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THE KAMAN AIRCRAFT CORPORATION

PIONEERS IN TURBINE POWERED HELICOPTERS

KAMAN

Rotor Tips

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THE COVER

This striking photograph of an HOK-1 and Mt. Fujiyama was taken by GySgt. Roland E. Armstrong, 3rd Marine Division, FMF Pacific. The helicopter is from VMO-2, MCAF, Okinawa.
(Official U.S. Marine Corps photo)

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WHEN SECONDS COUNT!

From Office of Information
Perrin Air Force Base, Texas.

Ingenuity, resourcefulness and job "know-how" — all have been combined by the helicopter men at Perrin Air Force Base, Texas, in devising means of saving those precious seconds which could mean life or death to a rescuee.

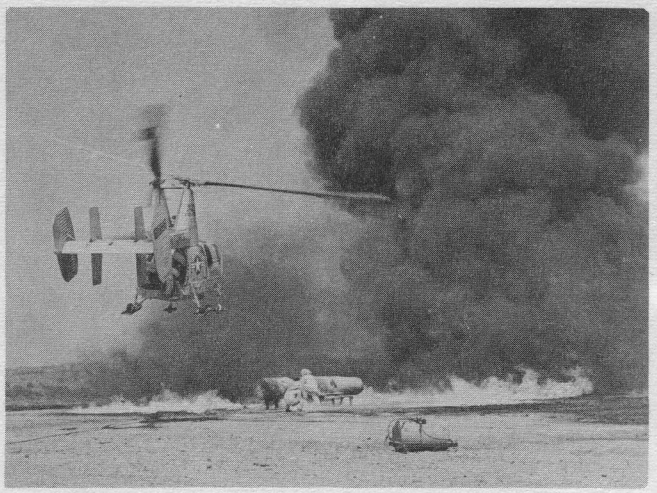
Under the leadership of Major John A. Price, OIC of the Helicopter Section, personnel have been encouraged to devise ways of stowing gear most efficiently in the unit's H-43As and to develop additional equipment to improve their rescue capabilities. The major also contributed many ideas and suggestions and worked with his personnel on several of the projects.

As a result of this informal but carefully supervised program, plus constant practice and training in all phases of helicopter rescue work, the section developed a hair-trigger readiness which was clearly shown a few months ago when an F-102 coming in at night for an emergency landing crashed just short of the runway. Within 90 seconds from the time the aircraft hit the ground the rescuemen were throwing foam on the burning plane, laying a path to the cockpit to rescue the pilot. Unfortunately, he had been killed by the impact.

Saving time through preparedness in advance has been the keynote of Major Price's program and under his supervision crews practiced all emergency procedures over and over again to keep in top form and to insure that their actions under every foreseeable rescue condition would be "learned responses" that come automatically.

"Under the conditions of an actual crash there is a tendency on the part of everyone to be in too much of a hurry and the result is that often ordinary precautions are sometimes forgotten," Major Price said. This constant practice gives the rescuemen confidence and assurance that they can handle any situation and such practice also makes their response to an emergency quick, yet sure, the major added.

TRAIN, TRAIN, TRAIN—Crash rescue technicians (firemen) practice removing a live person from a cockpit to give them experience in handling an actual casualty. They use an old aircraft fuselage which is always kept behind the alert center for this type of drill. (USAF photo)



PRACTICE, PRACTICE, PRACTICE—During one of numerous drills, firemen lay path of foam to the "cockpit" as helicopter hovers close to fire blowing flames and heat down and away from simulated aircraft and trapped "crewmen." (USAF photo)

At least once a week for the last three years the helicopter rescue crews at Perrin have practiced their procedures by working with a "hot" fire around a dummy fuselage built from old tail pipes and angle iron. In this type drill they use a dummy as the pilot to be rescued. Behind the alert trailer is an old aircraft with which the crews practice their rescue techniques. They place a rope in a large circle around the cockpit which represents the outer rim of the fire; then one of the men sits in the cockpit posing as the pilot while the others work in with their fire hoses to get him out.

"There is a lot of difference between carrying a dummy and a live person," Major Price explained, "and this sort of practice gives the men the needed experience in handling a casualty."

Recently the Helicopter Section at Perrin was designated ARS Detachment 33 with Capt. Robert F. Bennet as Commander. He is continuing the "train and practice, practice and train" program laid down by his predecessor.

When the first H-43A arrived at Perrin and was put into service about three years ago, all of the needed gear and equipment was dumped helter-skelter on top of the litters. But as time passed, different crew members devised ingenious pockets on the back of the pilots' seats and other belts with snap fasteners attached to the ceiling in which various tools, ladder, flares, etc. fit snugly. Crew members also figured out a way to install the litters so that one is set up at all times and still does not interfere with working through the open door. The second litter can be set up quickly.

"A place for everything and everything in its place," has been the by-word of the alert crew.

The first aid kit which was carried in the type helicopter used prior to the H-43A proved to be much too large for the compact interior of the latter aircraft. Major Price gave the Flight Surgeon's office at Perrin AFB the task of producing a smaller kit that would include all necessary elements. TSgt Herbert E. Atwell worked on the problem along with other members of the base to manufacture a new case and fit it with sufficient contents to handle at least two casualties.

The new first aid kit was designed for use by the flight surgeon as well as the firemen and contains enough equipment so that a doctor can give emergency treatment in the field. It contains all necessary equipment to treat almost any type injury that may be encountered in an aircraft crash. In addition it is used as a seat for one of the firemen in the helicopter, thus eliminating wasted space.

The revised medical crash kit was adopted throughout the Air Training Command for use in the H-43A helicopters. It is small, compact and only weighs approximately 35 pounds.

A 25-watt transistorized amplifier has been installed on each helicopter which permits the pilot to talk to people on the ground. It is connected to the interphone system and can be keyed by the pilot's microphone switch. It promises to be most useful in disaster control and water rescues or any time it is necessary to communicate with people outside of the aircraft.

An URC-4 is also carried and in case the crash rescue technician must go into a wooded area, he can maintain contact with the helicopter.

In connection with the use of the Fire Suppression Kit the alert crewmen devised a better system for storing the fire hose. Previously the 150 feet of nylon hose was folded in a rack attached to the unit and it was necessary for the entire length to be stretched out before the foam could be forced through. By using a reel to roll the first half of the hose they cut the time in half for putting the FSK into action. Where it used to take 30 seconds it now takes 15 seconds — in fighting a fire, every extra second counts!

Another time-saver developed at Perrin is that crash helmets, fitted with earphones, are installed inside the firemen's asbestos hoods making it possible for the entire crew to hear all necessary details simultaneously.

And the pilot can communicate with the technicians via the interphone system.

A safety device invented by Major Price is installed on the pressure release valve of the FSK. It is a small hood which prevents released foam from spewing straight up. The major pointed out that, due to the location of the carburetor on the helicopter, the foam could cause engine failure if it hit the helicopter while carrying the Suppression Kit or while hovering overhead to fan flames and smoke away from the firemen.

Often circumstances may delay ringing of the crash alarm, such as an aircraft with an emergency situation where the pilot desires to burn out some fuel before landing. Although the emergency is known to mobile control and the control tower, the helicopter section has no knowledge of it until the alarm sounds. This will be corrected in the near future at Perrin AFB when the renovation of the control tower is completed. At that time the helicopter alert section will have direct communication with the tower and will receive advance notice of an emergency whenever possible.

A small, hand-operated refueling unit is in the process of manufacture at Perrin AFB. When it is necessary for the helicopter crew to search some distance from the base for a pilot who bailed out, a crashed aircraft, etc., this refueling unit can be put in the back of a pickup truck and taken to some pre-designated place. This would save a trip back to the base for the chopper to refuel.

The crash-rescue helicopter and its crew at Perrin are always prepared to perform the classic hoist rescue and to suppress a crash fire long enough to reach and free trapped personnel.

After dropping the fire fighting kit and landing its two aircrew firemen, the helicopter then takes off once again as the firemen are extending the hose and activating the foam bottle. Airborne, the helicopter hovers close to the fire blowing flames and heat down and away from the firemen, aircraft and trapped crewmen, greatly easing the rescue job.

continued next page

Distinguished Passenger

TO ARS DETACHMENT 33, PERRIN AFB fell the honor of transporting Vice President Lyndon Johnson on a recent visit to Texas. The Vice President is shown alighting from an H-43A which was piloted by Capt. Robert F. Bennet, Detachment Commander. Assisting Mr. Johnson is S/Sgt. William H. Michael.

When crewmen are carried from the wreckage, the helicopter immediately assumes the role of ambulance to carry injured personnel back to the base for treatment. A special landing pad near the emergency room of the USAF Hospital at the base enables the injured to be brought to the doctors in the quickest possible time. During a nightime emergency this pad is lit by floodlights and a rotating yellow light marks its location for the helicopter pilot.

A separate pad, large enough to accommodate the two helicopters assigned to the base, has been built between the ramp and taxiway. The Fire Suppression Kit is located off to the side of the pad so that when taking off to the north there is a clear path past the standby helicopter. In this way the alert chopper has a clear run with the suppression kit in any direction except east and as there is seldom an easterly component, this is of minor importance. During the summer the prevailing wind is southerly and there is lots of room to get the alert bird into translational lift when carrying the FSK.

The alert crew, consisting of a pilot, two crash rescue technicians (firemen) and a mechanic, stand by in a house trailer alongside the pad. There are air conditioners, a refrigerator, TV and other conveniences to make the alert tour as pleasant as possible.

The crew is on "ready" alert any time there is student flying in progress, which is normally between 0630 and 0030, and on "standby" alert the rest of the day and on weekends. The pilots stand a six-hour alert tour and the remainder of the crew a nine-hour tour so that the alert crew is reasonably fresh at all times. No sleeping is allowed during ready alert because it is felt that a crew, particularly the pilot, cannot wake up out of a sound sleep and become airborne safely in three minutes.

The standby alert crew may remain at home or in any location where they can be easily reached by telephone. Each crew member keeps the base operations dispatch section advised of his whereabouts at all times.

