OCCURRENCE REPORT: 67811

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FSIS 67811 16 NOV 1982 AIR ACCIDENT

Status: amended supplemental sent

D 211077 ED 16/NOV/1982 23:25 67811 CAR 12/APR/2005 15:35

Unclassified

Refs:

- A. Board of Inquiry CC130329 16 Nov 82
- B. National Aeronautical Establishment Report FRPC-547 09 Feb 83 (Notal)
- C. QETE Report D001382 21 Feb 03
- D. UCR CFB Edmonton D0127/2126FS 10 Dec 82
- E. AirCom Project Directive 83-3/CC130/AMT3-02 29 Mar 83
- F. UCR CFB Edmonton D0127/3083FS 25 Apr 83
- G. 4520-3 (CO 435 Sqn) 15 Jul 83
- 1. Injury Level: Black Fatal
- 2. Aircraft/Operated By: CC130329
- 3. Aircraft Ownership: 435 SQN / 17 WING / 3435 /
- 4. A. Location: 2000 FT EAST THRESHOLD RWY 29 EDMONTON, ALBERTA
- Latitude: N53-39

Longitude: W113-26

- 4. B. Date/Time: 162100Z NOV 1982
- 4. C. Phase of Flight: LOAD/UNLOADING AIRBORNE CARGO DROP, PARA DROP
- 5. Damage Level: Destroyed / missing
- 6. Personnel Injured: , AIRCREW, Black Fatal
- , OTHER NON-MAINTENANCE TRADES, Black Fatal
- , OTHER NON-MAINTENANCE TRADES, Black Fatal
- , AIRCREW, Black Fatal
- 7. Mission Type: PROFICIENCY NAV TRAINING XCOUNTRY

8. Description: The Hercules was on a Low Altitude Parachute Extraction System (LAPES) training flight. The load consisted of a low profile tandem platform weighing 30,000 lbs. The takeoff weight of the aircraft was 132,900 lbs. Enroute to the extraction zone, the crew completed all the prescribed checks to ready the load for the drop. With the aircraft configured for the final run-in, the "one-minute" warning was given. The landing gear was down, flaps set at 70 degrees, ramp door opened, and the left hand restraining locks on the dual rail system released. The drogue chute was deployed and the loadmaster confirmed "Good drogue". The aircraft commenced its descent to the extraction zone and crossed the release point in a descent to approximately 5 feet and 130 Kts. The co-pilot gave the command "Green-go" to drop the load. However, there was no load transfer from the drogue to the extraction chutes nor was the drogue chute jettisoned although jettisoning is an automatic emergency procedure in case of no load transfer. At the end of the extraction zone, the pilot rapidly applied full takeoff power and initiated a normal climb. Almost coincidentally the loadmaster (LM #1) called "Malfunction", the aircraft pitch attitude immediately started to increase to an excessive nose high attitude. The LM #1 then called "We're caught on the ramp" indicating that the load was free of the right hand locks and had moved to the ramp area before hanging up. The aircraft pitch attitude increased rapidly to approximately 40 degrees nose up; the aircraft stalled and entered an incipient left spin and contacted the ground in a 70 degrees left wing down attitude with the nose slightly below the horizon. The pallets broke free and departed the aircraft approximately one second before impact. All seven crew members sustained fatal injuries on impact.

13. Flight/Ground Conditions: CONTACT - VISUAL FLIGHT VFR/VMC (GROUND REFERENCES)

14. Light/Weather Conditions: BRIGHT DAY

16. Aircrew Information: ; Time on Duty Last 48 Hrs: hrs, Day of Occurrence: hrs; Flying Hours Last 48 hrs: hrs; Past 30 Days:

hrs; Total on Type: hrs; Grand total: hrs.

; Time on Duty Last 48 Hrs: hrs, Day of Occurrence: hrs; Flying Hours Last 48 hrs: hrs; Past 30 Days: hrs; Total on Type: hrs; Grand total: hrs.

; Time on Duty Last 48 Hrs: hrs, Day of Occurrence: hrs; Flying Hours Last 48 hrs: hrs; Past 30 Days: hrs; Total on Type: hrs; Grand total: hrs.

; Time on Duty Last 48 Hrs: hrs, Day of Occurrence: hrs; Flying Hours Last 48 hrs: hrs; Past 30 Days: hrs; Total on Type: hrs; Grand total: hrs.

; Time on Duty Last 48 Hrs: 17 hrs, Day of Occurrence: 6 hrs; Flying Hours Last 48 hrs: hrs; Past 30 Days: hrs; Total on Type: hrs; Grand total: hrs.

