

U.S. Department of
Homeland Security

United States
Coast Guard



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30 JUL 2009

MEMORANDUM

From: 
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COMDT (CG-01)

Reply to: CG-1131
Attn of: CDR J. L. Rebholz

To: Distribution

Subj: CHIEF OF STAFF'S FINAL DECISION LETTER REGARDING COAST GUARD
AIR STATION KODIAK CLASS "A" AVIATION FLIGHT MISHAP INVOLVING
HC-130H CGNR 1710 ON 28 JUN 2006

Ref: (a) Air Operations Manual, COMDTINST M3710.1 series
(b) Safety and Environmental Health Manual, COMDTINST M5100.47 series

1. SYNOPSIS. On 28 June 2006, CGNR 1710 departed Coast Guard Air Station Kodiak, AK, on a daytime logistics mission to deliver an empty 5,000 gallon fuel truck to the HH-60J deployment site on St. Paul Island Airport, in the Bering Sea. Upon arrival, the mishap aircraft executed an Instrument Landing System (ILS) approach to runway 36, which resulted in a missed approach. The mishap aircraft then entered holding for approximately 30 minutes. The mishap aircraft then executed another ILS approach to runway 36 touching down approximately 1859 feet from the approach end of the runway. After touchdown, the aircraft swerved left and exited the left edge of the runway approximately 3725 feet from the approach end and then paralleled the runway on the gravel shoulder for approximately 1000 feet. The mishap aircraft then swerved left again into the soft terrain next to the gravel shoulder and rolled to the right striking the ground with the right wingtip and #4 propeller. The #4 propeller departed the wing and was found 96 feet from the aircraft. The aircraft came to rest approximately 5900 feet from the approach threshold, 325 feet left of runway centerline and oriented 60 degrees left of runway heading. There was no fire. Nine Coast Guard personnel were onboard the aircraft, seven crewmembers and two passengers. The only injury was a bruise to the left knee of a passenger. The aircraft suffered extensive structural damage to the forward underside of the fuselage and right outer wing and wing tip. The nose landing gear collapsed and penetrated the interior of the aircraft, destroyed the avionics rack at fuselage station 245, and buckled the forward deck of the cargo compartment. Damage to the airport facility included: a runway light destroyed, a visual approach slope indicator display box and power/control assembly destroyed, an electrical power control box destroyed, and a partially buried concrete/steel post damaged and dislodged.

2. CLASSIFICATION. This mishap is classified as Class A flight mishap. The cost to repair the HC-130H is estimated at \$15 million and is beyond economical repair. The total cost of non Coast Guard damage is estimated at \$28,000.

3. CAUSAL FACTORS.

- a. The mishap crew (MC) made an unauthorized landing based on incorrect landing distance calculations. In accordance with the unit's Air Operations Manual, the MC should have applied a 1,000 ft correction factor for landing with a tail wind in excess of ten knots. In accordance with the HC-130H aircraft performance manual the MC should have also increased the touchdown speed required for the prevailing wind gust conditions. Both calculations would have resulted in the runway available being less than the landing distance required.
- b. The MC failed to follow standard procedures and heed associated warnings in the flight manual for retarding the engine throttles from the flight range to the reverse thrust range. The throttles were moved too rapidly, which combined with the high airspeed of the approach, caused the #3 propeller to pitch lock at 26 degrees blade angle, and the #4 propeller to remain in the flight range. This created an asymmetrical thrust condition since the engines on the left side of the aircraft were producing reverse thrust while the engines on the right side of the aircraft were producing forward thrust. The net result was a significant left yaw moment and swerve to the left.
- c. After the aircraft departed the paved runway surface, the MC failed to follow all of the steps for the emergency procedure for a directional control problem with the throttles in the ground range. Failure to place the engine throttles in the ground idle positions exacerbated the mechanical malfunctions manifested in casual factor (b).

4. ADDITIONAL FINDINGS

- a. The mechanical condition of the #4 propeller pitch lock regulator was found to be outside of acceptable tolerances, but that condition did not cause the mishap. The aircraft was airworthy and had adequate runway to come to a controlled stop if the crew had followed published policies and reacted in a procedurally correct manner to the directional control problem.
- b. Deficiencies were noted in the HC-130H training system with regard to documentation. In this case the habit patterns that were casual to this incident were known to the unit instructor pilots, but were not documented in training records or corrected through additional training.
- c. Imbedded throughout the analysis of the crew's decisions and actions is the pervasive notion that the MC did not effectively practice Crew Resource Management (CRM). Free and assertive communication during all phases of flight operations is critical for success and must originate from leadership example. It is also incumbent on each individual to be assertive enough to voice concerns. There were numerous examples of poor communication as the crew failed to diagnose propeller malfunctions, react with the proper emergency procedures and effectively communicate their coordinated actions to correct the loss of directional

control. It is understandable to assume that errors will be made under high stress situations, but that should only underscore the necessity to strive for perfection in effective communication as well as the embodiment of the other principles of CRM in all flight operations.

5. CORRECTIVE ACTIONS.

a. The following corrective actions from this incident have been implemented.

