SECTION G - NARRATIVE OF ACCIDENT

ARRATIVE ACCOUNT OF INVESTIGATION (Use format shown in "Reporting Procedures", AR 95-5. Use continuation sheets as necessary.)

1. GENERAL: The president of the accident investigation board, MAJ, Paul D Smith Jr, was notified of the accident at 0800 hrs, 3 July. The members of the board were assembled, and departed for Chu Lai at 0930 hrs. The accident investigating board arrived at the scene of the accident at 1030 hrs, 3 July. The bodies of the three crewmen had been recovered prior to the Boards arrival. The aircraft recovery operation was in progress. The main cabin, which had been upside down in 15-20 feet of water, had been righted, and towed into shallower water. The main rotor and other sections of the aircraft had not been disturbed.

2. IDENTIFICATION: Aircraft serial number 67-17694, a UH-1H, was assigned to B Troop, 2d Sqdn, 17th Cavalry. The aircraft had been flown a total of 387 hours. The fifth Periodic Inspection was completed on 2 July, and the aircraft was on a test flight when the accident occurred. The test pilot was CW2 Robert W Holditch, W . Assisting on the test flight was the senior maintenance supervisor, SFC Donald L Tovey, E , and a UH-1 helicopter mechanic, SP4 Thomas J Schneider, E . Aircraft departed from Chu Lai to the south on the test flight. About 2015 hrs CW4 Thompson, the 333d TC Det maintenance officer discovered the aircraft was missing. A search was initiated. The wreckage of the aircraft was found at 0610 hours, 3 July, at coordinates BT 460166, about 6 nautical miles north north-west of Chu Lai, RVN. The wreckage was 200 feet off shore in 15-20 feet of water. All three crewmembers were killed. The bodies were recovered about 0830 hrs. The aircraft was recovered by a Navy LCT about 1500 hrs. The aircraft was unloaded from the LCT onto the dock at 1630 hours. The accident investigating board examined the aircraft at dockside.

3. INVESTIGATION: The impact forces encountered on contact with the water caused the floor and longitudinal support members to shear at station 122. (See Photos 1, 2, and 3) The anti-torque pedal control tubes were sheared with the pedal in the full right position. Impact forces caused the console to break right and down. (See Photos 4 & 5) The FM radio was on and turned to the Troop FM frequency. All radio selector switches were on "PVT". The UHF and VHF radios were off. All other switches were in normal operating position. (See Photo 6) All pedestal and console lights were on full bright except the engine instruments, which were on dim. The DC selector switch was in the "STBYGEN" position. The anti-collision light was off, and position lights were on "Steady-Dim". The right door post was heared at the top and bottom. The left door post was present (See Photo 8). Instrument readings were taken at dock side, 3 July 1969 and the next morning, 4 July 1969. The readings varied considerably in the 12 hour period. The altimeter was set at 29.55. This is 90 feet below settings of 29.64 reported at 1948 hours, 2 July 1969. Due to immersion in salt water for 19 Hours, and the forces exerted in recovery and unloading the aircraft, the instrument readings are considered unreliable. The transmission oil temperature guage in Photo # 9 that indicates 120° C at 0800 hrs, 4 July, indicated 40° C at 1700 hours, 3 July. The force of the water against the top of the exhaust pipe and cowling bent the exhaust pipe down from top to bottom (See Photo 10). On the mast assembly the rod push-pull rod connecting the scissors lever to the mixing lever was broken at the mid-way point (See Photo 11), the white push-pull rod was intact, showing evidence of extreme torsion along the longitudinal axis of the bolt that affixes the push-pull tube to mixing lever. The upper end of the push-pull tube is shown in photo # 12. The end of the bolt with nut and safety intact are clearly depicted. The milled collar in the swashplate [illegible] from the bottom of the [illegible] to the tip showed evidence of [illegible] at tip, and was broken downward 4 feet 3 inches from the inboard end of the blade.

