

Log 2588



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: March 29, 1996

In reply refer to: A-96-7

To the Organizations of Operators of Public-use Aircraft
(See Distribution List Attached)

On February 22, 1995, about 0937 eastern standard time, a Eurocopter AS-350B helicopter, N20SP, operated as a public-use aircraft by the Massachusetts State Police (MSP), lost engine power shortly after takeoff, and crashed into a boat house at Cambridge, Massachusetts. Visual meteorological conditions existed. The pilot, copilot, and two passengers were killed, and the helicopter was destroyed.

The National Transportation Safety Board determined that the probable causes of this accident were: 1) The MSP management's failure to provide adequate oversight of its air wing; 2) fuel contamination and obstructed fuel injector ports, due to inadequate fuel storage and storage requirements by the MSP, resulting in a loss of engine power; and 3) the failure of the pilot to execute a proper autorotation, which resulted in a loss of rotor revolutions per minute and subsequent loss of helicopter control.

After takeoff, the aircraft had climbed to about 600 feet above ground level and proceeded west over the Charles River. Witnesses observed smoke coming from the engine and then observed the helicopter turn right and descend toward the north bank of the river at a descent angle of 45° to 70°. Several witnesses stated that the main rotor blades were turning slowly, or not at all. The helicopter struck two metal structures extending from a boat house and came to rest on the roof.¹

The investigation revealed that the loss of power resulted from contaminated fuel that had clogged the engine fuel injector ports. The MSP aviation fuel storage tank was determined to be the source of the fuel contamination. Fuel samples from the 6,000-gallon storage tank had degraded thermal properties and contained iron oxide and water. The water content of the samples ranged from 5 to 800 times the maximum allowable. Except for a filter change sometime between 1984 and 1986, the storage tank had not been maintained or secured in 14

¹For more detailed information, read Brief of Accident NYC95GA060.

years. The filter was a 25-micron separator element, normally used in diesel fuel applications. The inground fuel tank filter manufacturer recommended a 1-micron element filter for jet fuel. The manufacturer also recommended an annual change of the filter. The MSP had no written or verbal maintenance procedures for the fuel dispensing system.

The pilot had been assigned to the MSP Air Wing in 1988, and received non-structured training in the Eurocopter AS-350 the same year from the Wing Commander, who was also a Federal Aviation Administration helicopter certificated flight instructor (CFI). The only formal flight training that the pilot had received in the Eurocopter AS-350 was from American Eurocopter, using an American Eurocopter Corporation AS-350 flight training syllabus, during May 1994, from an American Eurocopter CFI. During this training flight, all maneuvers were completed during a single 0.9 hour flight. This was the only documented flight in the AS-350 during which the pilot-in-command (PIC) performed touchdown autorotations.

During the 1980s, pilot training was conducted locally by the MSP Air Wing Commander. The training was conducted in a Robinson R22, a Bell 206, and the AS-350. Touchdown autorotations were performed in the R22 and the Bell 206; however, touchdown autorotations were not performed in the AS-350, only power recoveries. This training was not formally documented, and followed no specific training program or syllabus.

In May 1994, the MSP Air Wing contracted with American Eurocopter to conduct AS-350 training. A 2-day ground school was conducted for all of the MSP pilots, and an American Eurocopter CFI conducted flight training. Except for this training, the Air Wing has not conducted any formal or informal helicopter training since the Air Wing Commander departed in 1990. During those 5 years, no touchdown autorotation practice or training was done, and no flight training or evaluations have been conducted by a CFI.

The investigation revealed that the MSP Air Wing had only one written document relating to the operation of the Air Wing. The three-page document was an MSP General Order that established guidelines for the utilization of the MSP Air Wing. The general order described the type of mission that the Air Wing would support, and how flights were requested. The Air Wing did not possess standard operating procedures, or operation specifications. The Wing did not have a documented description of the Wing structure, or a statement of its mission.

During interviews with Wing pilots, specific missions such as high-intensity spotlight, search and rescue, and surveillance were identified; however, no documents identified the aircraft equipment requirements, the day and night environmental conditions in which the mission could be performed, the established criteria to perform the missions, or a description of how to perform the missions. Additionally, pilot prerequisites, qualifications, and training requirements to perform the mission had not been identified.

Although missions were flown both day and night over water, the helicopters were not equipped with floats, personal floatation devices, or rafts, and the wing personnel had not received water survival training.

Interviews revealed that the Wing personnel had different opinions about who was a PIC within the Air Wing. The Wing did not publish a roster of designated PICs, and there was no formal program to identify PIC selection, training, evaluation, or their duties and responsibilities.

The Air Wing Operations did not record, or track, pilot flight hours flown, duty hours worked, or biennial flight reviews completed. The chief pilot stated that these items were monitored "through personal knowledge." The Wing did not possess a formal or documented training or safety program.

As a result of this investigation, the MSP has done the following to prevent a recurrence of this kind:

1. Closed the MSP in-ground fuel tank.
2. Obtained copies of State Police programs from New Jersey and Maryland to help the MSP establish a comprehensive Air Wing standard operating procedure.
3. Initiated emergency procedures training for all Air Wing pilots. This training is conducted by a CFI using the Bell 206.
4. Sent Air Wing pilots to the Eurocopter facility in Texas for factory training in the AS-350.
5. Established a program to qualify an Air Wing pilot as a CFI.
6. Contracted for additional training in the Bell 206, by a Bell Helicopter factory CFI.

The Safety Board is concerned that other operators of public-use aircraft are not aware of the circumstances of the subject accident and believes that action should be taken to disseminate the appropriate information.

