system. Coning and droop stops allow routine turn up and shut down in winds up to 60 knots. The four main rotor blades are individually interchangeable and can be folded back in the horizontal plane within one minute of engine shut down without the crewman having to support the weight of the rotor blade or turn the blade broadside to the wind. An in-flight blade tracking system assures proper blade track at all times and eliminates the need for manual tracking procedures after initial factory adjustment.

The engine and power transmission system components in the HU2K-1 are supported on top of the helicopter so that structural loads of all major components are carried directly to the fuselage frame structure. Power from the T58-6 turbine engine is transmitted forward thru the drive shaft to the main rotor gear box. Power takeoffs from the main gear box drive the accessories and tail rotor. The engine air intake is remote from the cabin area minimizing engine noise in the cockpit. The inlet ducts lead to a plenum chamber which provides substantial pressure recovery at high speeds and which acts as a settling chamber for foreign objects which could damage the engine. Engine exhaust is high and directed aft and well away from cabin and cockpit entrances. The power and drive system, characterized by its easily exposed arrangement provides exceptional accessibility for inspection, servicing, or replacement of components. Growth capability has been provided in all segments of the power and drive train to accommodate the T58-6 engine at higher horsepower ratings.

These facts make the HU2K-1 a very desirable plane for the Navy. NAMTD 1070 will teach this aircraft to Fleet personnel in the future.

SPECIALISTS—Members of NAMTD 1071, Naval Air Mobile Training Group; who will conduct similar HU2K-1 training at NAAS, Ream Field, Imperial Beach, Calif. Left to right, W. A. Ruthford, AMCA; W. C. Morris, ADC, Assistant Area Representative; O. Z. Williams, AEC; C. F. Robertson, AMCA; H. C. Davis, AEC; R. L. Welch, ADC; W. E. Rietz, AT1. (Official Photograph, USN)

REPORT *from the ready room*

THE KAMAN AIRCRAFT RESCUE UNIT

by DAN C. SHARP
Test Pilot

We have at Flight Test a requirement to provide the greatest possible degree of safety for our pilots undergoing test flights. To help accomplish this end, the primary means is the function of the "standby helicopter," as it is phrased. In effect, it is a search and rescue mission not too unlike that being carried out in the military. By utilizing the low disc loading, and low-velocity, high-volume breast stroke type rotor downwash pattern of the synchropter, we can provide adequate fire fighting coverage—a valuable asset in the safety of our pilots.

Daily, a flight schedule is posted covering the tests and evolutions to be run for the day. Whenever an experimental plane is airborne (or any aircraft if the pilot requests it), we have a helicopter on duty with pilot and crew. The pilot requirement is varied throughout the ready room. Before discussing the interworkings of our particular operation, I'll list the equipment and personnel necessary to adequately do the job.

1. Helicopter – Usually an H-43A, but if it's down for check or maintenance we use an H-43B HUSKIE.

2. Crew – One pilot, two firemen and one crew chief (also the fire suppression kit hook-up man).

3. Fire Equipment.

a. Fire Suppression Kit – Carried externally by the helicopter. The kit weighs 996 pounds, carries 78.5 gallons of water, 5 gallons of foam and produces 700-800 square feet of active agent. It has 150 feet of hose and the hose nozzle will shoot foam 55 feet. It operates for 52 seconds before emptying the kit.

b. Fire Truck – A 500-gallon Mack truck located on the production flight test ramp.

c. Willys Crash Truck – Specially rigged vehicle which carries an additional fire suppression kit besides an ARC-34 radio receiver and a two-way portable radio. To conserve battery power, the crash truck is plugged into a quick-disconnect electrical receptacle on the experimental flight test ramp.

d. Ambulance.

e. Communications – The helicopter (H-43A) has a TV-10 UHF radio, a 27-channel Narco VHF commercial radio, and a portable transistor radio. The portable is a 2-way, 67.5-volt General Electric set. These radios, all on the crash-emergency frequency, are located in the helicopter, crash and fire trucks, tower, and security (guard) headquarters. An additional frequency, known as the security frequency, utilizes portable radios located in guard headquarters, Dr. Bagnall's car (company

READY FOR RESCUE—Shown are personnel and equipment attached to Kaman Aircraft's Fire Department. Like similar units in the military, high efficiency is maintained by numerous drills in which both ground equipment and the stand-by helicopter participate.

doctor), C.H.Kaman's office, ambulance and maintenance Jeep. This other frequency is used to minimize the number of persons involved during initial aspects of an emergency.

The procedure for the helicopter standing by is to make sure the aircraft is turned up periodically so it's warm and ready for flight and, at all times, the pilot and two firemen are strapped in on immediate call. This, of course, only applies when a helicopter is flying on an experimental test. When the helicopter isn't turned up, an auxiliary power unit is plugged into the aircraft so all radios can be turned on and monitored. The Mack truck, Jeep and ambulance are manned also during standby operations and they monitor the portable radio. The crash truck with the ARC-34 monitors tower frequency on UHF.

The Kaman Control Tower has contact with all company aircraft and keeps constant vigilance on the helicopters in the air plus providing them with all pertinent weather information conducive to any particular test. The tower also monitors nearby Bradley Field Tower and approach control to advise company aircraft on all civilian and commercial traffic.

When an aircraft has an emergency, the Kaman tower alerts the standby helicopter which immediately scrambles and picks up the fire suppression kit located only a few feet away from the aircraft. The tower then provides known directions as to location. During an emergency the standby helicopter is the "eyes" for the whole operation. The crash truck heads for the scene and is directed by the helicopter via UHF or portable radio. The ambulance, doctor and nurse stand by at the plant until an initial report is received from the helicopter. After everything is under control, the tower passes the word to guard headquarters which, in turn, notifies all others concerned.