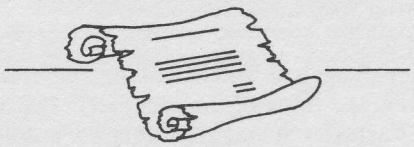
(*continued on page* 18)

A PLACE FOR EVERYTHING

Perrin helicopter crewmen worked diligently to provide a place for the numerous pieces of essential rescue equipment so that they were out of the way but readily accessible. Here is the location of rescue gear: 1. Disarming tool — behind pilot's seat. 2. Pyrotechnic guns, 3 flares, 3 signal cartridges, and 3 message delivery containers — rack for original first aid kit. 3. Rescue screwdrivers, keyhole saw spare blades and gear, seat pins for a/c — carried in bag mounted on inspection door, left side (a belt has been fabricated to hold the other crash entry items). 4. Twenty-five feet of 1/2-inch nylon rope — carried on right inspection door. 5. Two MK-5 drift night signals — in the rear, far left and far right corners of aircraft. 6. Splint kit — back of center passenger seat. 7. Sling — back of center passenger seat. 8. Hoist operator's retaining harness (gunner's belt) — left and rear of overhead circuit breaker panel. 9. First aid kit — attendant's seat. 10. Body bag — under attendant's seat. 11. One-man life raft — left hand outboard passenger seat. 12. Two Mae Wests — above center passenger seat. 13. Aldis Lamp — right rear corner of floor board in front of pilot seat. 14. Flashlight — on bicycle clip in left rear corner of floor board in front of pilot seat. (USAF photo)

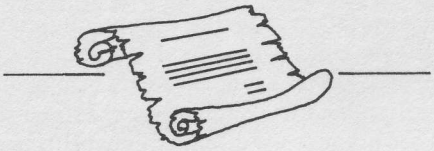
SCROLL OF HONOR

A Unit Scroll of Honor was presented recently to ARS Detachment 49 at Seymour Johnson AFB, N. C., as well as individual Scrolls to the H-43B crew members who participated in two dramatic rescues which occurred a comparatively short time apart. Awards were made for the rescue work which took place after a C-123 crashed on takeoff at a Wilmington, N. C., airshow. The HUSKIE, on static display at the time of the crash, was airborne in 1 minute, 32 seconds after the C-123 hit the ground. The helicopter downwash held back the flames while survivors were carried from the aircraft and afterward the H-43B, along with Army and Marine helicopters, was used to carry injured personnel to the hospital. Receiving Scrolls of Honor were Capt. John C. Armstrong, Jr., pilot; 1st Lt. Charles A. Morrill, co-pilot; Capt. Charles Pummill, flight surgeon; S/Sgt. Boyce W. Allen, crew chief; S/Sgt. Donald H. Holloman and A1/C Gene C. Mayo, rescuemen. Receiving Scrolls for the rescue of a pilot whose F-105 crashed and burned on the runway at Seymour Johnson were Lt. Norman R. Albee, pilot; Captain Armstrong, co-pilot; T/Sgt. Calvin Wilkins, medic; S/Sgt. Marvin S. DeBerry and A1/C Mayo, rescuemen. In this rescue, the H-43B was airborne with the Fire Suppression Kit in slightly over a minute after the crash phone rang, orbited at the end of the runway until the F-105 appeared, quickly dropped off the FSK, firemen and medic at the crash scene and then immediately lifted and used the rotor down wash to suppress the fire. A veteran ARS helicopter pilot observed afterward that the manner in which the H-43B and FSK were utilized during the rescue was " a classic example of correct procedure from start to finish."

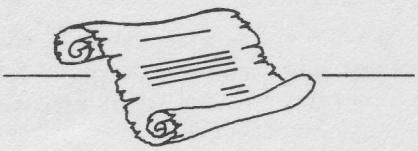


Two H-43B crews from Fairchild AFB, Wash., have received Scrolls of Honor for separate missions involving hazardous flights and landings in mountainous territory. On one mission, an H-43B was dispatched to the aid of an airman from the base who had been accidentally shot in the stomach while deer hunting. Helicopter pilot was 1st Lt. Richard W. Shriber; co-pilot, 1st Lt. James P. Scarff, Jr.; crew chief, S/Sgt. Robert H. Meyer and the doctor aboard was Major R. H. Unger. In successfully carrying out the mission the pilot flew in 25-knot winds, later touched down and picked up a guide, then continued onward 20 miles through a canyon with its walls partially hidden by rain and fog. The ceiling was 400 feet. When the H-43B arrived at the rescue site it was held on the spot with full forward cyclic while the rescuers carried the survivor 100 yards up the steep slope. The attitude indicator was showing a 30-degree climb while on the slope. A vertical takeoff was made to clear the 50-foot trees and stumps behind the helicopter. The airman is reported to be recovering.

The other H-43B crew consisted of Capt. Louis F. Sparrow, aircraft commander; 1st Lt. James P. Scarff, Jr., pilot; and A1/C Donald Gollehon, crew chief. They rescued two seriously injured mountain climbers from a 6500-foot-ledge on Snow Shoe Mountain, Mont. The rescue was accomplished after a long flight over mountainous territory during which turbulence, rain showers and poor visibility were encountered.



Scrolls of Honor were also presented to four H-43B members of ARS Detachment 4 at Paine AFB, Wash., for the rescue of two teenagers whose raft overturned and left them clinging to a large boulder in the rapids of the Skyhomish River. Receiving the Scrolls were 1st Lt. John L. Wells, pilot; Capt. Robert D. McDougal, co-pilot; S/Sgt. Frank S. Gilash, crewman; and A2/C David E. Thayer, medical technician. When the crew of the HUSKIE arrived on the scene visibility was rapidly deteriorating due to the oncoming darkness and haze which had begun to fill the narrow valley. To further complicate the situation, trees approximately 100 feet tall grow in profusion on both banks of the river allowing just enough space to hover the H-43B. Twelve-foot boulders protruding from the bottom of the river made it necessary for the pilot to hover the aircraft high to avoid striking them. With the aid of the rescue spotlights on the underside of the HUSKIE, the two youths were hoisted from their precarious perch to safety. Once aboard the helicopter they were wrapped in blankets and treated for shock. After flying the survivors back to Paine, the helicopter crew returned to the accident scene to aid in the search for the body of a skindiver from the county sheriff's office who had drowned while attempting to save the two youths.



For their rescue of a 12-year-old girl from a spot near the base of a 1200-foot cliff in Ecola State Park, Ore., Scrolls were presented to 1st Lt. Dennis M. Chase, H-43B pilot; 1st Lt. Donald F. Donk, co-pilot; S/Sgt. Colbert Ezell, crew chief; and Capt. John W. Funk, flight surgeon, from Portland Air Force Base, Ore. To accomplish the rescue the pilot flew the HUSKIE 15 to 20 feet above the sea to avoid the fog and then, to stay clear of the cliff, hovered the helicopter with two wheels on the beach and two in the pounding surf while the pickup was made.

HU2K-1 EMERGENCY FLOTATION SYSTEM

by D. G. Uitti
Ass't Project Engineer
HU2K-1 Project Office

The Kaman HU2K-1 "SEASPRITE" helicopter will require considerable over-water operation in the fulfillment of its rescue, plane guard, and utility missions for the U.S. Navy. Accordingly, one of the important safety features which has been stressed in the design of the HU2K-1 is the emergency flotation system.

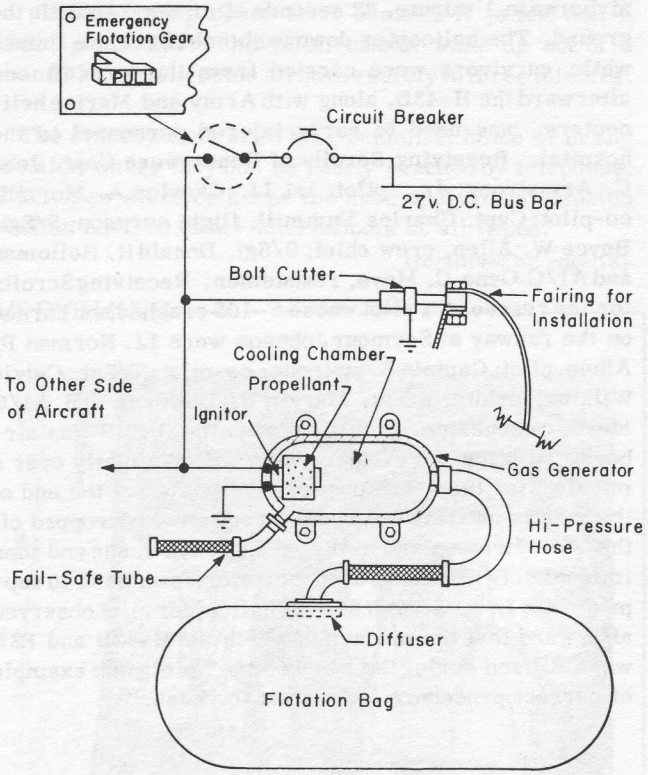
Since the design requirements for such an installation are not formally defined by specification, Kaman has endeavored to establish appropriate criteria to derive a system consistent with the major mission requirements. Discussions with Naval pilots and fleet operational personnel who have taken part in and/or observed helicopter ditchings at sea have emphasized the importance of good emergency ditching capabilities and ability to operate from the water under certain emergency conditions.

The preliminary design studies of the system discarded existing flotation schemes which prevailed in operational use, because of their adverse effects on weight, drag, and in some cases, complexity. The design which was implemented into the HU2K-1 helicopter is a careful balance of these factors to obtain an optimum system which satisfied the following objectives: 1. Capable of being stowed in a small space to minimize drag. 2. Light weight. 3. Inflation time less than four seconds. 4. Capable of inflation when partially submerged. 5. Capable of withstanding high water landing loads. 6. Inflation must be simple, positive, and reliable. 7. System should result in minimum interference with personnel egress. 8. Low maintenance.

Since the flotation requirements were considered at the outset of the HU2K-1 design, the fuselage hull itself has been stressed to withstand water landing loads. Furthermore, the detail design calls for watertight joints and sealed components in the lower fuselage with special lightweight check valves for the standard compartment drains, which allow no water to enter when the aircraft is floating. The main cabin has a partial bulkhead at the aft end which prevents water from entering the tail boom if water should enter the cabin because of wave action.