The (white) main rotor blade pitch change horn was ripped from the blade, and the (white) blade had rotated 180° (See Photo 14). The mast showed evidence of a severe mast bump on the same side, and in line with the longitudinal axis of the (white) main rotor blade. (See Photo 15). The (white) main rotor blade shows evidence of striking the tail boom. There are several gouges, scratches, and considerable OD paint on leading edge of the (white) blade beginning 148¼ inches inboard from the blade tip (See Photos 16, 17, & 18). The tailboom was broken from the fuselage at station 260. The verticle fin was broken from the tail boom vicinity station 425. The metal from the left side of the tailboom from station 410 to station 425 is missing. The rear of the tailboom shows scrape marks near the tail rotor drive shaft at station 380, and the scrape marks extend down the left side of the tailboom to station 410 (See Photo 19). The trailing edge of the right synchronized elavator is bent down at a 30° angle, and there is a fracture 11 inches from the tip (See Photos 19 & 20). The bottom of the vertiole fin shows evidence of a 4 inch deep compression dent from bottom to top station 440 (See Photos 21 & 22). The tail rotor blade tip struck the vertiole fin, causing only a slight burr on the tail rotor blade tip (See Photos 22 & 23). The tail rotor blades were not other wise damaged. Inspections of the 42° and 90° gear box revealed that both were funotioning properly.

Preliminary investigation in the B Troop area revealed that the aircraft completed the 5th periodic maintenance inspection the evening of 2 July. All personnel who assisted in the inspection and the last pilot to fly the aircraft prior to the periodic inspection were questioned.

CW4 Thompson, Maintenance Technician, 333d TC Det, was closely associated with CW2 Holditch. CW4 Thompson's experience in aviation, and the fact that he and CW2 Holditch lived in the same tent add validity to his observations about CW2 Holditch's physical condition. CW4 Thompson, also expressed a plausible explanation of why the accident occurred. He states that he saw what appeared to be a parachute in the water. Two other witnesses saw something in the water and believe it to be pieces of soundproofing material from the aircraft. The beach was searched four times on two consecutive days, and several pieces of the aircraft and one pair of fatigue pants were washed ashore. No evidence of a parachute was found. A specific search was make early on 4 July around the crash site for evidence of the fabric objects seen near the crash. No such objects were found.

The Periodic Maintenance inspection performed on the aircraft was the first periodic performed at Chu Lai. Here-to-fore intermediate inspections were performed at Chu Lai, and periodic inspections were performed at Camp Eagle. B Troop moved the necessary personnel of the 333d TC Det from Camp Eagle to Chu Lai to perform the periodic inspections there, saving two hours blade time by avoiding the flight to Camp Eagle and return flight to Chu Lai.

The 5th periodic inspection was performed in one day. Normally a periodic inspection requires more than one day. However, the time taken to perform the inspection depends on the condition of the aircraft, and the number of personnel allocated to perform the inspection. There were eight helicopter mechanics, one UH-1H crewchief, and the door gunner working on the aircraft during the inspection. One of the mechanics, SP4 Schneider, was killed in the accident. Two technical inspectors were involved in the quality control aspect of the inspection. SSG Schall, Senior Technical Inspector and SP6 Webb who was a CH-34 crewchief. He attended an 11 week Technical Inspector Course on the UH-1 at Ft Eustis, Va. He was assigned to B Troop on 22 June 1969. SP6 Webb performed the Technical Inspection of the aircraft. SSG schall checked his work, except he did not check the mast assembly, engine, or transmission. The periodic inspection worksheet and the log book were aboard the aircraft when it crashed and neither was recovered. Questioning of personnel who performed the inspection did not reveal any grounds to suspect that the inspection was not properly performed.