The only way to operate an efficient rescue unit is to practice. Several things are done periodically to keep our standards high:

A. Practice Fires - Six pilots are always kept current; each flies a practice fire periodically. This consists of an 800-1400 gallon spill of flammable wastes (JP-4, av-gas, lacquer thinner, etc.), which is ignited in our practice fire area.

B. Maximum load takeoffs and landings practiced with a 1000-pound weight (approximate weight of the fire kit).

C. Local flights made to check the back road conditions for rain erosion, etc.

Other uses of the standby can be tailored to meet a specific test being conducted. Generally, company policy is that whenever a 2.5 positive load factor or -.5 negative load factor or more is anticipated during a test, the standby helicopter launches with the fire kit and orbits the area where the test is being conducted. However, anytime the pilot desires a chase aircraft regardless of test, the standby helicopter is launched.

We feel this facet of our operation is excellent insurance and, as can be seen, a great deal of time, effort, and money are spent on our own rescue capability. K

H-43A Pilot Saves Two

CONNALLY AFB, TEX. -- The F-89 was preparing to land when there was an explosion in the right engine and flames, four times as large as the aircraft, blossomed forth. The pilot, 1st Lt. Clyde Falls, successfully completed his landing despite the fire.

Meanwhile, an H-43A being flown by 1st Lt. Glyneth M. Gordon on a night transition flight had been alerted to the emergency and followed the F-89 down the runway. As the F-89 came to a stop, Lieutenant Gordon used the helicopter rotor downwash to blow the flames away from the cockpit and enabled the F-89 radar observer, 2nd Lt. Jay A. Johnson, to evacuate the aircraft without incident. Lieutenant Falls, however, was delayed when his personal equipment caught in the cockpit. During the brief delay, the H-43A downwash kept flames away from Lieutenant Falls until he also evacuated. K

Maintenance Mailbag

Dear Sarge,

Remember that practical joker called Harry the Horse? Well you'll be glad to know the boys finally got back at him for all the stuff he pulled on them and he's been pretty good about things lately. As you know, Harry has a private income——I think his family pays him to stay away from home——so he has really been living it up what with a silver-plated motorcycle and a private cottage complete with swimming pool. Every morning before heading for the base he'd run out the door, give a few jungle yells and then dive into the pool. (I bet the neighbors were crazy about this at 5 a.m.). Anyway, this one morning Harry the Horse followed the usual routine and dove without looking into the biggest tapioca pudding you ever saw. Man, that pool was filled to the brim and then his buddys had thrown in a lot of old, beat-up grapefruit, bananas, melons and about three dozen over-age tangerines. They got everything, including about four-hundred pounds of condemned tapioca powder, out at the city dump. Some of it was pretty ripe. I tell you, it was worth getting up before dawn to watch Harry eat his way to the surface.

Found out a good way to get a nut started on a hard-to-get-at stud the other day. Wrap heavy safety wire around the nut and leave about a foot or so sticking out for a "handle." Then, using the wire, maneuver the nut into position on the end of the stud and place a screwdriver blade on top of the nut to hold it in position. Pull on the safety wire, the nut revolves, the threads catch and you're in business. Make sure the nut isn't cross-threaded though before tightening.

Not much else cooking here. We started to pull a check on one of the choppers the other day and then had to secure because a hurricane was heading our way. Then we had to clean up the mess it left so it wasn't until about five days later we started to work on the 'copter again. Man, didn't we have troubles because of someone's busy little fingers. I guess some inquisitive character tried to find out how every accessory we'd taken off was put together, how it worked and, worst of all, how to adjust it. It took us an extra two days just to check everything over to find out what the "playboy" did. From now on you can be sure that if a check is interrupted for any length of time we won't leave anything laying around where people not "in the know" can get at it.

Gotta' leave for town now, I'm taking a course at the high school on "The Influence of the Homeric Wars On Our Present American Culture."

GUS.

P.S. The teacher is 23 and her name is Suzie.

HELICOPTER AIR-TO-GROUND COMMUNICATIONS

by G. HACKENBERGER
Chief, Equipment Section

The rescue capability of the helicopter frequently brings it into sudden and dramatic contact with people on the ground—panicky people who are in danger, and whose previous acquaintance with the helicopter has been principally through their TV screens. Under such trying circumstances the crew's job of rescue is complicated by the sometimes unpredictable and fear-motivated actions of the rescuee. The pilot or crewman can see him... can wave at him... may well feel that if he could just talk to him, a much quicker and safer rescue could be affected.

The obvious solution to this problem is to put some form of public address device on the helicopter, such as the battery-powered "bull horns" used by police and firemen, to enable a crewmember to shout directions down to the rescuee. There are variations on this theme; one or more projector-type loudspeakers can be clamped to the aircraft and energized by a power amplifier in the helicopter with the microphone tied into the intercom system, so that the pilot can talk down via these speakers without releasing the controls. Another variation consists in lowering a speaker on a line, to place it close to the rescuee.