17. Non Aircrew Pers Info: OTHER NON-MAINTENANCE TRADES, Time on Duty Last 48 Hrs: hrs, Day of occur: hrs OTHER NON-MAINTENANCE TRADES, Time on Duty Last 48 Hrs: hrs, Day of occur: hrs

18. Aircraft Maint Data: TSN Aircraft: CC130/329, 0 hrs, TSI: 199 hrs, TSO: hrs, CF349: , CF543: , Civilian Journey Log: , Inspection: #3 OR 4 PERIODIC OR "B"

20. Component Information: ENGINE WUC: SER NUM: 109443 NSN: TSN: TSO: TSI: 199 PERIODIC TSII: , Part List: 22. A. Investigation: With the aid of the information obtained from the FDR/CVR, it was determined that all integral aircraft systems were operating normally. The investigation therefore focused on the entire extraction system and LAPES operating procedures.

The initial investigation revealed that the aft pallet hung up on the extraction link which had partially rotated but was jammed in its housing by the insertion of drogue jettison pin.

The extraction link jammed because both an electrical release pulse and a mechanical drogue jettison activation were made simultaneously. Thus while the electrical pulse released the extraction link, the drogue jettison activation inserted a pin through the jettison activation hole in the side of the link preventing it from completing its rotation/transfer, and the force of the drogue on the partially rotated link prevented either extraction of the jettison pin or jettisoning the drogue. It is most probable that the extraction link in Hercules 130329 was jammed because the LM #1 either did not move the control handle far enough towards manual release before rapidly moving the handle to drogue jettison, or he inadvertently moved the control handle to drogue jettison as the co-pilot was initiating the electrical release.

The analysis by the Board, Lockheed, National Aeronautical establishment and QETE, all suggest that the application of power on the overshoot as depicted on the FDR trace was insufficient to overcome the preset tension of the right hand locks. Thus the load must have been manually released from the locks prior to or during overshoot.

One of the nine right hand locks was destroyed on impact. The remaining eight were checked for correct settings and all tested out as serviceable. Although there is some evidence to indicate that the locks were released manually, it is not fully reliable because the impact forces on lock #2 as it was being destroyed affected the indications shown on the other locks which are interconnected. Nevertheless, it is most likely that the locks were released manually by the right hand lock release handle.

Although it cannot be proven conclusively from the available evidence, by the process of elimination, it is most probable that the LM #1 unaware of the partially released and jammed extraction link pulled the right hand emergency lock release handle after activating the manual release/drogue jettison handle because the visual clues he observed led him to believe that load transfer had occurred and the load was "hot". This is the emergency procedure in the event that load transfer occurs and the load remains in the aircraft. Two indications that he would see are adjacent to 'the manual release/ drogue jettison handle; the white extraction link lock light would be "out" and the green light "on". In addition to the light indications, as this was a low profile load he may have quickly observed and mistaken the drogue line which should have released for the main chute extraction line which would further reinforce his evidence of load transfer.

With the load free, the longitudinal acceleration developed by the application of power and the altitude changes on the overshoot was sufficient to break the three 1000 lb emergency restraining straps and caused the load to move aft. The protruding and jammed extraction link subsequently stopped the pallets from exiting the aircraft during the climb. When the load was momentarily arrested, the aft pallet was partially over the ramp. This created an extreme aft C of G well beyond the elevator authority of the aircraft thus making recovery impossible.

23. Cause Factors: PERSONNEL MANAGEMENT/GHQ INFORMATION/COMMUNICATION THERE ARE NO IDENTIFIED REQUIREMENT OR PROCEDURES FOR VISUAL COMMUNICATIONS AND NO AUDIO CAPABILITY TO CONFIRM LOAD TRANSFER BETWEEN #1 AND #2 LOADMASTER NOR A BACK-UP SYSTEM TO ADVISED THE PILOT OF THE LOAD STATUS.

PERSONNEL MANAGEMENT/GHQ RESOURCES THERE ARE NO IDENTIFIED REQUIREMENT OR PROCEDURES FOR VISUAL COMMUNICATIONS AND NO AUDIO CAPABILITY TO CONFIRM LOAD TRANSFER BETWEEN #1 AND #2 LOADMASTER NOR A BACK-UP SYSTEM TO ADVISED THE PILOT OF THE LOAD STATUS.