Although the hull has adequate buoyancy to float the aircraft, design studies showed that the lateral stability can be improved to permit rolling angles up to 30° by the use of quickly inflatable air bag sponsons. This stability is, therefore, provided by two 56-cubic foot bags; one mounted on either side of the aircraft. They are carried in a folded position in pods just forward of the main landing gear. These bags are made from a rubber impregnated nylon material similar to that utilized in rescue raft construction.

The heart of the flotation bag installation consists of the two gas generators that produce the gas which pressurizes the floats. The generator is a steel bottle with an electrically actuated igniter, a chamber for propellant grain, and additional volume for expansion of burning gases and cooling prior to exhausting into the bags. The bottle also has a safety disc which would rupture and exhaust the gas overboard if the normal outlet was plugged for any reason. The gas-producing characteristics of the generator inflate the bag in less than four seconds throughout an ambient temperature range varying from below zero to 125°F. Since the system does not rely on outside air for the bags, the bags can be inflated even if the entire assembly is underwater.



The fiberglass pod which houses the flotation gear retains the clean lines of the aircraft. The door of this pod is held closed by several screws and locked shut with a bolt. When the generator is fired by pulling an emergency "T" handle in the cockpit, the bolt is simultaneously cut with a bolt cutter similar to the cable cutter for the rescue hoist cable. The screw holes are slotted so that the inflation of the bag can push the door open without difficulty.

The engineering test program for the flotation system will be completed shortly. The tests emphasize the reliability of the generator to function satisfactorily by calling for a long series of firings throughout the temperature range and variety of attitudes. It is also subject to a qualification program which includes shock, drop, vibration, and high and low temperature storage tests. The flotation bags have also been subject to an extensive structural integrity program and continuing high degree of quality control during the process of their production. The system has been flown with the bags inflated throughout a speed regime up to 100 knots to determine its effect on stability and control with satisfactory results. These tests even include flights with only one bag inflated, and also with low bag inflation pressure.

Water landings and water taxi tests have been conducted to evaluate the flotation system in its actual operational mode. It was found that taxi characteristics were very similar to those on the ground. The aircraft

SEASPRITE MAKES FINAL APPROACH for water landing with emergency flotation bags inflated.

MAKING APPROACH for a landing with flotation bags stowed.

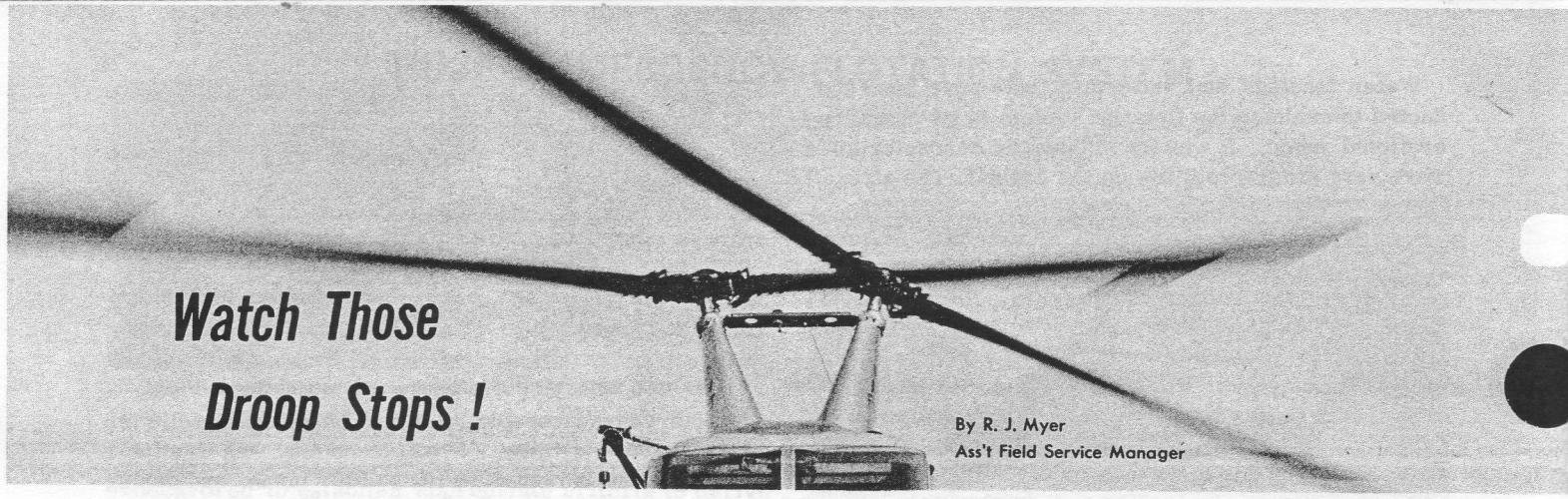
was very maneuverable requiring only small cyclic inputs in rudder turns. Positive control was available during turns in both directions, 360° turns, and during crosswind taxiing in a 20-knot wind. There was negligible pitching motion and positive lateral stability throughout the tests. These water landing tests have been particularly gratifying and are the key to the high confidence level which the flotation system has earned.

HU2K-1 LANDS ON CONNECTICUT RIVER and begins taxi tests to evaluate maneuverability of the helicopter with flotation bags inflated.

VMO-6 Demonstrates Clockwork Precision In Landings At Sea

One hundred and five in two hours — that's the number of practice shipboard landings made recently by HOK-1 pilots from Marine Observation Squadron Six, MCALF, Camp Pendleton, Calif.

Five HOKs participated in the exercise which involved landings and takeoffs from an LSD anchored off the coast. Approximately two hours elapsed from the time the helicopters left the chocks and headed seaward until they returned to the flight line. This adds up to one landing a minute on the narrow deck. Shown just after touchdown is an HOK piloted by Capt. Norm Smith, USMC, Capt. Ray Shinkle, USMC, is co-pilot. (USN photo)

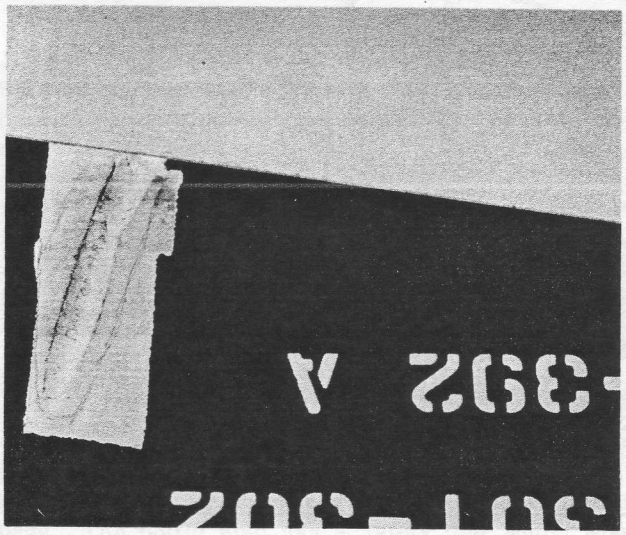


Watch Those Droop Stops!

By R. J. Myer
Ass't Field Service Manager

Due to the angular relationship of the synchropter rotor mechanism and the optical illusion created by the whirling of the intermeshing blades, concern is occasionally expressed as to the possibility of blade-to-blade and/or blade-to-opposite hub contact. We at Kaman Aircraft can readily understand that those who have not witnessed our exhaustive flight and ground test might harbor such concern; we also realize that each new using activity has to satisfy itself by personal observation and many hours of uneventful operation that their concern is unwarranted. This philosophy has proven effective over the years until some symptom crops up, once again reviving the question in the minds of the personnel involved.

From time to time a gouge or scrape is found on the underside of a rotor blade which shows it has contacted the protruding hardware on the opposite hub. Usually the problem, manual rotation of rotors with a droop stop out, is discovered at the time of occurrence and correction is made in time to avoid excessive damage or damage to the second blade of the pair. However, due to haste or unfamiliarity, the damage can be incurred without the knowledge of the individual handling the blades. In such cases, both blades of a given pair can be similarly damaged without it becoming evident until a subsequent inspection is performed. At this time the "ugly suspicion" of in-flight contact reappears.



For those not familiar with the affected components and related geometry, the HOK, HUK and H-43 rotors are semi-articulating. This means that the blades lead and lag about horizontal pivots instead of flapping on hinges at the inner ends of the blades. The amount of teeter provided is based on the cyclic disc change required for all normal flight conditions. Adequate blade-to-blade and hub clearance is insured by the combination of three factors:

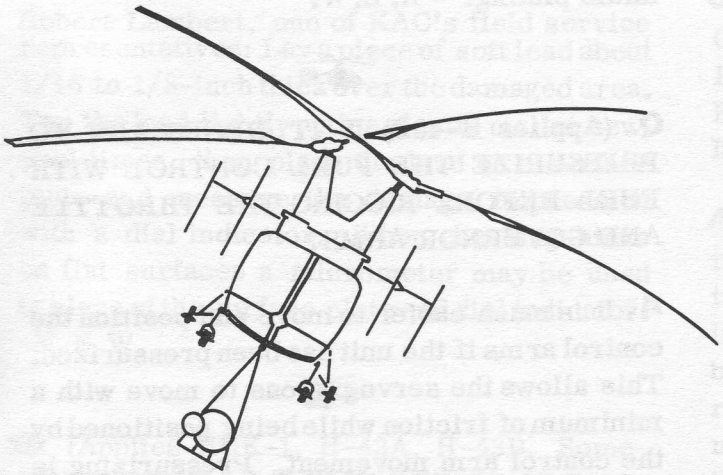
(1) Built and rigged-in inboard cyclic control limits, which prevent the rotors from tilting too close to the opposite hubs.

(2) Normal rotational dynamic and aerodynamic forces, which insure that the rotor disc remains relatively normal to the shaft axis, coupled with the down collective control limit which governs the attitude of the rotor cones at rotor speeds above droop stop engagement RPM.

(3) Physical teeter limitation established by engagement of droop stops at the lower rotor speeds encountered during run-up and shutdown, or ground handling.