All of these solutions suffer from the same drawback; they will not yield intelligible voice communication in the area directly under the hovering helicopter. With a little reflection, the reason for this is obvious; any loudspeaker device functions by disturbing the air. Even if tremendous audio power (on the order of a 100-Watt amplifier) is used, the amount of sound energy which gets into the air is less than 5/100's of a horsepower. Immediately above the helicopter is the rotor, which is industriously disturbing the air with many hundreds of horsepower. The (relatively) tiny amount of sound energy cannot buck the competition. Nor is the solution simply adding more sound energy by upping the amplifier power. In the area immediately beneath the helicopter the sound energy level due to rotor and engine noise is very high, being (for most helicopters) on the order of 110 to 115 decibels. This sound level is on or beyond the threshold of pain for the normal ear. If one adds more noise to this already tremendous din by means of very powerful loudspeakers, the ear does not interpret the extra bursts of energy as sounds, but as twinges of pain! Experience gained in many tests with various loudspeaker schemes has shown that this form of communication close under the hovering helicopter is not practical.

It has been found, however, that loudspeaker schemes will work very nicely at a distance from the rescuee. If the helicopter will orbit or hover at distances of about 100 yards or greater from the rescuee and beam the sound energy from the bull horn or speaker out of the area of rotor-disturbed air under the machine, good readibility can usually be obtained. The pilot should attempt to orient the aircraft so that the engine exhaust is pointed away from the rescuee when making such attempts, and don't get too close! The minimum distance will vary quite widely depending upon many factors, and a few test flights are worth more than a month of speculation if such a system is contemplated.

A somewhat sophisticated improvement is possible on the basic scheme, if the operator is lucky enough to have the necessary time and equipment. Although the ear hears sounds from 20 to 16000 cycles per second, this much frequency spread is not essential for conveying intelligence. Telephones do a good job with a spread of only about 200 to 3500 cycles per second. It's not hi-fi, but it works! If an amplifier to be used for helicopter work is constructed to suppress the frequencies below 200 and above 3500 cycles and concentrates its available energy in this range, the signal will have more "punch" in penetrating the masking noises. And for the man who cares enough to send the very best: within this band from 200 to 3500 cycles the helicopter will probably exhibit several noise peaks of a restricted frequency range. The frequency spread of these peaks will be peculiar to a particular model helicopter, and can be measured (with proper equipment) or perhaps obtained from manufacturer's data. If so-called "notch filters" are inserted in the amplifier to discriminate against these narrow bands of noise frequencies, a further improvement should result in the "punch" and readability of the signal. Not enough work had been done to establish clearly the value of these amplifier output shaping techniques, but work done to date points to some improvement.

Other communication methods have been investigated. For instance—if the rescuee is judged sufficiently lucid, a pair of headphones or a microphone headset can be lowered on a long extension cord; or this cord can be built (by the manufacturer) into the hoist cable, so that a mic and phones can be plugged into the end of the hoist cable. The value of a microphone under such noisy conditions is problematical, and even a noise-cancelling mic probably would not produce a useable signal, but phones can be very effective. To date there has not been any military requirement for such equipment, but the hoist of the HU2K-1 contains built-in provisions for operation of a pair of phones; only a new cable with built-in con-

ductor would be required to provide for phone operation at the end of the hoist cable.

Perhaps the most satisfactory communication method would be two-way radio. A small rugged receiver-transmitter with one control only (push to talk) or no controls at all (voice-actuated keying) dropped to the rescuee would provide maximum flexibility, including a talk back capability so that the rescuee could talk to the helicopter crew, as well as listen. Such equipment would also permit rescuees dispersed over an area to talk among themselves as well as with the helicopter.

No equipment which accomplishes this is currently available in any of the military supply systems, so far as Kaman knows, although it is readily achievable. Tests with small commercial Citizens Band equipment have been quite successful, although maximum performance requires either an antenna external to the helicopter or positioning of the aircraft to permit the antenna of the airborne set to see the antenna of the set on the ground. The U.S. Air Force is currently having developed some equipment with the nomenclature AN/GIC-9 which, with some minor modification, would be ideally suited for such use, and Kaman Aircraft is currently exploring this possibility.

Kaman Engineering, through the Service Department Field Representatives, welcomes any suggestions from the field, or any information on in-the-field trials and experimentation along the air-to-ground communication lines. K

Flight Manual Reviewed

U.S. Air Force and KAC personnel met recently at Kaman Aircraft for a Command Review Conference called to examine the H-43A Flight Manual. Also present were representatives from Pratt & Whitney Aircraft.

Purpose of the Review was to discuss the accuracy and completeness of the present manual, based on the experience of the using USAF Commands. Detail changes will be made in the next issue of the manual to incorporate the decisions made.

Among those attending the review were Mr. Charles F. Peters, Mr. David R. P. Sweeney and Mr. Thaddeus J. Kania, Olmsted AFB, Pa., MAAMA; Mr. M. Czuczko and Mr. D. Norman, Wright-Patterson AFB, Ohio, ASD; Maj. Russell R. Tyler, Scott AFB, Ill., and Capt. Paul A. Johnson, Orlando AFB, Fla., MATS; Capt. Jimmie S. Honaker, Edwards AFB, Calif., AFSC; Capt. Charles F. Frost, James Connally AFB, Tex., Capt. Albert E. Hooper, Jr., and 1st Lt. David W. Thomas, Vance AFB, Okla., ATC; Mr. Harold E. Robbins and Mr. William E. Buckingham, Jr., Pratt & Whitney Aircraft.