PERSONNEL LOAD MASTER (LM) VISUAL ILLUSIONS/LIMITATIONS UNAWARE THAT THE EXTRACTION LINK WAS JAMMED IN A PARTIALLY RELEASED POSITION AND BECAUSE OF MISINTERPRETATION OF ONE OR MORE VISUAL INDICATIONS THE LOADMASTER ASSUMED LOAD TRANSFER HAD TAKEN PLACE AND RELEASED THE RIGHT HAND LOCKS.

PERSONNEL LOAD MASTER (LM) INATTENTION THE LOADMASTER EITHER DID NOT MOVE THE CONTROL HANDLE FAR ENOUGH TO ACTIVATE MANUAL RELEASE BEFORE QUICKLY SELECTING DROGUE JETTISON, OR HE INADVERTENTLY MOVED THE CONTROL HANDLE DIRECTLY TO DROGUE JETTISON AS THE CO-PILOT ELECTRICALLY ACTIVATED RELEASE. MATERIEL AIRFRAME DESIGN THE EXTRACTION LINK COULD BE JAMMED IN A PARTIALLY RELEASED/EXTRUDING POSITION AS THERE WAS NO RESTRICTION TO PREVENT BOTH AN ELECTRICAL RELEASE AND MECHANICAL DROGUE JETTISON SELECTION FROM ACTING ON THE EXTRACTION LINK SIMULTANEOUSLY.

24. Preventive Measures: (SEE DETAILED DESCRIPTION - 1) The duties/responsibilities of LM #1 and LM #2 have been published.

Hand signals to aid in identification of load transfer have been developed and the commonly used hand signals standardized. The LM #1 operation of the towplate assembly manual release handle have been modified. The above changes developed and evaluated by 435(T) Sqn will be promulgated by Air Command in Annex H to CFACM 60-2601(1) CC130 Amplified and Abbreviated Check List. (SEE DETAILED DESCRIPTION - 2) To prevent inadvertent selection/ movement to drogue jettison, the towplate system control handle has been modified by the insertion of a pin preventing movement to drogue jettison. The pin can be quickly removed to permit drogue jettison when required.

(SEE DETAILED DESCRIPTION - 3) To aid LM/crew communication, an intercommunication box and a 45 ft extension cord for use by No.2 loadmaster will be installed for TAL operations. In addition, a "hot mike" capability for LM #2 will be evaluated.

(SEE DETAILED DESCRIPTION - 4) To provide loadmasters with an unequivocal indication that the drogue force has transferred to the main extraction chutes, a positive indication of load transfer (PILT) system has been developed, evaluated and incorporated as part of the LAPES rigging system. The indicator is 24" x 4" red flag located on the ceiling adjacent to anchor cable arm near the parachute door and attached to the extraction lines on the main chutes. The description and operation of the PILT system will be incorporated in CFACM 60-2601(2) by Air Command.

(SEE DETAILED DESCRIPTION - 5) A modification to improve the system of securing the towplate controller to the floor of the aircraft adjacent to the 245 bulkhead is to be developed, evaluated and subsequently incorporated.

(SEE DETAILED DESCRIPTION - 6) The new CC130 flight simulator should be programmed for adverse aft C of G conditions and flown to determine whether aircraft handling procedures for aft C of G conditions could be developed.

25. Comments: DFS: In determining the events leading up to this accident the Board of Inquiry was greatly assisted by the data contained in the FDR/CVR. The TAL school video tape of the run and photo- graphs taken by a military observer also provided valuable evidence. Nevertheless, it is seldom possible to back up every event with conclusive evidence. In this accident the 10 second lack of communication or knowledge of what exactly took place " in the back between the two loadmasters from the "green go" call to the "malfunction" call required the Board to establish the

most probable events and causes as supported by all the evidence gathered. In this respect the Board did a thorough and commendable job.

While well-founded concern has been expressed over the condition of the dual rail system, there is no evidence to suggest that the failure of a number of right hand locks was the reason the load broke free. This concern however was beneficial as it led to a review and fine tuning of the maintenance and operating procedures as well as giving consideration to a future rail/lock replacement program.

Although the Board's toxicological finding on drugs was not considered contributory nor a cause of this accident, Air Command recommended that this finding be deleted because it only indicated probable ingestion. It is however the opinion of DPM and DFS Flight Surgeon that while the evidence is limited and not substantiated by additional tests, there is sufficient indication from the results obtained in Edmonton and DCIEM to warrant the toxicological finding as noted in the Board and commented upon by DCIEM and DPM. The Board's finding at para 2(q) will therefore stand as part of the Board's proceeding. In view of this finding, DPM is presently pursuing a vigorous education and drug awareness program.