OCCURRENCE REPORT: 69500

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FSIS 69500 29 JAN 1989 AIR ACCIDENT

Status: amended supplemental sent

BFS 011 30/JAN/1989 09:25
69500 CAR 16/JUN/2005 15:26

Unclassified

Refs:
AAIR 1010-130318 29 Jan 89

1. Injury Level: Black - Fatal
2. Aircraft/Operated By: CC130318
3. Aircraft Ownership: 435 SQN / 17 WING / 3435 /
4. A. Location: - WAINWRIGHT AFB -
4. B. Date/Time: 290347Z JAN 1989
4. C. Phase of Flight: LANDING - FLAREOUT
5. Damage Level: Destroyed / missing
6. Personnel Injured: , AIRCREW, Black - Fatal
, PASSENGER, Black - Fatal
, PASSENGER, Black - Fatal
, PASSENGER, Black - Fatal
, PASSENGER, Black - Fatal
, PASSENGER, Black - Fatal
, PASSENGER, Black - Fatal
, PASSENGER, Black - Fatal
, PASSENGER, Yellow - Serious
, PASSENGER, Yellow - Serious
, PASSENGER, Yellow - Serious
, AIRCREW, Black - Fatal
7. Mission Type: TRANSPORT AND COMMUNICATIONS, TALEX (INCLUDES HELOS)
8. Description: AIRCRAFT CRASHED ON LANDING: CC130318, callsign CANFORCE 5636, departed Canadian Forces Base Edmonton at 2250Z on 29 January 1989 enroute to Fort Wainwright Army Airfield near Fairbanks, Alaska. The flight was the second of three aircraft deployed in support of Exercise Brimfrost 89. There were eight crew, ten duty passengers and a mixed cargo payload on board.
The prevailing Fairbanks area weather was dominated by a large arctic high pressure system, resulting in clear, cold air and local ice fog conditions. Temperatures were in the -50 C range on the day of the accident.
Four hours and thirty-seven minutes after departure, the crew commenced a night precision radar approach (PAR) to runway 24R at Fort Wainwright. During the final segment of the approach, the aircraft struck three approach light standards and then impacted the lip of a riverbank approximately 350 feet short of the runway threshold.
On impact the aircraft broke into three sections. The right wing separated from the fuselage and continued ahead about 850 feet from the impact point. The left wing and fuselage came to rest abeam the right wing having pivoted approximately 170 degrees to the left. Several personnel in the cargo compartment were thrown out during this sliding turn. The tail section came to rest on the runway threshold. Unable to use the forward passenger door, the flight deck crew exited through the overhead cockpit escape hatch. Fort Wainwright crash rescue crews responded to the scene.
Seven passengers and two crew members were killed while three passengers received serious injuries. The remaining six passengers and crew were admitted to hospital for overnight observation. The aircraft was destroyed by the impact.

14. Light/Weather Conditions: NIGHT (UNSPECIFIED), FOG OR ICE-FOG OR RIMEICE
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.
CAPTAIN (NOT INSTRUCTING); Time on Duty Last 48 Hrs: 8 hrs, Day of Occurrence: 8 hrs; Flying Hours Last 48 hrs: 5 hrs; Past 30 Days: 58 hrs; Total on Type: 1567 hrs; Grand total: 2914 hrs.

17. Non Aircrew Pers Info: PASSENGER, Time on Duty Last 48 Hrs: hrs, Day of occur: hrs
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18. Aircraft Maint Data: TSN Aircraft: CC130/318, 3691 hrs, TSI: 373 hrs, TSO: hrs, CF349: , CF543: , Civilian Journey Log: , Inspection: #1 OR 2 PERIODIC OR "B"

20. Component Information: ENGINE WUC: SER NUM: 102261 NSN: TSN: TSO: TSI: 337 PERIODIC TSII: , Part List:
ENGINE WUC: SER NUM: 106130 NSN: TSN: TSO: TSI: 337 PERIODIC TSII: , Part List:
ENGINE WUC: SER NUM: 103860 NSN: TSN: TSO: TSI: 337 PERIODIC TSII: , Part List:
ENGINE WUC: SER NUM: 105411 NSN: TSN: TSO: TSI: 337 PERIODIC TSII: , Part List:

22. A. Investigation: This was a routine flight into known arctic weather conditions. The crew was aware of the local ice fog situation in the Fairbanks area. They obtained weather reports for the three possible local area airports and monitored the Elmendorf (Anchorage) weather as the alternate. The aircraft was maintained in accordance with current rules and regulations and was serviceable prior to impact.

As the aircraft approached Fairbanks, the crew noted slant and vertical visibility to be much greater than anticipated, particularly in light of the consistently low visibilities reported at the three local airfields. On contact with Wainwright operations, the crew learned from the captain of the preceding aircraft that the runway lights had been visible throughout the approach. He cautioned, however, that the visibility was one half to one quarter mile in the vicinity of the threshold and that it deteriorated along the runway. As a final caution, he advised that the taxiway lights were out and safe ground movement would require extra vigilance. During the approach check the aircraft commander (AC) stated his intention to execute a second approach in the event of an overshoot. While the aircraft was on vectors for the Fort Wainwright airfield, Fairbanks Approach acknowledged and granted overshoot instructions to accommodate a second approach.