Mr. Edward J. Odlum, Senior Vice President; Mr. Charles L. Morris, Assistant Vice President and Field Service Manager; Mr. Frank H. Horn, Assistant Field Service Manager; Mr. Winford A. Newton, Chief Test Pilot; Mr. Richard J. Wood, Contracts Administrator; Mr. Lawrence A. Barrett, Military Operations Research Engineer; Mr. Frank G. Weber, Supervisor, Mr. John W. Nessen, Assistant Supervisor, and Mr. George L. Wood, Group Leader, Service Publications; Mr. Arved Plaks, Aerodynamicist; Mr. Ralph E. Sluis, Technical Writer; and Mr. Edward Wells, Assistant Project Engineer, KAC. K

THE PROBLEM: Rescuee, especially in the case of a civilian, does not know correct procedure to be used in putting on sling after it is lowered from helicopter. Conditions are such that lowering crewman to assist would be hazardous or this action unnecessary because others on ground could assist if properly instructed.

POSSIBLE SOLUTION: Helicopter unit has instruction sheet prepared with either step-by-step drawings or pictures showing correct procedure for entering sling; clearly understandable directions are printed underneath. Special instructions to fit the terrain also printed on sheet. For example —"Stay as far away from trees, poles, towers and other high obstructions as possible." Space left so that additional message may be written if necessary. Most bases have facilities for printing such a sheet and expense would be small. The instruction sheet could be dropped to the rescuee in a small canvas, button-flap container weighted with a few ounces of sand at one end and streamers at the other. While probably not necessary, a small parachute could also be attached to the container. The message carrier could easily be manufactured on the base.

Rescue units could also have the drawing, or drawings, printed on waterproof labels. One or more of these could then be sewn on the sling in such a manner that the rescuee would see them even if in a state of near panic. Another solution might be to stencil instructions on the sling. These could read—"Slip sling over head and under arms. Cable in front. Both hands on cable."

Instructing a person in the water as to the correct way to enter the sling (even with printed instructions) obviously presents an additional problem. Each year more and more pleasure craft put out from shore, either on lakes or in the ocean, and the possibilities that helicopter crews will be confronted with rescuing civilians directly from the water also increases. Rotor Tips will welcome ideas and suggestions from readers as to how these rescuees can be instructed in the use of the sling so that the necessity for a helicopter crewman going "over the side" to assist will be lessened. K

Maintenance SAFETY Safety accident-free accident-free Safety Safety Safety safety of flight. professionalism maintenance

"SAFETY IN FLIGHT" -- Personnel attached to the Helicopter Unit at Offutt AFB, Neb., receive a weekly reminder of the importance of these words in the form of a formal flying safety meeting conducted by the OIC, Capt. Charles McClusky.

Pilots, maintenance personnel and firemen assigned to the H-43Bs are required to attend the meetings and join in the discussion of the week's activities. Topics discussed may range from ways of improving "scramble" time to good work and flying habits, but these are always tied in with the safety theme.

Below is an article which Captain McClusky wrote and passed out at one of the meetings:

1. GOOD WORK - You've passed an SSG Inspection. You've been on alert with nothing to indicate your performance is anything other than good. You've been operating a new helicopter since January and there have been no difficulties to indicate you are other than good pilots, operating your aircraft in a professional manner. These facts, and a few others not mentioned, could and should make a man feel proud of his work. Everyone should be commended for their performance of duty. Now, paragraph 2 is not designed to let the wind out of your sails, but read and be conscious of this.

2. CONFIDENCE - This is an ingredient that is absolutely necessary in the make-up of a professional pilot but very hard to obtain due to its basic composition. Its composition is very accurately measured portions of success, job knowledge, hard work and incentive. There is no climax, no definite boundary where one can say he has gained confidence. BUT OVER CONFIDENCE IS NOT THAT HARD TO DEFINE.

3. CAUTION - Go back and read paragraph 1. This is a warning signal just as plain as loss of oil quantity warns that oil temperature bears watching. You've done a satisfactory job, which is expected, but just because you have made no "boo boos" don't let over-confidence make you think you are outstanding. Another warning of possible over-confidence can be obtained from accident and incident reports. What causes a pilot to attempt a landing with the collective pitch stick in his right hand? What causes a pilot to disregard an oil pressure gauge reading out of limits?

When did you use your checklist last? Last flight of course! But did you use it all the way from pre-flight to engine shutdown? How many times have you exceeded the optimum rate of descent on an approach just because you wouldn't admit you goofed in judgement?

4. SUMMARY - The titles of the preceding paragraphs are the messages to remember: GOOD WORK, CONFIDENCE, CAUTION. One should constantly evaluate himself and separate that which he can do from that which he says he can do down at "Two-Fers." The very nature of the H-43B is a red flag waving in a pilot's face. It is easy to operate and may falsely build confidence. Knowing your own limitation is the key to combating over-confidence.

"SAFETYMITIMUS MAXIMUS"

SAFETY MEETING—Capt. Charles McClusky, OIC, Helicopter Section; discusses fire suppression kit hook-up and inspection of cables for broken strands or cracks in ring assembly which could mean an aborted mission. The meetings are held in the Base Fire Department's quarters. Front row, left to right, 1st Lt. Dale McDonald, pilot; S/Sgt. Jerry Hakes, fireman; T/Sgt. James Augeri, NCOIC Helicopter Maintenance Section; 1st Lt. Kenneth Wullschleger, pilot; Mr. George Crume, Base Fire Chief; Captain McClusky, 1st Lt. Robert Allen, pilot; and Mr. Richard Reynolds, KAC. Back row, A2/c Philip Armstrong, crew chief; S/Sgt. Charles Daniels, fireman; S/Sgt. James Brant and S/Sgt. Clark Cook, crew chiefs. (USAF photo)

FAIRCHILD AFB, WASH. -- Two mountain climbers, seriously injured in a fall, were rescued recently from a 6500-foot-high ledge by an H-43B crew from this base after a long flight over mountainous territory during which turbulence, rain showers and poor visibility were encountered. Due to the weather, radio communication was also temporarily lost. Luckily, at the rescue site on Snow Shoe Mountain near Libby, Mont., the weather cleared sufficiently to allow successful completion of the mission. Aboard the HUSKIE were Capt. Louis F. Sparrow, aircraft commander; 1st Lt. James P. Scarff, Jr., pilot; and A1/C Donald Gollehon, crew chief.