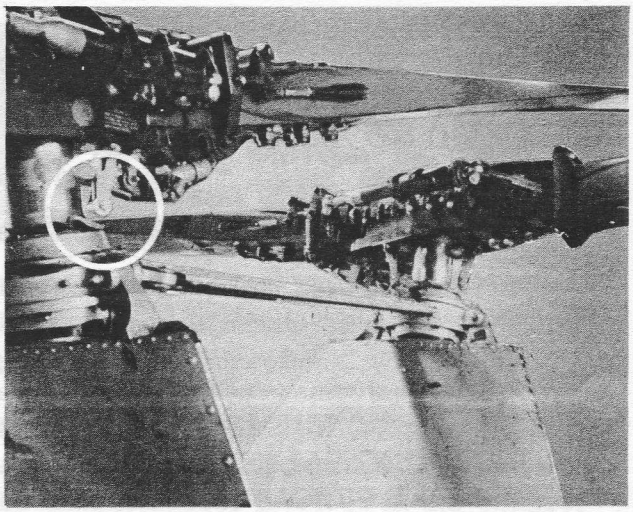
Occasionally mechanical devices have been known to perform differently in actual operation than in theory, especially if some unusual circumstances are brought into

play. Recognizing such a possibility, numerous in-flight, blade-to-hub proximity checks were performed by KAC. Proximity markers were secured to the edge of the blade grips and the top of the rotor shafts. Extremely abnormal flight maneuvers and control applications were then accomplished, including rapid lateral cyclic control reversals which were so severe as to cause rotor tilt in a direction opposite to that in which the fuselage was leaning. Even with the most violent and uncoordinated control inputs and with 1000-pound external stores suspended from the cargo hook, adequate blade-to-hub clearance was demonstrated to exist at all times.

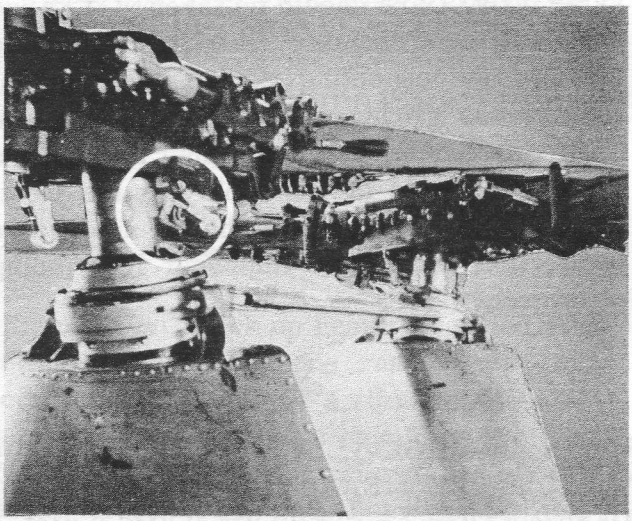


In summary, it has been established by over a hundred thousand synchropter flight hours, and the above-described dynamic test, that in-flight, blade-to-blade or hub contact is IMPOSSIBLE IN A PROPERLY RIGGED AND OPERATED AIRCRAFT. Obviously, any mechanical component may perform abnormally when subjected to operating conditions far beyond the established limits. This is also true with tandem and single rotor helicopters, particularly relative to blade contact with tail rotor drive shafting or pylons on the latter type. Many such instances are on the records. However, when evidence of rotor contact is found on KAC synchropters, it is most probable that the cause was inadvertant rotor rotation with droop stops out.

This condition usually occurs while the blades are being handled manually. For example, the droop stops may have been pulled into the "out" position by maintenance



Droop stop (circled) is shown in "in" position. Note clearance between rotor blade and opposite hub.



Stop has been placed in "out" position in bottom photo, allowing blade-to-hub contact.

personnel in order to lower the rotor blades for inspection or other purposes. Afterward, while the stops are still in this position, ground handlers may move the blades in order to avoid contact with nearby obstructions. Again, when the droop stops are out, the blades may be moved to facilitate inspection or while a damper friction check is being made. Damage to the rotor blade, or blades, may also occur during the lower run-up and shut-down rotor speeds. if the droop stops are not functioning properly. Approximate droop stop actuation speeds are:

	OUT	IN
HOK/HUK/H-43A	150-160 RPM	85-100 RPM
H-43B	50% N2	45% N2

Q's AND A's

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

Q. (Applies H-43B) WHEN INSTALLING THE FUEL CELL VENT VALVES, P/N H2055MA, WHAT SPECIAL PRECAUTION SHOULD BE TAKEN?

A. The assembly should only be held by the valve body. Care should be taken NOT to use the float as a "handle" when installing the valves or disconnecting or connecting the vent line. Since working in this limited space is difficult, maintenance personnel may have a tendency to hold the assembly by the float. This, however, damages the float-to-valve connection and causes improper functioning of the vent valve. -A. A. W.

Q. (Applies HOK-1, HUK-1, H-43A, H-43B) WHAT IS THE MEANING OF THE VARIOUS DESIGNATION LETTERS "M," "MS," "ML," ETC. WHICH APPEAR ON OIL CONTAINERS?

A. These letters are taken from the American Petroleum Index (API). Their meanings are:

M -- Motor

ML -- Motor, Light. Generally a low grade, low viscosity oil with a mineral base.

MM -- Motor, Moderate. Average or middle grade viscosity mineral base oil.

MS -- Motor, Severe. Detergent oils and multi-viscosity oil fall in this category.

The "D" series stands for "Diesel."

DG -- Diesel, General.

DM -- Diesel, Moderate.

DS -- Diesel, Severe.

— C. W. J.

Q. (Applies HOK-1, HUK-1, H-43A, H-43B) SOME ROTOR BLADES ARE SHIPPED WITH WHAT APPEARS TO BE BRASS COTTER PINS INSTALLED THROUGH THE FLAP CABLE RETENTION NUT. IS THIS PERMISSABLE?

A. It is not permissable to use brass cotter pins in this application. However, the cotter pin referred to in the question is actually steel, not brass. A quick check with a magnet will prove this. Blades are shipped with the required AN380-2-3 cotter pin which is cadmium plated steel. The brassy finish is the result of a chrome-iron dip process used to enhance the corrosion resistance of the cadmium plating. - N. E. W.

Q. (Applies H-43B) IS IT NECESSARY TO PRESSURIZE THE FUEL CONTROL WITH FUEL BEFORE RIGGING THE THROTTLE AND GOVERNOR ARMS?

A. It is much easier to move and position the control arms if the unit has been pressurized. This allows the servo pistons to move with a minimum of friction while being positioned by the control arm movement. Pressurizing is not necessary, however, since it is not detrimental to the fuel control to move the throttle and governor arms without taking this action first. - A. A. W.

Q. (Applies HOK-1, HUK-1, H-43A, H-43B) THE TEETER LOCK, P/N K304033-5, HAS A TENDENCY TO SLIP DOWN THE ROTOR SHAFT UNLESS PROPERLY INSTALLED. WHAT IS THE PROPER PROCEDURE?

A. The locks must be installed with the ears (surfaces that contact the rotor shaft) directly opposite each other on the shaft. When properly positioned, the lock must be tightened securely. Holes have been placed in the circumference of the knurled handle so that a pin or screwdriver may be inserted for added leverage when tightening. If the two ears are installed at an angle to each other they will loosen easily. - N. E. W.

Q. (Applies H-43B) WHAT IS THE FEDERAL STOCK NUMBER FOR THE ELEVATOR BLOWDOWN TAB CONTROL CABLE ASSEMBLY, P/N NAS313C17-1744?

A. The Federal Stock Number for the cable assembly is 4010-899-5072. This number will appear in the next revision of T. O. 1H-43B-4. - W. J. W.

Q. (Applies HOK-1, HUK-1, H-43A, H-43B) HOW CAN THE DEPTH OF A NICK OR DENT IN A ROTOR HUB BE MEASURED ACCURATELY?

A. The following method is recommended by Robert Lambert, one of KAC's field service representatives: Lay a piece of soft lead about 1/16 to 1/8-inch thick over the damaged area. Tap the lead lightly with a plastic mallet several times, then place the lead on a surface plate and measure the damage impression with a dial indicator. When checking nicks on flat surfaces a micrometer may be used in place of the surface plate and dial indicator. -N. E. W.

Q. (Applies HUK-1, H-43A, H-43B, Some HOK-1s) THE 1 1/2 INCH RED (OR CREAM) SQUARE AND THE 1 1/2 INCH ORANGE CIRCLE ON ROTOR COMPONENTS SIGNIFY RIGHT-HAND AND LEFT-HAND HARDWARE RESPECTIVELY. DO THESE MARKINGS SERVE ANY OTHER PURPOSE?

A. Yes, they do serve another purpose. During rotor hub-to-shaft installation these markings should be used to properly position the rotor hubs. Both the right and left hand hubs must be installed with the rotor shaft and hub markings aligned on the same side so as to insure that the in-flight-tracking wire is properly routed between the tower bearing dust shield and the actuator motor. Correct installation eliminates the possibility of interference between the wiring and the movements of the droop stops or excessive tension being placed on the wires. N. E. W.

Q. (Applies H-43A, H-43B) WHAT DO THE ORANGE YELLOW STRIPES SIGNIFY THAT ARE FOUND AROUND SOME CONNECTIONS IN VARIOUS PARTS OF THE HELICOPTER?

A. This color code is applied in accordance with AF specification MIL-M-25047 which calls out orange yellow as the color to be applied to all connections which must be disassembled when removing the power plant. This includes all systems, lines, conduits, control rods, cables, bell-cranks and casting flanges involved in the change. G. M. L.

Q. (Applies H-43B) DOES THE CONDITION OF THE ENGINE MOUNT BEARINGS INFLUENCE THE READINGS ON THE TEST EQUIPMENT WHEN A VIBRATION CHECK IS BEING MADE OF THE ENGINE?

A. The condition of the engine mount bearings can have a definite affect on these readings. If a bearing is loose, the sensitive instrument will pick up resultant added vibration and an erroneous reading will be recorded. Before such a vibration test is made the mount bearings should be given a thorough inspection. Experience has shown that the left and right rear bearings are the most frequent offenders when erroneous readings have been recorded during tests. A. A. W.