SECTION G - NARRATIVE OF ACCIDENT

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The diver who recovered the bodies from the aircraft was a helicopter pilot, CW2 Kenneth H Fritz, W , 176th Avn Co, 14th Group. The board attempted to get CW2 Fritz' statement on 4 July, but he could not be located. His statement was received by mail on 21 July 1969. The wreckage diagram submitted by CW2 Fritz, the diver who recovered the bodies, differs from the wreckage diagrom drawn by members of B troop. CW2 Fritz observed the wreckage from a boat, and while swimming under water, which limits his perspective. The wreckage diagram, Exhibit E, was prepared from four diagrams drawn by independent observers. One was a SP4 from the 335th Maint Co who assisted in rigging the aircraft for recovery. His sketch of the wreckage pattern, based on underwater observation of the wreckage, agreed with the three wreckage sketches prepared by members of B Troop, all of whom observed the wreckage pattern from the air. The FM radio found ahead of (NW of) the fuselage supports the fact that the aircraft was flying an azimuth 135° with relative high forward speed when it crashed. The person in the left seat with the cyclic in his hand was SFC Tovey. The cyclic was struck from the rear 3 inches above the floor, probably by the lower seat bar, and broken loose. The leather hand strap on the door was also broken, and had not been reported as broken before the crash. This indicates that SFC Tovey was not on the controls, but may have grabbed the cyclic just prior to impact. Such a reflex action would be instinctive for anyone familiar with helicopter flight controls and facing impending disaster.

During the investigation the board had difficulty locating the oil samples taken during the Periodic Maintenance Inspection. The oil samples from the 42° gearbox and 90° gear box were located by questioning each mechanic. These oil samples were in a mechanics tool box in the maintenance area. The oil samples for the engine and transmission were finally located on 6 July in a 7.62 mm ammo can belonging to SP4 Schneider, deceased. The ammo can contained assorted small tools, and was aboard the aircraft when it crashed. The lids were off the oil sample bottles and the oil samples were lost. The oil samples taken during the periodic inspection from the 42° gearbox 90° gearbox were submitted for analysis. Oil samples were taken by the board from the engine and transmission on 4 July and submitted for analysis.

All aircraft parts that may have failed in flight have been submitted for analysis. The parts submitted were the engine, transmission mast assembly, main rotor hub, hydraulic servos, and irreversible valve assembly. All engine instruments, airspeed indicators, and rate of climb indicators were submitted for the purpose of determining the impact reading, if possible.

Examination of engine revealed that the N2 turbine blades were shattered. The transmission case was cracked from top to bottom on the right side, and the short shaft was frozen and could not be turned. Analytical teardown of the parts may determine if any mechanical failure occurred.

ANALYSIS: It appears that sufficient skilled personnel were assigned to properly perform the periodic inspection in one day. There was no clearly defined quality control procedures during the periodic inspection. SP6 Webb states that SSG Schall checked his work. SSG Schall stated that he only signed off the internal and external panels, and tail rotor cable. He did not TI the engine, transmission, or main rotor mast assembly. There is no evidence of improper maintenance, or of improper technical inspection. Statements indicate that CW2 Holditch and SFC Tovey normally gave an aircraft a thorough pre-flight inspection prior to the test flight. There is no evidence that the pre-flight inspection was not adequate, however, both CW2 Holditch and SFC Tovey had been working approximately 13 hours, had eaten supper less than one hour before, and were test flying a low - hour aircraft with a good maintenance history.

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SECTION G - NARRATIVE OF ACCIDENT

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The fact that a good pre-flight inspection was make cannot be substantiated, and pilot complacency cannot be ruled out. The position of the DC generator selector in the "Stand-By" position, and the inverter switch in the "spare-inverter" position, could be the result of poor cockpit procedure prior to take off. These switches may have been placed in this position as part of the test flight, or because of a mechanical failure in flight.

The Investigating Board cannot determine any reason for leaving radios - intercom selector switches on the "PVT" position. This was not CW2 Holditch's normal procedure. Chu Lai Towers, both Chu Lai East and Chu Lai West, operate on UHF. All radios were checked on the PE, and operational. The UHF radio should have been on, and tuned to one of the Chu Lai Towers. The fact that the UHF radio was off, and the control selectors were set on "PVT", are deviations from normal procedures and indicate poor judgment, poor flying habits, and pilot complacency. CW2 Holditch received his last proficiency check ride in the UH-1H on 14 April 1969.

The pilot was flying under conditions that could easily induce vertigo and spatial disorientation. The aircraft was over water, at twilight, with all console and pedestal lights on bright, except the engine instruments, which were dim. The aircraft crashed in an area where helicopters normally descend to an altitude of 300 feet or less when landing south at Chu Lai.