The helicopter touched down at Libby, the crew chief disembarked and a doctor climbed aboard. Later, when the H-43B neared the rescue point, high turbulence was encountered. These same currents had made earlier attempts by fixed wing aircraft to drop supplies, impossible. The ledge on which the injured men were waiting was approximately 50 feet long and 35 feet wide, with a 5-degree slope. The terrain afforded only a downwind approach to the ledge and zero airspeed was indicated with an apparent ground speed of 30 knots. Captain Sparrow maneuvered into the spot, using 27 psi torque on landing. Within five minutes, the injured men were on their way to Libby and a waiting ambulance.

In photo on left the H-43B is shown approaching the rescue area; in the middle photo, number 1 shows where the injured men fell and number 2 indicates where the pickup was made. Last photo shows the injured being loaded aboard the HUSKIE. K

H-43B Men Rescue Girl

Heavy fog, a rugged cliff and crashing surf—an H-43B crew from Portland Air Base, Ore., encountered them all while rescuing 12-year-old Becky Roever of Bellaire, Tex., who had disappeared three days earlier while on a family outing. The pickup was made from a rocky beach a short distance away from the base of Tillamook Head, an almost sheer, 1200-foot cliff in Ecola State Park.

The lost girl, object of an intensive search in which a Coast Guard helicopter participated and bloodhounds were used, was found in the almost inaccessible spot by a fisherman. She was covered with scratches and bruises, had suffered an injured ankle from a tumble down the slope and was also badly dehydrated.

The H-43B, piloted by 1st Lt. Dennis M. Chase, was dispatched to the rescue site which had no roads or trails near it. Also manning the HUSKIE were 1st Lt. Donald F. Donk, co-pilot; S/Sgt. Colbert Ezell, crew chief; and Capt. John W. Funk, flight surgeon.

Flying 15 to 20 feet above the sea to avoid the fog which shrouded Tillamook Head, the H-43B arrived at the narrow strip of beach where the pilot hovered the helicopter with two wheels on the beach and two in the pounding surf. The tips of the rotor blades were clearing the cliff by two or three feet and it was necessary to hold the helicopter at 60 knots because of the high winds encountered. Captain Funk and Sergeant Ezell ran through the water, picked up the girl and then placed her aboard the helicopter which immediately headed for the hospital. K

Life-Saving Flight

A mercy mission with all the elements of a movie thriller was carried out recently by an H-43B crew from Kincheloe AFB, Mich.

It started when Capt. Phillip A. Bond, MOD at Kincheloe, received a call from the Newberry State Hospital for an emergency air evacuation. A six-year-old boy had suffered a head injury requiring immediate treatment at the University of Michigan Hospital in Ann Arbor. 1st Lt. Paul J. Darghty, helicopter alert pilot, was notified and Captain Bond also called K.I. Sawyer AFB for an aircraft to transport the child from Kincheloe to the Willow Run Airport near Ann Arbor. Sawyer diverted a C-47, already airborne, to Kincheloe.

Meanwhile, the H-43B headed for Newberry at maximum speed. With Lieutenant Darghty were 2nd Lt. Richard Harwood, co-pilot; Capt. Edward J. McMurray, flight surgeon; and A2/C James B. Hegwood, medical technician. At Newberry the boy and his mother were transferred from an ambulance to the helicopter.

Halfway back to Kincheloe the blowdown elevator control cable broke, introducing control problems at higher air speeds. The pilot continued on at 70 knots while Captain McMurray worked steadily to preserve the life of his tiny patient. Upon reaching Kincheloe, the boy and his mother were transferred to the waiting C-47 along with Captain McMurray for the flight to Willow Run. A waiting ambulance there took them to the hospital where a 3-hour operation took place. K

HUSKIE HAPPENINGS

H-43B CREW FROM KINCHELOE AFB, Mich., flies 70 miles through thunderstorms and over heavily wooded area partially obscured by ground fog to evacuate American citizen who suffered heart attack while on Canadian fishing trip in isolated area. Aboard helicopter are Capt. C. R. Ratcliffe, Jr., Lt. Richard J. Harwood, T/Sgt. Travis Lee and Capt. Ralph M. Howard, flight medical officer. Weather conditions make it necessary to fly circular route at tree top level and in near zero, zero conditions. Because of terrain, HUSKIE is landed one and half miles from 200-pound rescuee who is carried out of woods to helicopter over extremely muddy ground by Captain Howard, Sergeant Lee and two guides.

....HUSKIE HELICOPTER PILOTED BY MAJ. FRANCIS CARNEY of Stead AFB, Nev., rescues ill camper from 10,000-foot mountain peak near Bishop, Calif..... FIVE AIRMEN stranded on mountain at 5,000-foot level while fighting forest fire, evacuated by HUSKIE from Nellis AFB, Nev. Pilot of H-43B, Capt. C.R. Carpenter, crosses 8,000-foot ridge to reach pickup site. Other crew members, 1st Lt. R. S. Adams, co-pilot; S/Sgt. T. C. Turner, crew chief; and S/Sgt. R. Castro, medic. Forestry service worker also aboard. Crew chief, medic and forestry man off-loaded at site and four airmen flown to road intersection 15 miles away. They return to base by auto while helicopter returns and picks up remaining personnel.