(1) On page 3-9 of the HC-130H Flight Manual, the Directional Control Problems with Throttles in Ground Range emergency procedure **BOLDFACE** items were changed as follows:

- | | |
|---------------------------------------|---|
| 1. THROTTLES | GROUND IDLE (P/CP) |
| 2. BRAKES | AS REQUIRED (P/CP) |
| 3. CONDITION LEVER | "FEATHER" (CP)
(If required)
(On command of the pilot) |
| 4. Reverse symmetrical engines | (P) |

(2) The following clarification was made to the Normal Landing section on page 2-57 to provide better guidance for the determination of delay between ground idle and reverse thrust: "Reverse thrust is applied by moving the throttles from **FLIGHT IDLE** to **GROUND IDLE**, verifying no swerve is detected, stating "reversing" and moving the throttles into reverse range in coordination with nosewheel steering."

(3) The normal landing discussion on page 2-57 in the HC-130H Flight Manual was changed to the following: "The yoke will normally be transferred to the co-pilot before the pilot moves the throttles into the ground range."

(4) The following information was added to the Instrument Approach section of the HC-130H Flight Manual, page 2-90: "Aircrews may consider early configuration to 100 percent flaps, including prior to the Final Approach Fix in some cases, to assist in a stabilized approach to landing. Each landing situation and time of configuration must account for winds, gross weight, ceiling, visibility, icing conditions, and missed approach procedures."

(5) The following Maintenance Procedure Cards were changed:

(a) 611000.2 PROPELLER BLADE ANGLE, INSP/CHECK: The following note was added after A. 3.c: "After adjustments are completed, the QA representative will review all blade angle settings in steps 1 through 3."

(b) 611000.0 PROPELLER ASSEMBLY, REM/INST:

1. The following sentence was added prior to existing verbiage on step B. 16: "Carefully inspect the pitch lock regulator condition prior to

installation. Pay particular attention to the condition of the o-ring lands and mating surfaces.”

2. QA REQUIRED (5) step was added immediately after step B. 19.c and remainder of the QA REQUIRED steps were renumbered.

- (6) The HC-130H proficiency course was modified to include:
- (a) Demonstration of a propeller pitch lock due to rapid throttle movement.
 - (b) Demonstration of a double propeller malfunction on landing.
 - (c) Demonstration of engine instrument indications of low pitch stop failure and propeller pitch lock due to rapid throttle movement on landing.
 - (d) Practice boldface Directional Control Problem with Throttle in Ground Range emergency procedure.
- (7) The following items have been approved by CG-711 and will be included in the next update to the HC-130H Flight Manual:
- (a) The Normal Procedures Descent Checklist crew briefing will be modified to include an established go-around point as follows: Change: “d. Missed approach intentions” To: “d. Missed approach intentions / Go-around point/Touch and Go point.”
 - (b) The following warning from page 2-55 of the HC-130H Flight Manual will be added to Section 2 under Flaps-Up Landing, Section 3 under Propeller Malfunctions, and Section 7 under Hot Weather Procedures: “At high true airspeeds and/or high ambient conditions with the throttles at flight idle, the propeller blade angle may be in the pitch lock range. The exact airspeed at which this occurs is indeterminate due to the many variables involved. At the higher airspeeds, abrupt movement of the throttles into the ground range could result in pitch lock.”
 - (c) The following warning from page 2-57 of the HC-130H Flight Manual will be added to Section 2 under Flaps-Up Landing: “The failure of one or more propellers to reverse may result in complete loss of directional control. After touchdown, if the throttles are moved into the ground range with a movement which is too rapid, it is possible to lose control of the airplane before the propeller malfunction can be detected. The movement from the flight range into the ground range should be made at a reasonable rate which will permit detection of a malfunction, such as a failure of the low-pitch stop to retract. At the first indication of directional control difficulties during reversing, immediately return all throttles to GROUND IDLE. Maintain directional control with flight controls, differential braking, and nose wheel steering, as required. After identifying the affected propeller, symmetrical propellers may be reversed and the affected engines shut down while it is in ground idle. Rudder, differential power, and brakes are the primary means of directional control. During the final stages of landing roll, reduce reverse thrust, if conditions permit, to prevent debris from causing restriction of visibility or engine damage.”

(c) The statement on page 2-57 that reads: "The minimum field length for a normal landing is the landing distance over a 50-foot obstacle using two symmetrical engines in reverse and maximum braking available for the existing runway conditions" will be changed to "The minimum field length for a normal landing is the landing distance over a 50-foot obstacle with all four engines in ground idle, and max braking available for the existing runway conditions. Normal landings should be planned as if reversing was not available. This should not preclude the use of reverse during the landing ground roll."

b. The following corrective actions are pending and shall be implemented.

(1) CG-711 shall task ATC Mobile to develop a standard process to document reported or observed performance issues of HC-130H pilots and aircrew in individual training records similar to processes in other CG aviation communities. This procedure should include identification, documentation, corrective action and Operations Officer notification. The HC-130H training and standardization program should continue to be brought into closer alignment with and strictly model the existing ATC Mobile and unit level training and standardization programs.

(2) CG-41, CG-711, and CG-1131 shall further evaluate the need for the incorporation of a visible indication of propeller blade angle movement into the ground range in the HC-130H cockpit.

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