Q. (Applies H-43B) WHAT TYPE OF PRESERVATIVE OIL SHOULD BE USED TO PRESERVE THE FUEL CONTROL ON THE LYCOMING T53 ENGINE?

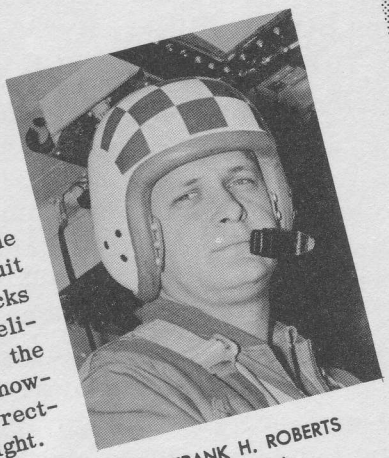
A. MIL-O-6081 (ASG) grade 1010 or the equivalent should be used. DO NOT USE MIL-C-8188 preservative oil as this will cause the fuel control to malfunction. This condition occurs because the rubber O-rings swell when subjected to MIL-C-8188 oil which is a synthetic oil (MIL-L-7808) with a rust preventative added. T. O. 1H-43B-2 has been revised to call out the correct preservative for the fuel control. - C. W. J.

KAMAN SERVICE ENGINEERING SECTION—*G. D. Eveland, Supervisor, Service Engineering; E. J. Polaski, G. S. Garte, Asst. Supervisors; E. L. White, A. Savard, G. M. Legault, Group Leaders.*

ANALYSTS—*R. A. Berg, P. M. Cummings, A. D. Cutter, P. A. Greco, E. Hermann, C. W. Jenkins, D. W. MacDonald, J. McMahon, W. J. Rudershausen, W. J. Wagemaker, N. E. Warner, A. A. Werkheiser, M. Whitmore, W. H. Zarling, R. W. Olsen.*

REPORT *from the ready room*

MAINTENANCE TEST FLYING



by FRANK H. ROBERTS
Test Pilot

The purpose of this article is to aid the local base test pilot in expediting his duties involving maintenance test flying. This will increase aircraft availability for the fulfillment of the overall mission of the unit.

Maintenance test flying does not consist of merely kicking the tires, and going for a joy ride to see what the latest bathing suit fashions are. It is an orderly execution of established checks and procedures to determine the condition and status of the helicopter in the most efficient manner. To accomplish this, the base test pilot must be one of experience, have thorough knowledge of his aircraft and be able to interpret and explain correctly in clear, understandable terms what he encounters in flight.

Initially, let us consider the planning stage necessary to accomplish the job at hand. Assuming the base test pilot has all the above attributes, he will never stop learning about his aircraft. In order to gain the utmost knowledge concerning the H-43B, it is recommended that a library be established. It should consist of the following items: T. O. 1H-43B-1 Flight Manual, T. O. 1H-43B-2 Maintenance Manual, Kaman Rotor Tips, and a reference file of flight test procedures. The information for such a file can be obtained from the above publications. A file of this nature can be kept on 5x8 cards. By doing so, the pilot need only pull the cards covering the system to be checked. This will allow him to review the procedures required and provide adequate space to record any comments while flying. Remember, the best time to know procedures— and the worse time to learn them— is during an emergency! This file can also be used as a training aid for the pilots and crew members of the unit to improve the trouble shooting techniques of the entire section.

Now that everything is organized, you are notified that an H-43B is back in commission and ready for a test flight. Ah, flight time at last! But wait a minute, how about a flight plan, the weather conditions, weight and balance, the maintenance that has been performed, and the ground runup?

After the paperwork has been completed, the next step, which is one of the most important procedures in test flying, is a thorough preflight. A good preflight is not merely a casual walk-around, kick-the-tires affair, but a complete inspection of all the components of the helicopter. A preflight of this nature accomplishes several things; first, it eliminates the assumption that the helicopter is ready for flight, and secondly, it can be utilized as an educational period for everyone involved.

During the preflight and the initial flights, it is recommended that the cabin overhead and the engine cowling remain off. In this way, better inspection for leaks and control rigging can be accomplished.

During the cockpit inspection and prior to starting the engine, it is well to check for proper control response with cyclic input. This is performed by placing the right-hand rotor parallel to the lateral axis and the left-hand rotor perpendicular to the lateral axis. When the cyclic is pushed in the direction the leading edge is pointing on any blade, the trailing edge of that flap must move down.

By now, "Eager Edgar" has determined that the heli - copter is in flight status and is impatient to "screw into the blue." But again, caution and common sense must be utilized in order to stay in full control of the situation — is the helicopter facing directly into the wind?

Since engine operating procedures were covered in an article written by Al Karvelis in the August, 1961 issue of Kaman Rotor Tips, I will not belabor this subject. It should be sufficient to say that during the acceleration and start, the engine instruments should be monitored and recorded in order that appropriate action may be taken. Also, the engine must be inspected for leakage prior to engaging the rotors.

If the start is normal and the area clear, rotor engagement is the next step. During the engagement the engine instruments are still monitored, but we also shift our attention to the transmission instruments and the track as rotor speed is increased. Rotor engagement at this time should not be the type executed when the crash alarm sounds, but must be a positive, comfortable increase of rotor speed. As rotor speed increases, most of our attention is focused on the condition of the track and cones.

I will not pursue the subject of rigging and tracking further, but refer you to an article written by Andy Foster in the September, 1960 issue of Kaman Rotor Tips. One word of warning before leaving this subject; never assume that the desired result will be obtained from the corrections made to the rotor system. The next engagement must be executed just as cautiously as the first one, and the helicopter should be slowly walked off the ground so that full control is maintained at all times.

Now that the helicopter is airworthy again and the proper control responses are resulting, the remainder of the flight checks can be made. It is recommended that initial flights be conducted within the field boundaries and last for a duration of approximately 30 minutes. The reason for the short duration of these flights is to give the crew chief an opportunity to inspect the engine and transmission for leakage.

Since space does not permit a full description of all the checks that must be made during the maintenance flight test, I recommend the trouble shooting sections of the T.O. H-43B-2 be utilized to establish your program.

I will conclude with one thought; the helicopter you are about to test fly has been down for a period of time trying to conceive way to outfox you. The caution you demonstrate should be equal in amount to the unwillingness of the helicopter to fly. Higher aircraft availability will be realized if maintenance test flying is conducted seriously, cautiously, and with common sense. K

Helpful Info From EARC

In an article on helicopter air-to-ground communications which appeared in the October 1961 issue of Kaman Rotor Tips, readers were asked to supply any additional information which might also prove helpful to the various services engaged in helicopter rescue. Personnel attached to the Eastern Air Rescue Center at Robins AFB, Ga., have responded with the following communications data.

EARC advises that sometime ago, as an iterim measure until more advanced equipment now being developed is made available, helicopter personnel at Brookley AFB, Ala.; devised a means of improving communications between helicopters and ground vehicles by modifying the URC-4 radio, an emergency radio set on guard channel. The radio was modified by changing the crystal to a training frequency and has proven very helpful during practice fires and other training exercises; in addition, it keeps the guard channel free from interference. The equipment has also been used many times to communicate with boats in the area. Similar modified radios have been used successfully at Robins AFB. The regular emergency URC-4 is also carried, of course.

Here is the procedure for the frequency change from 243 megacycles to 252.8 megacycles on the URC-4 radio, S/N 5821-505-1854, P/N RT-159-URC-4 (NO CHANGE SHOULD BE MADE, HOWEVER, WITHOUT AUTHORIZATION FROM THE PROPER AUTHORITY):

Change crystals and use 31.60000 KC on 252.8 megacycles. The S/N for the 252.8 crystal is 2100-2X524-31.60000. After the crystals are changed, realign coils to 252.8 in accordance with T.O. 12R2-2URC4-2.

The URC-4 radio frequency range is 240-260 megacycles UHF and 120-130 megacycles VHF and can be set anywhere in between providing the correct crystal for the desired frequency is used and the set is aligned in accordance with T.O. 12R2-2URC4-2. K

HUSKIE HAPPENINGS

ARS DET. 54 at Moody AFB, Ga., scrambles two helicopters, an H-43B with FSK and an H-43A as back up, flys 66 miles to Turner AFB after B-52 declares an emergency due to hydraulic system malfunction. Bomber escorted down runway by both helicopters, "B" drops Fire Suppression Kit and firemen by nose of giant ship as precautionary measure after it safely comes to halt. Firemen ordered to foam aircraft down at first sign of spark. As crew of B-52 evacuate, they are greeted by downwash from rotors of both H-43s which have assumed positions to cool overheated brakes and wheels on B-52. Capt. William J. Fitzgerald, H-43B pilot; Capt. Grant F. Mackie, co-pilot; S/Sgt. Arlie P. Stalvey and A1/C C.S. Jarrell, firemen. 1st Lt. David H. Pittard, H-43A pilot; 1st Lt. Grant D. Kerber, co-pilot; S/Sgt. Frank D. Hinton, A1/C Sidney Allen, firemen; T/Sgt. Joseph Blaquiere, crew chief.

... H-43B crew from ARS DET. 52, Charleston AFB, S. C., instrumental in recovery of second stage of Minuteman missile while stationed aboard missile-tracking ship about 80 miles off Cape Canaveral, Fla. Helicopter flys two divers to point of impact and directs recovery operation. Capt. Herbert A. Lee, pilot; Maj. R.J. Martin, ARS Hdqs., co-pilot; Lts. Robert Henderson and Gary Robertson, landing control officers; T/Sgt. George M. Brown, crew chief; Sgt. Paul Eberhart and A1/C Larry Henderson, crewmen. The divers were M/Sgt. C. Tolbert, ARS Hdqs., M/Sgt. N. Klimis, ARS Eglin AFB.

... Approximately 350 pounds of food dropped to snowbound military personnel manning radar station atop Mt. Lemmon, Ariz., by HUSKIE crew from ARS DET. 17, Davis-Monthan AFB, Ariz. Radar station located above 9,000-foot altitude. Capt. William T. Hayes, Jr., pilot; 1st Lt. Stanley Schaetzle, co-pilot; A1/C Presley E. McQuigg, crew chief.

... H-43B crew from ARS DET. 5, McChord AFB, Wash., joins in search for missing civilian aircraft, five minutes later locates wreckage and determines that occupant was killed in the crash. Capt. Warren K. Davis, HUSKIE pilot; 1st Lt. Frank J. Christy, co-pilot; M/Sgt. L. G. Seckley, rescue technician; T/Sgt. H. Katz, medical technician.