.... TWO H-43B CREWS FROM KINCHELOE AFB fly 2-day search mission for missing F-101 during which 630 square miles of land area are covered by HUSKIES and additional 700 square miles of water surface surveyed by SA-16 and Coast Guard boats. Aircraft wreckage spotted from H-43B and flight surgeon and para-medic lowered through 60-foot trees, identify wreckage and pilots. H-43Bs manned by Capt. C.R. Ratcliffe, Jr., 1st Lt. P.J. Darghty, 2nd Lt. D.E. Dickey and 2nd Lt. R.J. Harwood, pilots; Capt. W.M. Landholm, flight surgeon; Airman V.R. Calloway, para-medic; S/Sgts. B.L. Gray and R.R. Runion, A1/C R. Campbell, K.B. Thompson and S.C. Olson, and A2/C R.J. Hegwood, scanners.

....H-43B CREW FROM LUKE AFB, Ariz., called on when commercial helicopter makes forced landing on ledge in bottom of Grand Canyon. Pilot of downed 'copter and two women passengers flown out by HUSKIE crew consisting of Capt. R.R. Driebelbis, pilot; 1st Lt. C.L. Wright, co-pilot; and S/Sgt. G.S. Edwards, crew chief.

....HUSKIE CREW dispatched from McChord AFB, Wash., after mountain-climbing party of five reported missing in Baker National Park. Five climbers, one a young woman with injured leg, located on snow field in almost inaccessible spot where normal helicopter landing or approach impossible as slope is almost 60 degrees. Approach made at 3500-foot level and H-43B hovers with rotor tips clearing overhanging cliff by three feet. Hovering in difficult position continually hampered by turbulence and none of rescuees know how to put rescue sling on properly. Dispite difficulties, mission performed successfully and all climbers evacuated. Helicopter rescue crew, 1st Lt. Wayne G. Ward, 1st Lt. James L. Cantey and M/Sgt. Lawrence G. Seckley.

....CANNON AFB, N.M., CREW flying in HUSKIE on training flight when F-100 crashes at end of runway. H-43B crew picks up fire suppression kit and quickly flies to crash site, bringing flames under control before ground equipment arrives..... HUSKIE CREWS AT CANNON not only perform fire-rescue work but also transports firemen to gunnery range fifty miles from base whenever fires break out. Fire equipment always on range ready for use and utilization of helicopter transportation does away with necessity of having personnel standing by.....H-43B CREWS AT CANNON AFB also retrieves 10-foot-long DARTS used as flying gunnery targets and which are occasionally dropped by tow planes.

....PILOT FROM T33 who ejected and landed safely also picked up by Luke AFB HUSKIE crew consisting of Capt. R. Dreibelbis, pilot; 1st Lt. Carrol Wright, co-pilot; and S/Sgt. G.S. Edwards, flight mechanic.

HUSKIE HAPPENINGS *(continued)*

CHEYENNE AFB, WYO., HELICOPTER CREW in H-43B flies to missile site to pick up airman and return him to hospital for treatment after fuel splashes into his eyes while missile component being refueled ... ALERT CREW AT SAWYER AFB. Mich., takes off in HUSKIE and joins search for missing F84F. Downed aircraft spotted next morning and H-43B crew picks up pilot who ejected safely and called in from ranger station. Helicopter also used to transport investigation team to crash site in swamp 40 miles from base.

Wheels-In-Trees Rescue

NAS JAX, FLA. -- The HUK-1 from Station Operations was on a routine photo hop when word was received that a pilot had bailed out of his disabled aircraft just north of Green Cove.

Pilot ADC/AP Wilkerson and his crewman, V.R. Gray, AD2; immediately flew to the area and located the uninjured rescuee who was in a small clearing surrounded by tall pines. Chief Wilkerson hovered the HUK with the wheels below the tree tops in order to bring the sling within the downed pilot's reach. He was quickly hoisted to safety.

....MAIN GAS LINE TO ALBUQUERQUE, N.M. explodes and catches fire, burns out of control for several hours. Gas company calls on Kirtland AFB, N.M., for aid because location of break, at 6000-foot level, would require time-consuming trip by ground vehicles over rough terrain. H-43B crew flies to area in 15 minutes with emergency equipment. Crew consists of Capt. Warner A. Britton, pilot; Capt. William Greener, co-pilot; S/Sgt. K. Andrews and A3/C J.R. Clark. Civilian from gas company also aboard.

....HELICOPTER PERSONNEL AT LUKE AFB, Ariz., called on for assistance after two truck loads of farm laborers are involved in accident. Capt. Walter McMeen, pilot; Capt. Zack Stockett, co-pilot; A1/C R.E. Crites, flight mechanic; and Dr. M.D. Klien take off in HUSKIE for scene of accident and pick up two seriously injured men. Doctor says one of the men, losing blood rapidly, wouldn't be alive but for the efforts of the helicopter men and fast transportation to hospital.

....FOUR CREW MEMBERS of downed Army helicopter picked up in rugged terrain by H-43B crew from Luke AFB. Pilot, Captain McMeen; Co-pilot, Captain Stockett; Flight Mech, T/Sgt. H.F. Alford. Density altitude at pickup site was 8,000 feet and gross weight, 7250 pounds. Takes 27 pounds of torque to hover, using 92 percent N1 and 103 percent N2. To make vertical take-off, pilot uses 30 pounds and 94 percent N1. K

SKUNKED

WESTOVER AFB, MASS. -- An H-43B crew here came out second best recently when they encountered a small, but powerful "enemy" whose extreme mobility and night-fighting ability were enhanced by the possession of a built-in secret weapon.