The possibility of mechanical failure cannot be ruled out at this time. The destruction of the N2 turbine blades may have been caused by a failure of the number 3 or 4 bearings. A failure of the irreversible valve or hydraulic servos may have induced an uncontrollable condition. Analytical tear-down of these components should identify any mechanical failure that occurred

Examination of the wreckage indicates that aircraft was flying from north to south. The stinger and tail boom struck the water first causing the compression dent in the tail boom. A tailboom strike of this nature could be caused by a sudden rearward movement of the cyclic. The sudden rearward movement of the cyclic would be instinctive if a pilot suddenly realized he was extremely low. Analysis of the damaged parts indicates that after the tail boom strike, the tailboom rebounded into the air, inducing a severe mast bump that snapped the mast at the main rotor head. The (white) main rotor blade hit the tail boom an instant after snapping the mast, or at the same time. The main rotor blade severed the tail rotor drive shaft, severed the verticle fin from the tailboom, and broke the tailboom from the fuselage. The force of the strike apparently knocked the vertical fin and tailboom down and to the right, into the water. The fact that the tail rotor was not damaged would indicate that the tail rotor drive shaft had been severed, and there were no torque forces on the tail rotor when it hit the water.

The fuselage hit the water in a right nose low attitude. The severe structural damage incurred on impact indicates a relative high forward airspeed. The main fuselage came to rest upside down on the ocean floor about 50 feet from the verticle fin and tailboom. The main rotor carried on coming to rest about 50 feet beyond the fuselage.

SP4 Schneider was appearently not wearing a seat belt. His body was found outside the aircraft. All seat belts and attaching rings were examined, and none showed any elongation, stress, or breakage, that would indicate impact forces tore him loose.

SUMMARY OF TECHNIC... ...ORT OF ... 95-5 and AI ... | REPRODUCED AT THE NATIONAL ARCHIVES | ...IT | REPORTS CONTROL SYMBOL CSFOR-5 (R1)

FINDI... AND RECOMMENDATIONS

1. FINDINGS

a. ESTABLISHED CAUSE FACTORS

NONE

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b. PROBABLE OR SUSPECTED CAUSE FACTORS

Pilot suffered spatial disorientation and flew into the ocean.

Material failure of #3 or #4 turbine shaft bearings.

Pilot was fatigued, and his mental alertness was marginal.

c. NONRELATED FACTORS

Improper pre-takeoff and inflight cockpit procedures.
Oil samples taken for analysis were not properly controlled, nor turned-in expeditiously.

2. RECOMMENDATIONS (*Recommended Corrective Actions in Order of Importance*)

1. That all pilots be informed of the improper emergency planning aspects of this accident. Radios should be set for immediate transmission.
2. That all pilots be briefed on the effects and the danger of spatial disorientation when flying over water.
3. That commanders closely monitor the actual duties performed by aviators and insure that adequate time is provided for rest and relaxation.
4. Establish positive control over the oil sample analysis program to insure that oil samples are properly handled and expeditiously turned-in. (cont'd)

BOARD MEMBERS (*Signature, Grade, Branch and Rating*)

PRESIDENT PAUL D SMITH JR, MAJ, ARM, 3-3	MEMBER LESLIE J HEFFLER, MAJ, TC, 3-2
ADDRESS AND TELEPHONE NUMBER HHT, 2/17th Cav, 101st Abn Div	MEMBER
RECORDER GEORGE M REIMER, 1LT, FA, 3-3	MEMBER
ADDRESS AND TELEPHONE NUMBER A Trp, 2/17th Cav, 101st Abn Div	MEMBER
MEMBER LAWSON E MC CLUNG, CPT, MC	MEMBER

REVIEWING OFFICIAL

STATEMENT OF REVIEWER WILL INCLUDE CONCURRENCE, NON-CONCURRENCE, AND CORRECTIVE ACTIONS TAKEN

Concur with the findings and recommendations. Statements contain much conjecture with no supportable foundation. At this time there is no conclusive evidence indicating any specific cause factor. This will be reviewed upon receipt of reports of analysis of the power train components. Until such time as definitive cause factors can be identified the following action is being taken:

1. All aviators are being advised of the necessity for having all communications equipment operating at all times.
2. Test pilots are required to monitor troop FM frequencies at all times.
3. Although it is not considered to be a factor in this accident, maintenance teams are being instructed as to each man's specific duties.