The AC flew the radar approach from the left seat although he periodically glanced at the runway. Approach and runway lights were visible to him several miles out and the PAR was flown clear of cloud. The first officer (FO) in the right seat maintained a visual lookout and during the initial stage of the approach requested that the approach lights be turned down. The AC directed that the aircraft taxi lights be turned on but that the landing lights not be used in order to minimize distraction during landing. At 300 feet above ground level (AGL) the FO called the airfield visual. The AC acknowledged the runway was visual and transitioned to a visual approach. The FO then directed his attention inside the cockpit and began to scan the instruments in case of an overshoot.

An examination of the flight data recorder (FDR) revealed that power on all four engines was reduced to idle and an aggressive nose down attitude was set after the flaps were fully down. Although the aircraft rapidly descended below the standard PAR glide path, there was no warning issued by the PAR controller before impact. The resulting flight profile put the aircraft approximately 20 to 30 feet above the approach lights, roughly one half mile from the runway threshold. The FO, navigator (NAV) and both flight engineers (FE) all commented on how bright it became as the runway approach lighting illuminated the cockpit.

The aircraft struck three approach lights after crossing the bar of lights 1,000 feet from the threshold. Although the pilot was aware that the aircraft had struck the final approach lights, he felt that he had touched down just short of the runway and no more damage would occur. No attempt to overshoot was initiated. Suddenly, what appeared to be a wall was illuminated by the taxi light and aft elevator was immediately applied in an attempt to clear the obstacle. This input merely changed the attitude of the aircraft before impact. The aircraft struck the river bank just forward of the main landing gear and began to fail structurally.

The aircraft broke into three main sections. The left wing and main fuselage bounced once and then slid and rotated to a stop on the runway centreline. During this skidding turn the left side of the fuselage was forced outward and the troop seat and seat belt support structures suffered major damage. A definitive seating plan could not be established for all occupants of the cargo compartment but it is known that the majority, if not all, were seated along the left side of the fuselage. The tail section came to rest straddling the threshold lights.

The flight deck was relatively intact although its sub-flooring was severely damaged. The six personnel on the flight deck received only minor injuries and were able to egress through the overhead hatch and down the escape rope. Several of the occupants of the rear compartment were thrown from the aircraft during the turning slide. The precise location of several passengers after the crash is uncertain. Two passengers were trapped under the number two engine when the aircraft stopped.

There was no post crash fire. Initial rescue efforts were delayed due to the uncertainty of the crash location. The first personnel on site were eye witnesses who had seen the crash from their vehicles. The first rescue vehicles on site were the ambulances approximately 13 minutes after the crash. The fire vehicles arrived five minutes later. All personnel, including the casualties, were removed from the site within 70 minutes.

During the investigation a contradiction was discovered between the depiction of the airfield approach lighting on the Department of Defense (DOD) approach plate and the actual lighting available. It was also determined that there were no daily inspections of the

approach or threshold lighting. An examination of the threshold lighting revealed that several threshold and runway termination lights were totally obscured by snow. Base policy dictated that snow ploughing would occur only after a snowfall of two inches. Airfield staff had assumed that the heat from the bulbs would melt the surrounding snow but the extremely cold temperatures the day of the crash prevented melting. Thus, the crew of CC130318 would not have had all available runway lighting visible even without the ice fog. The lighting available was, however, sufficient for the preceding aircraft to complete a successful landing approximately 30 minutes earlier.

DFS COMMENTS
Unlike normal instrument approach procedures, approaches into ice fog situations are often flown in visual conditions until final approach, when horizontal visibility is reduced and a decision to continue must be made at minimum descent altitude or decision height. The crew of
this aircraft agree that the field was visual several miles back. Despite the PIREP and the hourly weather reports, they were unprepared for the visual presentation once the aircraft had descended to just above the approach lights.
The AC, as the pilot flying, made an early decision to land on or very near the threshold of the runway but did not tell the crew. Selecting the threshold rather than the normal PAR touchdown point 1145 feet down the runway required an aggressive change of flight profile in the final stage of the approach. By not stating his intention to deviate from the PAR approach glide path, he left no opportunity for a discussion amongst the crew to explain or discuss the technique to be used. The decision to dive for the approach lights was the worst possible one because it put the aircraft into the lowest horizontal visibility under the most distracting lighting situation. Apart from an obvious increase in the probability of striking an approach light, this dive virtually eliminated all visual cues necessary for a safe touchdown.
The pilot also erred when he closed the throttles over the last major approach light without visual acquisition of the runway. The crew erred in not calling for an overshoot when they recognized that the aircraft was striking the approach lighting. After the AC realized that the aircraft was striking the approach lights, he simply accepted that he had landed short and elected to ride it out.
In a multi-crew aircraft the AC is a personnel manager in addition to being a pilot, and must set the tone for teamwork amongst the crew. In this accident, despite a drastic change of flight profile and a flight path so close to the approach lights that several crew members had to look back in the cockpit because of the high light intensity, no one said anything. Even when the power was reduced for the final descent and the aircraft had contacted the first approach light, it was three seconds before the FO said "You're low." Three seconds later, the aircraft impacted the river bank.