The crew, 1st Lt. David Glick, 2nd Lt. William Deming and S/Sgt. Benjamin Ellis, were making an approach at one end of the field while night flying when the incident occurred. As they began to touch down, one of the helicopter's bear paws encountered a skunk who was leisurely meandering along, intent upon his skunky business.

The skunk exploded into action! Thoroughly aroused at what he thought was an unprovoked attack from the sky, the indignant animal artfully dodged the bear paw and then struck back as only a skunk knows how.

Three days were spent fumigating and cleaning the "B" ---the skunk was "long gone" but his memory lingered on. K

Public Performance

Helicopter activities were among the feature attractions at many of the military bases holding "open house" in observance of Armed Forces Day.

High-flying H-43Bs were used by Army paratroopers to make delayed jumps from approximately 13,500 feet at many bases, and numerous helicopter fire-rescue and personnel hoisting exhibitions were also presented.

At Robins AFB, Ga., an H-43B manned by Major Ralph Searle, Capt. John Slattery, Sgt. Virgil McChord and Sgt. Theodore Youngblood, "dropped in" on the mayors in 18 area communities to issue invitations to the citizens to visit the base. Schools were let out so students could view the helicopter.

During the Robins "open house," Captain Slattery put the H-43B through its paces and wound up the exhibition by knocking over a 55-gallon drum painted yellow and rolling it toward a pole in the ground—the object being to hit the pole. After accomplishing this, Captain Slattery then used the helicopter's Bear Paw to stand the container on end. K

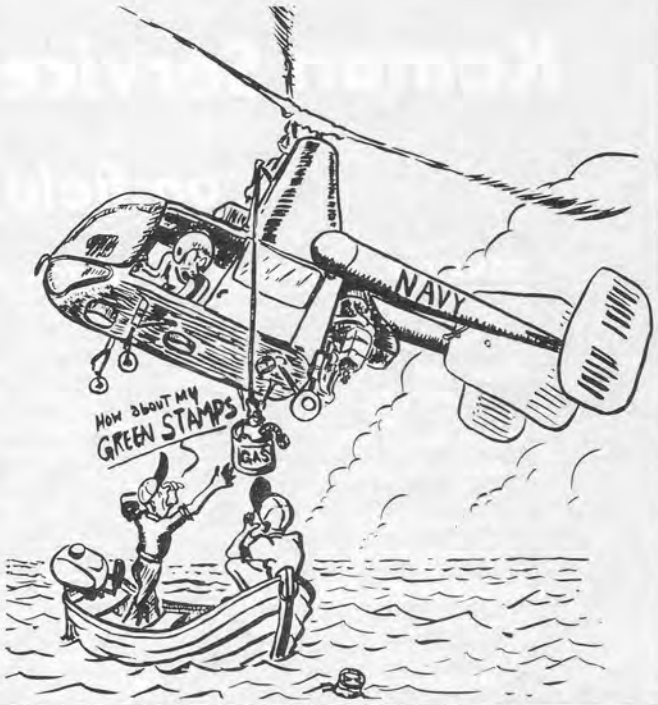
SERVICE PLUS

NAS JAX, FLA. -- When a car runs out of gas on the highway the driver either begins hiking or, if a member of a national automobile association, he places a call and assistance is forthcoming.

Two fishermen had neither choice, however, when the engine on their small craft quit for lack of fuel. Swimming 20 miles to shore through warm Florida waters with its teeth-snapping denizens is not a healthy pastime, and 14-foot boats rarely have provisons for "ship"-to-shore communications.

The men in the boat had been adrift for 28 hours before they were reported missing and the search began. Soon Lt. R.J. Shanley and his crewman, R.J. Schwartz, AD1; from Station Operations here spotted the drifting boat from their HUK-1. After finding out what the trouble was they took immediate steps to remedy the situation. The sling was lowered and the boat's empty gas can attached, then the HUK headed back to shore and the nearest gas station. Shortly afterward the can, full this time, was lowered to the eagerly awaiting fishermen and they were seen safely on their way by their Navy "angel."