DATE	GRADE, BRANCH, RATING & ORGANIZATION	SIGNATURE
5 Aug 69	WILLIAM W DELOACH, LTC, Armor HHT 2/17th Cav, 101st Abn Div	William W DeLoach

APPROVAL AUTHORITY

REMARKS OF APPROVING AUTHORITY

1. The findings and recommendations of the accident investigation board, as clarified by the appointing authority are approved.

2. Corrective actions are adequate.

DATE	GRADE	SIGNATURE
	Brigadier General USA	ALLEN M. BURDETT, JR, Aviation Officer

DA FORM 1 JUN 66 2397 REPLACES DA FORM 2397, 1 APR 61, WHICH IS OBSOLETE FOR OFFICIAL USE ONLY PPC-Japan

TECHNICAL REPORT OF U.S. ARMY AIRCRAFT ACCIDENT

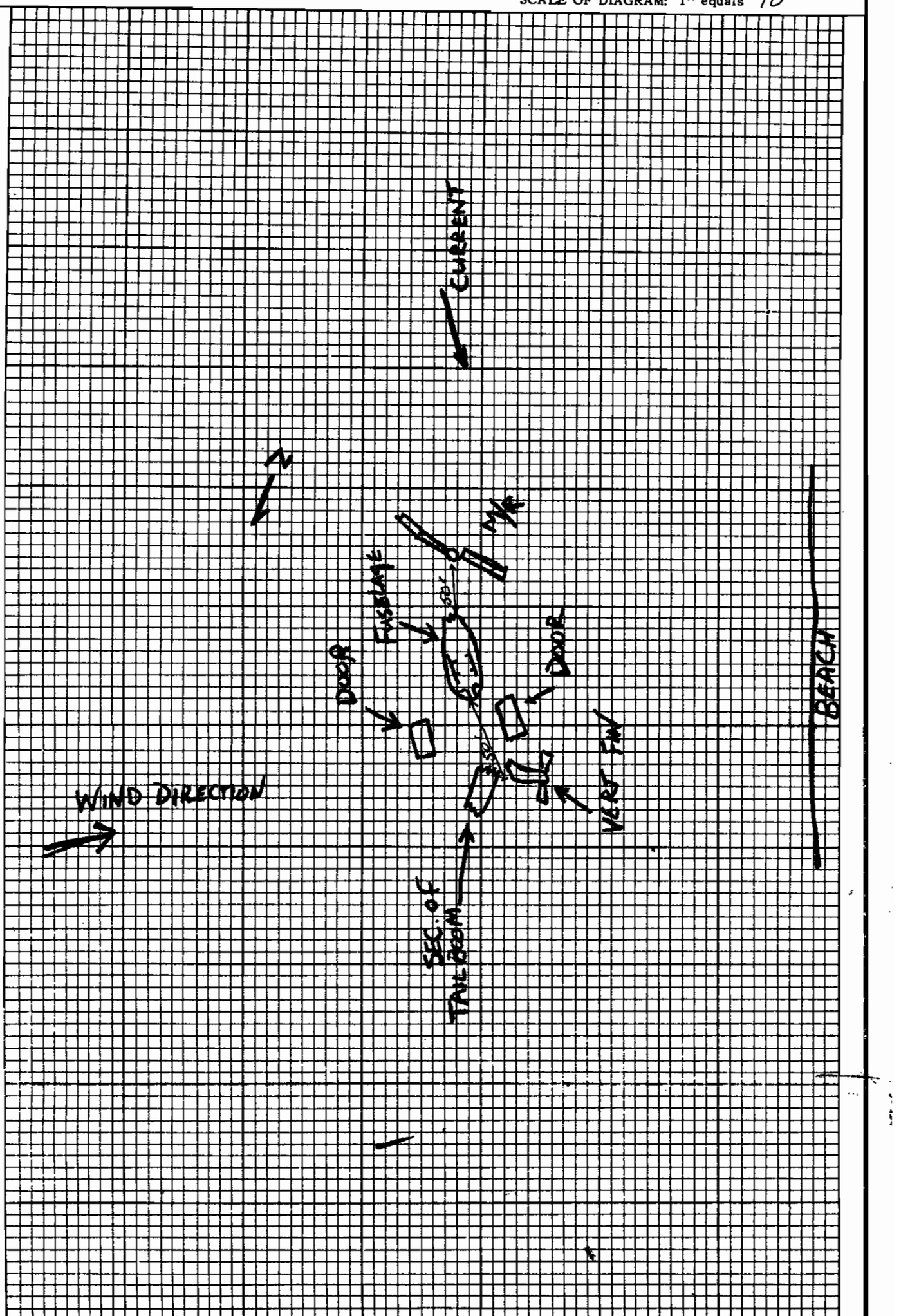
PART I *(Continuat*
(AR 95-5 and AR 385-40)