... Two H-43Bs from ARS DET. 49 at Seymour Johnson AFB, N. C., take to air when tanker with trim trouble and fighter aircraft unable to get landing gear down declare emergencies. Pilot of fighter bails out, lands safely and is picked up by helicopter waiting for him. Other helicopter, carrying FSK, follows plane down after tanker lands without incident. One HUSKIE flown by Capt. J.C. Armstrong, Jr., the other by Lt. N.R. Albee.

... H-43B from ARS DET. 15, Luke AFB, Ariz., lands at bottom of Grand Canyon to pick up seriously ill, 62-year-old Indian woman. Flys her to Phoenix, lands in schoolyard at night with aid of lights from police cars. Capt. R.R. Cowles, pilot; Capt. Z. L. Stockett, co-pilot; T/Sgt. H. Alford, crewchief; Capt. Seigel, doctor; M/Sgt. Moore, medical technician....

H-43B from ARS DET. 15, Luke AFB, flys 60 miles from base to pick up hunter seriously injured after being struck by boulder. Smoke signals used to guide helicopter to rescue site approximately 200 feet from top of mountain ridge and on a 45-degree slope. Capt. Z. L. Stockett, pilot; Capt. W. C. McMeen, co-pilot; A2/C J.T. Sloan, crewchief; Doctor M. D. Klien, A2/C R.L. Franklin, medic.

... H-43B from ARS DET. 46, Suffolk County AFB, N.Y., fitted as aerial ambulance with oxygen tent for airman seriously injured in automobile accident and flys him 50 miles from one hospital to another. Lt. William V. Berry, pilot; Lt. Gordon R. Hecht, co-pilot; Capt. R. Ettinger, doctor; and SM/Sgt. Juliane Bailey, medical technician.

... Police call on ARS DET. 15 at Luke AFB, Ariz., for assistance in rescuing two teenage boys stranded on Camelback Head Mountain. Pickup made at 2,000 feet from spot between two cliffs with little rotor blade clearance on either side. 1st Lt. Carroll Wright, pilot; Capt. R.R. Cowles, co-pilot; A1/C D.L. Paulson, crewchief....

What the •••• • —•—• —•— •• ••• wrong with Rotor Tips?

The tiny tower at the top of the page has been sending out its coded message for more than a year now, but it wasn't until a few weeks ago that an eagle-eyed reader spotted the mistake made by the butter-fingered radio operator. Can you? In the future, if you find anything like this, let us know. The Individual responsible will be beheaded—of course! ... Ed.

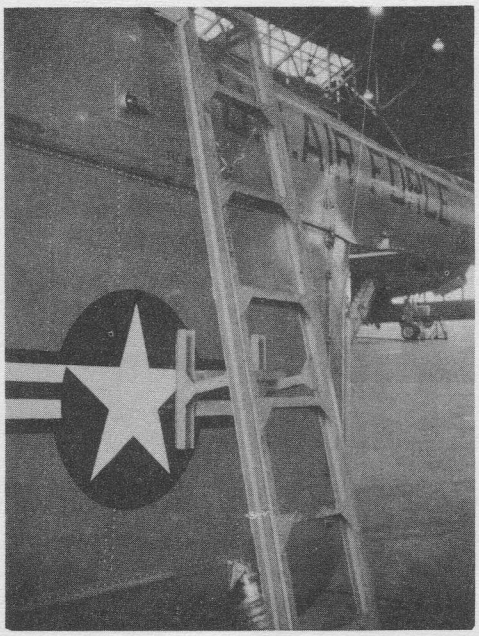
DR. EARL K. CANTWELL, rescued by an H-43B crew from ARS Det. 24, Kincheloe AFB, Mich.; after being lost in woods for three days, is removed from helicopter for transportation to nearby hospital. In addition, two other hunters were rescued and the bodies of two others located during three other recent missions flown by Det. 24 personnel. Capt. Chester Ratcliffe, Detachment Commander; has especially singled out A2/C Lewis O'Dougherty, hoist operator, for credit. On one mercy mission he spotted the doctor, and also was the first to see another lost hunter while flying on a second mission. A letter from Doctor Cantwell and his family, which first appeared in the KINCHELOE CHIEFTAIN, appears to the right of the photo. (Sault Ste. Marie, Mich., Evening News photo)

No mere words can truly express our deep gratitude to all of you. We want to thank you most sincerely for your prayers, cooperation and efforts given so generously in the recent rescue operation.

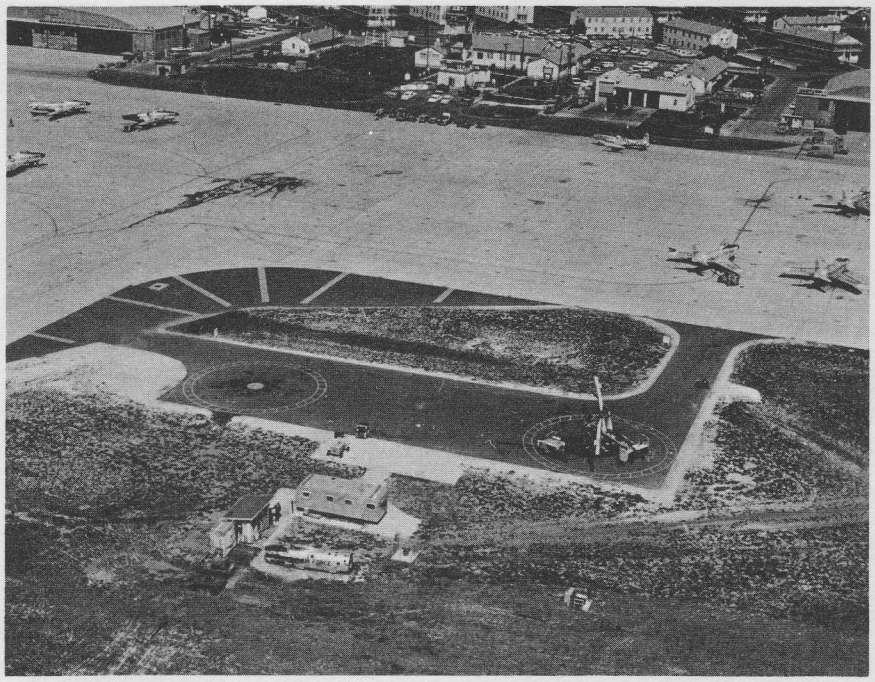
Without your help, the outcome most certainly would have been tragic. The men and women of Kincheloe AFB proved themselves to be an integral part of the community and one of its most valuable assets.

Dr. and Mrs. Earl K. Cantwell and Family

SIX-YEAR-OLD David Schollnick is comforted after being rescued from yacht aground in Delaware Bay by H-43B personnel from ARS Det. 48, Dover AFB, Del. The rescue was performed under adverse night conditions which included occasional instruments, and the civilians' lack of familiarity with the rescue sling. Four others were rescued by boat afterward. The H-43B was piloted by 1st Lt. Hugh G. Caldwell, co-pilot was 1st Lt. Raymond J. McGeechan and the hoist operator A1/C Robert P. Worhach. In photo, Worhach, behind David, describes the mission to Col. Robert H. Stuart, Base Commander, at extreme right. Medics were not identified. (USAF photo)



LABOR SAVER—This ladder was developed by M/Sgt. Constantino Pacilio at Brookley AFB, Ala., to facilitate access to higher areas of helicopter and reduce upper cabin window breakage. (Refer to KAC posters issued in past relative to use of upper cabin window shield P/N K704026-1 to prevent window breakage on the H-43B and P/N K304026-1 on HOK-1, HUK-1, H-43A). Two of the ladders are in use, one on the flight line for pre-flights and the other in the hangar for maintenance work. A1/C Robert Logan shows how ladder opens to facilitate all-around maintenance.



COMPACT UNIT—Aerial view shows relation of the helicopter pad to the operations ramp and nearness of alert crews' trailer. Also shown is old aircraft fuselage used by crew members in practicing their pilot rescue techniques. (USAF photo)

continued from page 6

A horn on the outside of the trailer is connected to the primary crash circuit and when it blows — the alert crew goes. In order to meet the three-minute limit the alert pilot gets the details of the emergency after he becomes airborne.

If the aircraft in distress intends to land at Perrin, the alert chopper orbits about a half mile off the approach end of the runway in case the emergency aircraft lands short. If there is a crash or bailout beyond Fire Suppression Kit range, i.e., 15 miles, the alert chopper returns to the pad, drops off the Kit, exchanges one crash-rescue technician for a flight surgeon or medic, refuels if necessary, and proceeds to the scene.

Because Perrin AFB is very close to Lake Texoma (one of the largest artificial lakes in the U.S.) and the GCA and ILS approaches pass directly over the lake, water rescue has a big priority.

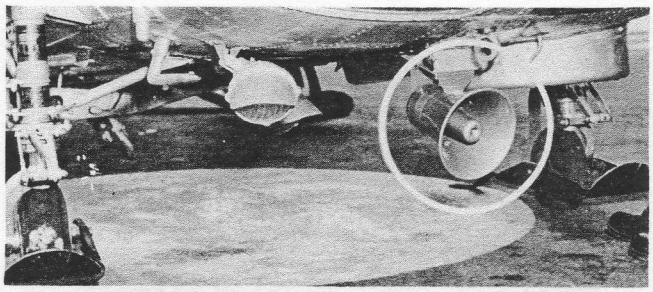
In the winter time the rescue practices are simulated but during the warmer months the crews keep in practice by making actual water pickups.

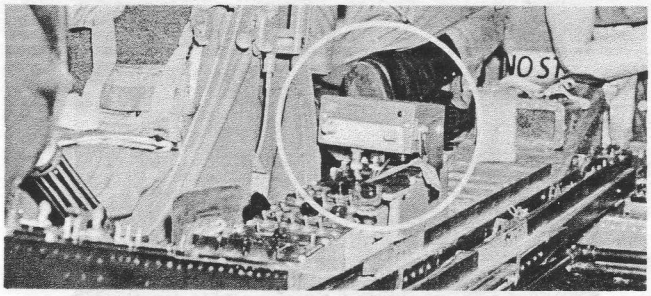
Drift markers, parachute flares, life preservers, and a one-man life raft are carried in the helicopter at all times and a six-man life raft is kept handy in the alert trailer. The unit also has a working agreement to assist the U.S. Corps of Engineers at Lake Texoma, in some of their emergencies, such as boating accidents.