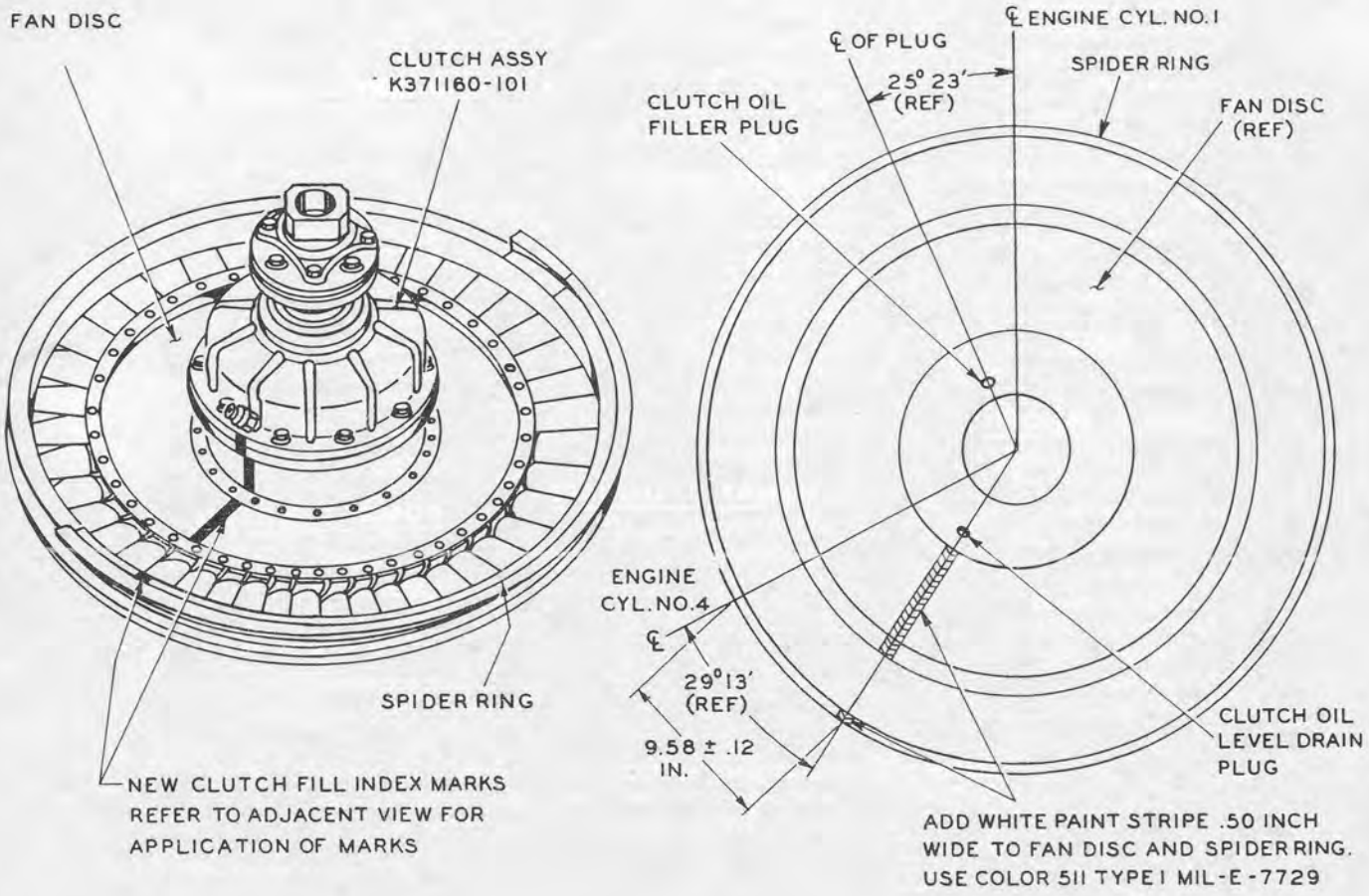
P.S. Putting an extra "frosting on the cake" Lieutenant Shanley paid for the gas out of his own pocket.



Q. s and **A.** s *(continued from page 11)*

Q. (Applies HOK-1, HUK-1, H-43A) SPARE COOLING FAN DISCS ARE OCCASIONALLY RECEIVED FROM OVERHAUL WITHOUT THE CLUTCH OIL LEVEL SERVICING MARKS. WHAT IS THE SPECIFIC LOCATION OF THIS STRIPE AND THE PROCEDURE USED IN PAINTING IT ON UNMARKED DISCS?

A. The drawings below show the location of this stripe and the proper marking method. Applicable T.O.s are being revised to include this information. — E.J.P.



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on field assignment

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Pope AFB
Fayetteville, N. C.
Myrtle Beach AFB
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Seymour-Johnson AFB
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Nellis AFB
Las Vegas, Nev.
Williams AFB
Chandler, Ariz.
George AFB
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JOSEPH T. JONES

Edwards AFB,
Mojave, Calif.

JOHN R. LACOUTURE

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O&R, NAS North Island
San Diego, Calif.
Midway Island
VMO-6 Camp Pendleton

ROBERT LAMBERT

Brookley AFB
Mobile, Ala.
Craig AFB
Selma, Ala.
Moody AFB
Valdosta, Ga.
Robins AFB
Macon, Ga.
England AFB
Alexandria, La.

THOMAS C. LEONARD

Wright-Patterson AFB
Dayton, Ohio

BILL MAGNAN

O&R NAS Jacksonville
Fla.

EDWARD F. NOE

Air Force Section
MAAG, Colombia

RICHARD REYNOLDS

Warren AFB,
Cheyenne, Wyo.
Offutt AFB
Omaha, Neb.
Forbes AFB
Topeka, Kan.

RAY G. RUSSELL

VMO-1 MCAF
New River, N.C.

DONALD TANCREDI

Duluth AFB
Duluth, Minn.
Minot AFB
Minot, N.D.
Ellsworth AFB
Rapid City, S.D.

HENRY J. TANZER

Shin Meiwa Industry Co. Ltd.
Toyonaka City, Japan
Atsugi, Japan

BILL C. WELDEN

K. I. Sawyer AFB
Gwinn, Mich.
Kincheloe AFB
Sault Ste. Marie, Mich.
Selfridge AFB
Mt. Clemens, Mich.
Wurtsmith AFB
Oscoda, Mich.

ROBERT I. WILSON

Dover AFB
Dover, Del.
Suffolk County AFB
Westhampton Beach, N.Y.
Westover AFB
Chicopee, Mass.

CUSTOMER OPERATIONS SECTION—*R. L. Bassett, Supervisor;*
G. D. Eveland, Asst. Supervisor, Field Service Representatives.
R. W. Spear, Asst. Supervisor, Training.