23. Cause Factors: PERSONNEL PILOT (32A) VISUAL ILLUSIONS/LIMITATIONS AS THE PILOT PROCEEDED INTO THICKENING ICE FOG, THE REDUCTION IN FORWARD VISIBILITY CAUSED HIM TO ADVANCE HIS AIM POINT RESULTING IN A LOWER THAN NORMAL APPROACH.
PERSONNEL PILOT (32A) EXPECTANCY AS THE AIRCRAFT DESCENDED TO JUST ABOVE THE APPROACH LIGHTS, THE PILOT EXPECTED TO SEE THE THRESHOLD LIGHTING CLEARLY. THE PILOT BELIEVED THAT THE BRIGHTEST LIGHTS MARKED THE RUNWAY THRESHOLD AND DID NOT REALIZE THAT THESE LIGHTS WERE ACTUALLY 1,000 FEET FROM THE THRESHOLD.
PERSONNEL PILOT (32A) JUDGEMENT THE PILOT ELECTED TO CONTINUE THE APPROACH TO TOUCHDOWN EVEN THOUGH HE WAS AWARE THAT THE AIRCRAFT HAD CONTACTED APPROACH LIGHTS SHORT OF THE INTENDED TOUCHDOWN.
PERSONNEL CO-PILOT/FIRST OFFICER INFORMATION/COMMUNICATION THE ENTIRE CREW FAILED TO QUESTION THE TECHNIQUE WHICH WAS USED TO EXECUTE THE LANDING AND FAILED TO INITIATE AN OVERSHOOT CALL DESPITE AN ABNORMAL APPROACH UNDER SEVERELY RESTRICTED VISIBILITY CONDITIONS AND THE SUBSEQUENT COLLISON WITH THE APPROACH LIGHTING.
PERSONNEL CO-PILOT/FIRST OFFICER JUDGEMENT WHEN HE REALIZED THE AIRCRAFT WAS LOW THE CO-PILOT DID NOT CALL FOR AN OVERSHOOT.
PERSONNEL NAVIGATOR INFORMATION/COMMUNICATION THE ENTIRE CREW FAILED TO QUESTION THE TECHNIQUE WHICH WAS USED TO EXECUTE THE LANDING AND FAILED TO INITIATE AN OVERSHOOT CALL DESPITE AN ABNORMAL APPROACH UNDER SEVERELY RESTRICTED VISIBILITY CONDITIONS AND THE SUBSEQUENT COLLISON WITH THE APPROACH LIGHTING.
PERSONNEL FLT. ENGR (FE) INFORMATION/COMMUNICATION THE ENTIRE CREW FAILED TO QUESTION THE TECHNIQUE WHICH WAS USED TO EXECUTE THE LANDING AND FAILED TO INITIATE AN OVERSHOOT CALL DESPITE AN ABNORMAL APPROACH UNDER SEVERELY RESTRICTED VISIBILITY CONDITIONS AND THE SUBSEQUENT COLLISON WITH THE APPROACH LIGHTING.
24. Preventive Measures: (SEE DETAILED DESCRIPTION - 1) Pilot Monitored Approaches (PMA) became the standard approach for the CC130 during instrument procedures as a result of this accident. The approach is flown by the pilot in the right seat with the left seat pilot monitoring. Once sufficient visual reference is available to carry out a safe landing, aircraft control is switched to the left seat pilot.
(SEE DETAILED DESCRIPTION - 2) Several methods were pursued to increase the awareness of visual illusions among ATG aircrew. A video of this accident was made by DFS and distributed. Several videos are available concerning lo visibility landings. Emphasis has been placed on this aspect by the CC130 Operational Training Unit (OTU). Finally, the new manual of instrument flying, A-OA-148 Chapter 38 deals with landing from instrument approaches in a variety of weather conditions including ice fog.
(SEE DETAILED DESCRIPTION - 3) Although not supported at all level, a major medical concern highlighted by this accident was the lethality of the CC130 cargo compartment. Trails and studies are progressing on several fronts. Troop seat studies are under way at NWI Edmonton and the USAF. AETE is studying the lethalityquestion and AMDU Trenton is prototyping a new loadmaster seat.
(SEE DETAILED DESCRIPTION - 4) 426 Sqn ha introduced a two hour Aircrew Coordination training lecture into the CC130 course

training standard. Comments below reflect future course actions.