Last November the alert crew was called into action when four teen-age youths overturned a boat. When the helicopter arrived at the scene the crew found three boys clinging to the boat and the fourth swimming toward shore. One of the firemen tossed a six-man raft to the three clinging to the boat, jumped in after it, inflated it, and hauled the youths aboard. In the meantime, the helicopter went after the one who was swimming and picked him up in the sling.

Another occasion when the alert crew was called into service was following a flash flood near Broken Bow, Okla., on a Sunday afternoon last July. A fisherman took refuge in the top of a tree to escape the fast rising waters. Rescue attempts by nearby spectators were thwarted by rushing water and debris. After the man had been in the tree seven hours the Oklahoma Highway Department requested help from Perrin AFB. Upon arrival at the scene, the helicopter hovered near the tree top while firemen demonstrated to the fisherman the correct way to don the sling. Then the man was lifted into the helicopter and taken to Broken Bow.

WATER RESCUE—In order to be ready for any eventuality, alert crews at Perrin practice actual water pickups at Lake Texoma during warmer months. Practice in winter time is simulated. (USAF photo)



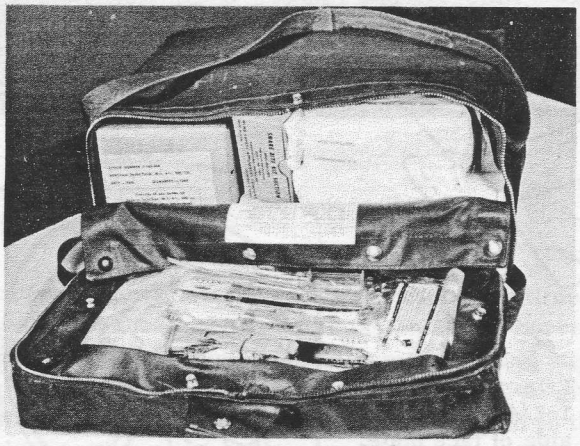


AUDIO AMPLIFIER

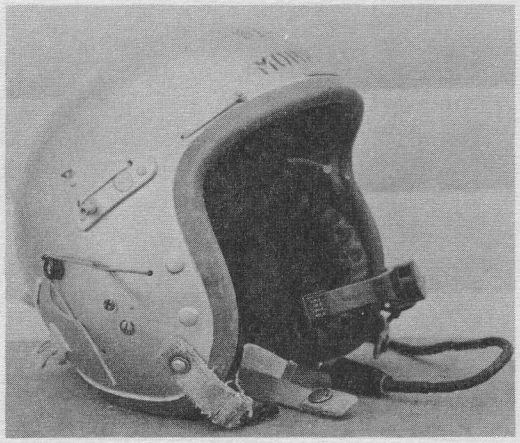
A small transistor amplifier is installed in the H-43A helicopters at Perrin AFB which permits the pilot to talk to people on the ground. The type of equipment used is a 20-watt GE Mobile Audio Amplifier, Model 4EA12A10, modified for an aircraft electrical system. This equipment draws 5 amps at full power and weighs slightly over seven (7) pounds. The amplifier is connected to an external speaker, Model 4EZ6C1. The amplifier circuit is tied into the interphone circuit of the helicopter so that the pilot can speak through the system merely by turning it on and depressing the microphone switch. Power is obtained from the 24-volt outlet on the left side of the console. The position of the speaker does not interfere with the operation of either the flood lights or the landing light. Work of perfecting this means of communication is still underway. (USAF photo)

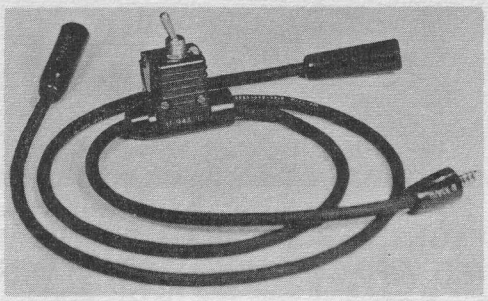
THE INFORMATION ON THIS AND THE FOLLOWING PAGES IS FURNISHED FOR PLANNING PURPOSES ONLY AND IS NOT TO BE CONSTRUED AS AUTHORITY FOR MAKING CHANGES ON AIRCRAFT OR EQUIPMENT WITHOUT PROPER PERMISSION FIRST BEING OBTAINED. THE PROGRAM AT THE PERRIN HELICOPTER UNIT HAS BEEN CONDUCTED UNDER THE DIRECT SUPERVISION OF THE OFFICER IN CHARGE AND, OF COURSE, CHANGES OR MODIFICATIONS WHICH DID NOT FALL WITHIN THE SCOPE OF HIS DISCRETION WERE AUTHORIZED BY HIGHER AUTHORITY. ROTOR TIPS WILL WELCOME SIMILAR CONTRIBUTIONS FROM OTHER ORGANIZATIONS AS A MEANS OF AIDING THE RESCUE EFFORT... Ed.

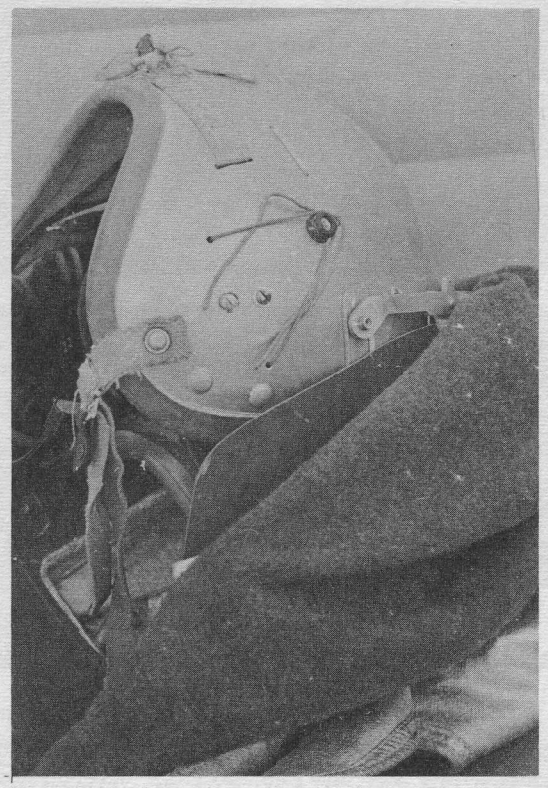
MEDICAL KIT



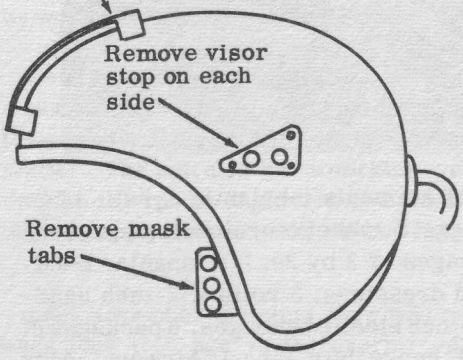
Developed to fit into the compact interior of the H-43A, this medical kit was adapted by the Air Training Command for use in all the H-43 units in the command. All of the medical items considered necessary, including blankets, were put into one package which would double as a seat for one of the crew. The kit is made of water-proof material, the inside is padded and a separate compartment provided for the small items. Contents include: 2 blankets, 2 sheets, 1 roll adhesive tape, 6 eye dressings, 2 rolls of 3-inch bandages, 1 box of ammonia inhalants, 2 rolls of 2-inch elastic bandages, 2 rubber tourniquets, 1 package of 4 by 4s, 2 packages of 2 by 2s, 6 triangular bandages, 4 large field dressings, 3 rolls of 2-inch bandages, 2 rolls of 3-inch elastic bandages, 6 packages of vaseline gauze, 1 snake bite kit, 1 Airway. Also included for use by medical personnel only are: surgical kit, trachea tube, 19 gage needle syringes, epinephrine solution, dextran injection solution. (USAF photo)



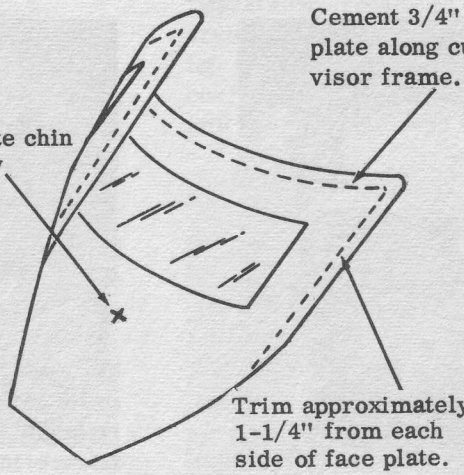




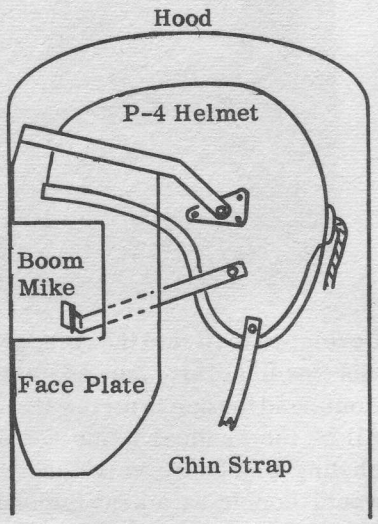
As a means of providing easy communication between the pilot and two firemen while in flight, inventive personnel came up with this combination made by modifying the fire-fighting hood and P-4 helmet for use with the interphone extension, also modified. The helmet serves as a liner for the hood and the pilot has 2-way communication with the firemen until they leave the aircraft. The hood is quickly detachable in the event it is not required. Experience has shown the combination of hood and helmet to be of considerable help on a mission for the situation can be discussed and a decision made as to the method of attacking the fire before the helicopter touchdown. The importance of this advance planning was shown in the prompt action taken when the F-102 crashed. (USAF photo)