REPORTS CONTROL SYMBOL
CSFOR-5(R1)

SECTION I - WRECKAGE DISTRIBUTION

Show principal ground impact points and distribution of wreckage. Indicate distance, direction of north, direction of wind, wind velocity, position of witnesses, etc.

SCALE OF DIAGRAM: 1" equals 10'



DA FORM 1 JUN 66 2397-5

REPLACES DA FORM 2397-5 DATED MAR 67, WHICH IS OBSOLETE

EFFECTIVE 1 JAN 67

FPO-Japan

S T A T E M E N T

I, WO1 Kenneth H. Fritz, W , am familiar with the provisions of Article 31, MFCM, 1969, and would like to make the following statement.

On the morning of 3 July 1969, I recovered the crewmember bodies from aircraft 67-17694, which crashed 2 July 1969. The aircraft was in twenty feet of water approximately one hundred meters from the shore. It's heading was parallel to a southerly heading along the beach. The ship lay on its left upper roof edge, skids in the air. The "door post" behind the right pilot's door was missing completely and the roof slightly squashed in front. The pilot's doors were both missing. I later found them in the near vicinity, but can ot say exactly where. Both pilot's seats were ripped from the floor, tracks included, but held inside the cockpit by the pilot's seat belts. Both seats were twisted towards the center floor console and it was necessary to cut the lap belts and shoulder belts of both pilots to extract them. The right seat pilot and his seat were removed before the body was removed from the seat. The left seat was manuevered by one diver while another pulled its occupant free after cutting the belts. Neither pilot seemed to be injured externally. The left seat pilot or the right seat pilot had a cyclic in his hand as he was removed, but I do not recall which. Both were not on the controls. Only one was on the controls when I extracted their bodies. Both men had wide open mouths and startled (frightened?) expressions on their faces and open eyes. I pried the right cargo door off, as it was badly sprung anyway, and removed the radio from the compartment on that side. I found the UHF radio in the nose hatch and FM radio 8 to 10 meters ahead of the ship in the sand. The tail boom and vertical fin were 25 to 30 meters further to the southeast, with the miscellaneous cargo (-20, M-60 gun, tool box, etc.) strewn in between. The tail boom separated from the main cabin section approximately 8 to 10 inches aft of the tail boom attaching bolts. The vertical fin, including both tail rotor drive gearboxes and the tail rotor assembly, separated from the tail boom at a point between the anchor points of FM Homing Coops. The vertical fin and tail boom were twisted 180 degrees out of phase and attached by only the nav. light wires, chip detector light wires, and one of the tail rotor cables. I cut the wires and cable in order to salvage the vertical fin and the tail boom more easily. During the salvage of the three main sections (cabin, tail boom, and vertical fin) the rotor head and blades lay on the sea floor as a reference point. The head was approximately 5 meters from the main cabin with one blade intact and one bent almost ninety degrees upward toward the sea's surface. All loose pieces of the aircraft and its contents were collected and salvaged as a single load. The larger pieces of that load were the right door (the one I'd removed), the two front doors, the seat, and other loose pieces. The diagram attached shows the approximate relative positions of the pieces.//
////////////////////////////////END OF STATEMENT/////////////////////////////////////