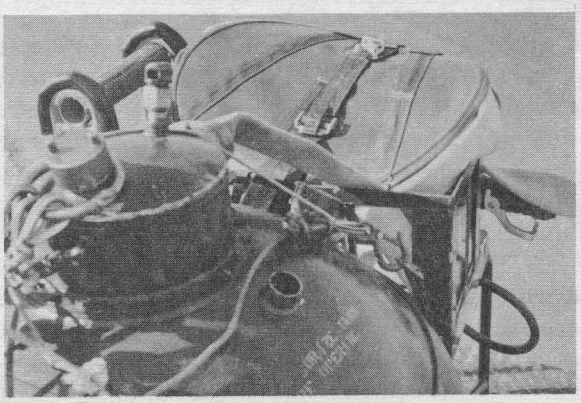
MODIFICATION OF P-4 HELMET FOR USE WITH FIREMAN'S HOOD

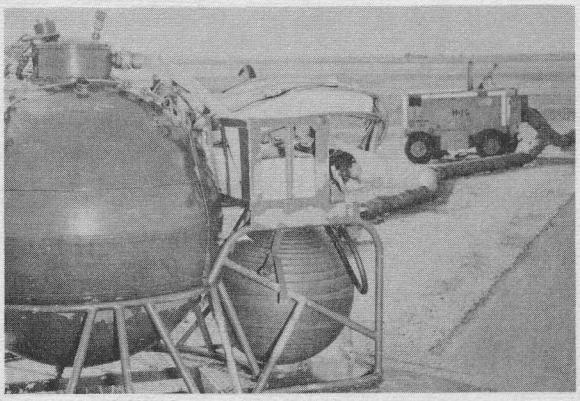


MODIFICATION OF FIREMAN'S FACE PLATE FOR USE WITH P-4 HELMET



ASSEMBLED VIEW OF FIREMAN'S HOOD, FACE PLATE AND P-4 HELMET



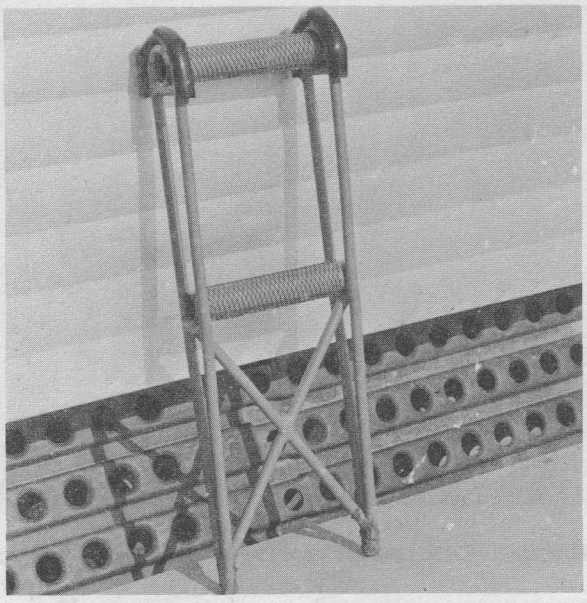


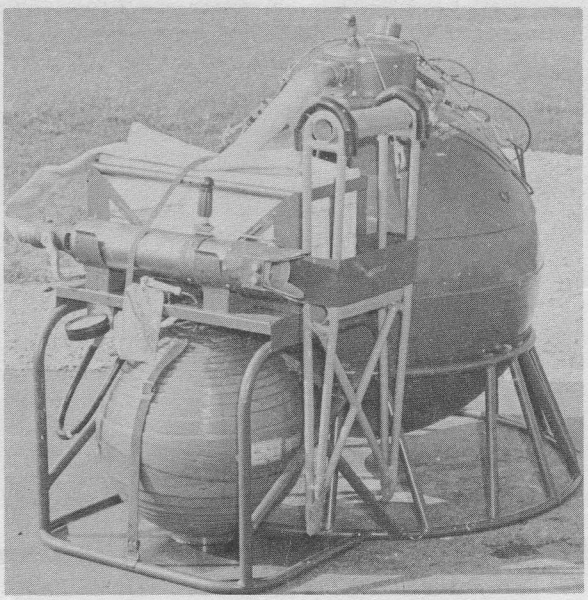
20 SECOND SAVER

Purpose of this hose carrier is to reduce the time it takes to get the FSK into commission. The carrier is made of heavy duck or similar material and steel wire is inserted around the edge of each half to give it some rigidity. Two rows of hose are placed in the basket in the usual manner and the remainder is rolled up into a double doughnut and placed in the carrier which is secured to the top of the basket with a strap and quick release buckle as shown. No special technique is involved in putting this into operation. If the Fire Suppression Kit is more than 75 feet from the fire, the nozzle man merely runs until he feels the pull on the hose, which indicates that all of the hose is out of the basket. At this point the nozzle man drops the carrier with the hose in it and takes up his position; at the same time the rescue man turns on the valve. The pressure of the agent will automatically unroll the rest of the hose. If the FSK is set down fairly close to the fire, the nozzle man may have to angle out before dropping the carrier. This carrier has been used on every practice fire for the past year and at no time did the hose get fouled up. Users found that this system cuts 15-20 seconds from the normal time to get the FSK into operation.

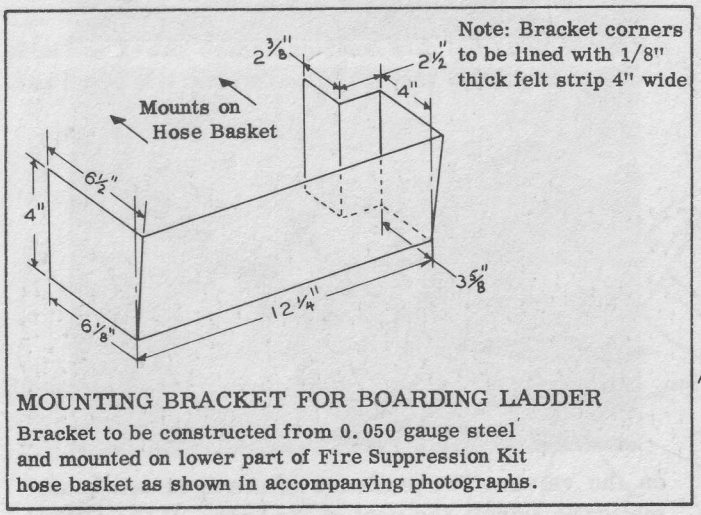
Practically no additional weight was added to the helicopter by the canvas carrier which is presently being evaluated by Air Rescue Service. Holding the hose carrier and nozzle is TSgt. George A. Payne, who received the Air Force Commendation Medal for jumping from the helicopter into Lake Texoma to help rescue three youths. (USAF photo)

BOARDING LADDER





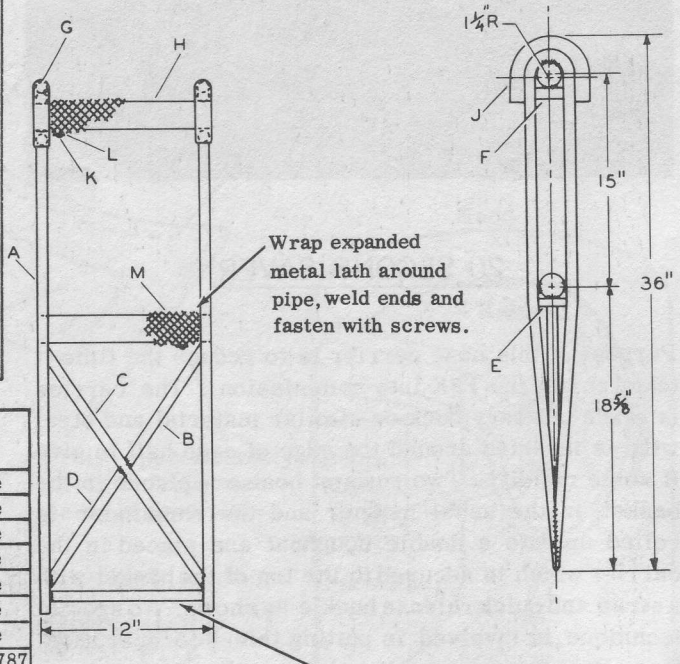
This special ladder, designed by Perrin helicopter men, weighs about five pounds and is attached to the Fire Suppression Kit by a simple bracket mounted on the side of the hose basket. In order to save weight it was kept as light as possible, consistent with strength. It is made of aluminum tubing and is symmetrical so that either side can be placed against the aircraft. The rungs are made of 2-inch tubing covered with expanded metal lath to insure non-skid footing and the top of the ladder is built up to hold the top rung away from the aircraft for a more firm footing. The ladder shown was the first made, later ones were lengthened about three inches and an extra piece of tubing was put across the bottom where the side pieces are welded together to keep the ladder from working too deeply into soft ground. The ladder was made under the assumption that if an aircraft lands off a prepared surface, the landing gear will be collapsed; it is of sufficient length for F-102, F-86, T-33 aircraft. (USAF photo)



MOUNTING BRACKET FOR BOARDING LADDER

Bracket to be constructed from 0.050 gauge steel and mounted on lower part of Fire Suppression Kit hose basket as shown in accompanying photographs.

Note: Fasten rubber hose to ladder with rubber-to-metal cement after splitting hose.



Sym.	No. Req.	Stock Size	Material	Spec. No.
A	2	3/4 O.D. x .049 x 74"	5052-0	4710-278-8746 Tube
B	1	3/4 O.D. x .049 x 9-1/4"	5052-0	4710-278-8746 Tube
C	1	3/4 O.D. x .049 x 19-1/4"	5052-0	4710-278-8746 Tube
D	1	3/4 O.D. x .049 x 9-3/8"	5052-0	4710-278-8746 Tube
E	2	3/4 O.D. x .049 x 1-7/8"	5052-0	4710-278-8746 Tube
F	2	3/4 O.D. x .049 x 2-5/8"	5052-0	4710-278-8746 Tube
G	2	3/4 O.D. x .049 x 11"	5052-0	4710-278-8746 Tube
H	2	2 O.D. x .049 x 12"	5052-0	UNK. Tube WW-T-787
J	2	3/4 I.D. x 1/8 x 11"	Rubber Hose	
K	4	AN530-10-12	Screw	Steel
L	4	AN960C10	Washer	Steel
M	2	3.4 lbs. per sq. yd. Sm. Mesh	Exp. Metal	

BOARDING LADDER-APPLIES TO F-102, F-86, T-33

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on field assignment

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Myrtle Beach, S. C.
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Enid, Okla.
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Portland Int'l AFB
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Limestone, Maine
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R. W. Spear, Asst. Supervisor, Training