Kenneth H. Fritz

KENNETH H. FRITZ
WO1, W

N.A

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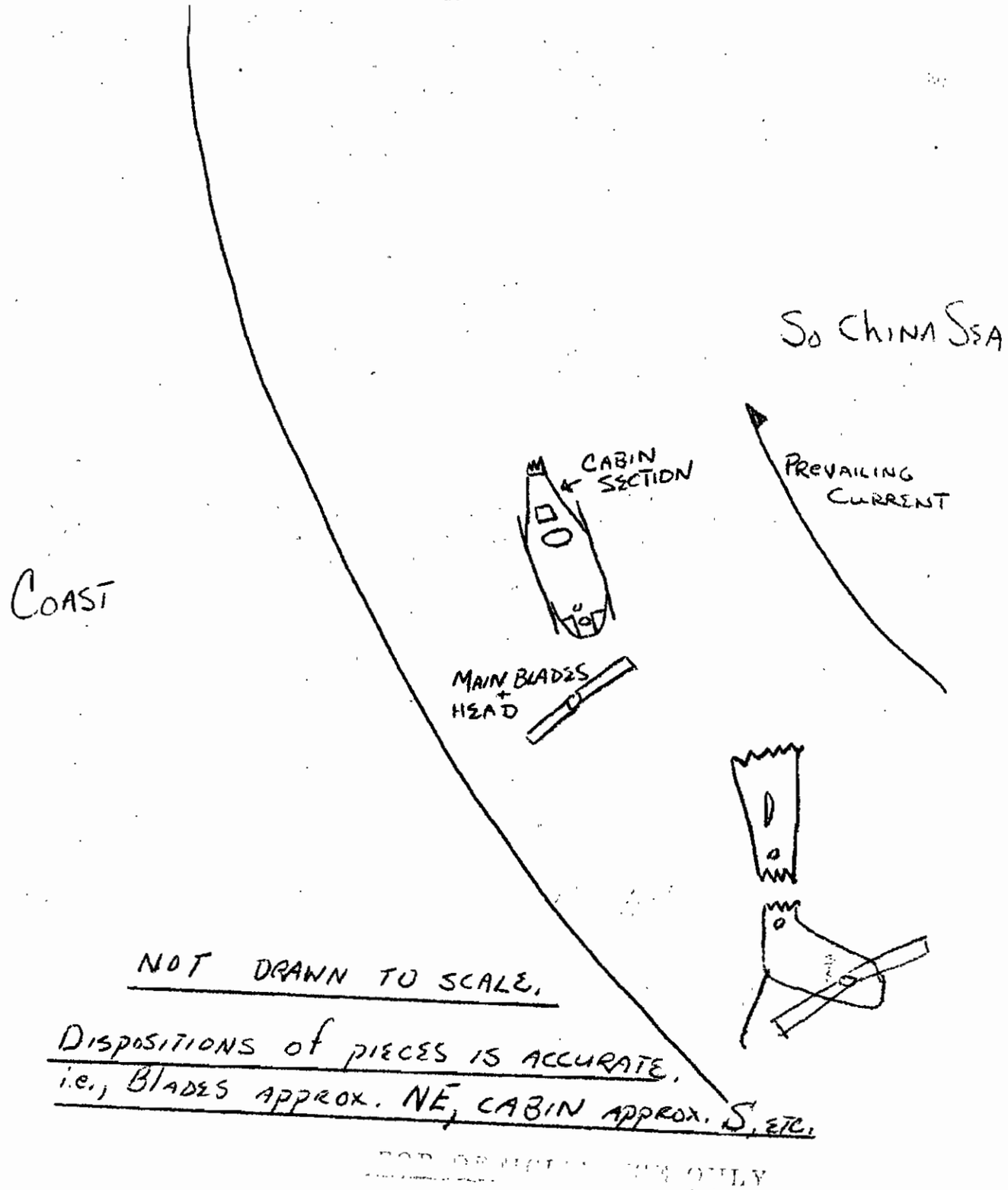

NOT DRAWN TO SCALE.

Dispositions of pieces is accurate.
i.e., Blades approx. NE, CABIN approx. S, etc.