Therefore, as a result of its investigation of this accident, the National Transportation Safety Board recommends that the organizations of operators of public-use aircraft (see distribution list)--

Advise your members of the circumstances of the February 22, 1995, Massachusetts State Police helicopter accident near Cambridge, Massachusetts, and urge them to review their flight operations in light of the National Transportation Safety Board's findings and take any necessary corrective action to ensure compliance with safe operating practices. (Class II, Priority Action) (A-96-7)

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation A-96-7 in your reply.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

By: 
Jim Hall
Chairman

Enclosure

Brief of Accident (continued)

NYC95GA060 FILE NO. 593	02/22/95 CAMBRIDGE, MA	AIRCRAFT REG. NO. N20SP TIME (LOCAL) - 09:37 EST
Occurrence# 1 Phase of Operation CRUISE	LOSS OF ENGINE POWER	
Findings	- AIRPORT FACILITIES, FUEL STORAGE - INADEQUATE - FACILITY, INADEQUATE MANUALS/DIRECTIVES - COMPANY/OPERATOR MANAGEMENT - FLUID, FUEL - CONTAMINATION, WATER - FLUID, FUEL - CONTAMINATION, OTHER THAN WATER - FUEL SYSTEM, INJECTOR - OBSTRUCTED	
Occurrence# 2 Phase of Operation EMERGENCY DESCENT/LANDING	FORCED LANDING	
Findings	- TERRAIN CONDITION - NONE SUITABLE	
Occurrence# 3 Phase of Operation EMERGENCY DESCENT/LANDING	LOSS OF CONTROL - IN FLIGHT	
Findings	- AUTOROTATION - IMPROPER - PILOT IN COMMAND - ROTOR RPM - NOT MAINTAINED - PILOT IN COMMAND - INADEQUATE TRAINING - COMPANY/OPERATOR MANAGEMENT - INSUFFICIENT STANDARDS/REQUIREMENTS - COMPANY/OPERATOR MANAGEMENT	
Occurrence# 4 Phase of Operation DESCENT - UNCONTROLLED	IN FLIGHT COLLISION WITH OBJECT	
Findings	- OBJECT - BUILDING (NONRESIDENTIAL)	
The National Transportation Safety Board determines that the Probable Cause(s) of this Accident was: 1) THE MASSACHUSETTS STATE POLICE (MSP) MANAGEMENT'S FAILURE TO PROVIDE ADEQUATE OVERSIGHT OF ITS AIR WING; 2) FUEL CONTAMINATION AND OBSTRUCTED FUEL INJECTOR NOZZLES, DUE TO INADEQUATE FUEL STORAGE AND STORAGE REQUIREMENTS BY THE MSP, RESULTING IN A LOSS OF ENGINE POWER; AND 3) THE FAILURE OF THE PILOT TO EXECUTE A PROPER AUTOROTATION, WHICH RESULTED IN A LOSS OF ROTOR RPM AND SUBSEQUENT LOSS OF HELICOPTER CONTROL.		

National Transportation Safety Board
Washington, D.C. 20594

Brief of Accident

Adopted 12/12/1995

NYC95GA060
FILE NO. 593 02/22/95 CAMBRIDGE, MA AIRCRAFT REG. NO. N205P TIME (LOCAL) - 09:37 EST

MAKE/MODEL - EUROCOPTER AS-350-B AIRCRAFT DAMAGE - Destroyed
ENGINE MAKE/MODEL - TURBOMECA ARTIEL 1B CREW 2 SERIOUS 0 MINOR/NONE
NUMBER OF ENGINES - 1 PASS 2 0 0
OPERATING CERTIFICATES - None
TYPE OF FLIGHT OPERATION - Public use
REGULATION FLIGHT CONDUCTED UNDER - 14 CFR 91

LAST DEPARTURE POINT - BOSTON, MA
DESTINATION - FRAMINGHAM, MA
AIRPORT PROXIMITY - Off airport/airstrip

CONDITION OF LIGHT - Daylight
WEATHER INFO SOURCE - Weather observation facility
BASIC WEATHER - Visual (VMC)
LOWEST CEILING - 3300 FT Overcast
VISIBILITY - 0012.000 SM
WIND DIR/SPEED - 360 /007 KTS
TEMPERATURE (F) - 31
OBSTR TO VISION - None
PRECIPITATION - None

PILOT-IN-COMMAND AGE - 33 FLIGHT TIME (Hours)
CERTIFICATES/RATINGS TOTAL ALL AIRCRAFT - 1150
Private, Commercial LAST 90 DAYS - 20
Single-engine land TOTAL MAKE/MODEL - 900
Helicopter TOTAL INSTRUMENT TIME - Unk/Nr
INSTRUMENT RATINGS
None

A MASSACHUSETTS STATE POLICE (MSP) HELICOPTER DEPARTED A HELIPORT WITH TWO CREWMEMBERS & TWO PASSENGERS, & CLIMBED TO ABOUT 600' OVER A RIVER. WITNESSES REPORTED SEEING A PUFF OF "SMOKE" (OR VAPOR) FROM THE ENGINE EXHAUST. THE HELICOPTER WAS OBSERVED TO TURN TOWARD THE RIVER BANK & DESCEND AT AN ANGLE BETWEEN 45 & 70 DEGREES. WITNESSES STATED THAT THE MAIN ROTOR BLADES WERE EITHER TURNING SLOWLY OR HAD STOPPED PRIOR TO THE HELICOPTER COLLIDING WITH A BOAT HOUSE ROOF. NO PREIMPACT FAILURE OF THE MAIN ROTOR OR TRANSMISSION WAS FOUND. EXAMINATION OF THE ENGINE REVEALED THAT FIVE OF THE SIX FUEL INJECTION PORTS WERE CLOGGED. SAMPLES FROM THE HELICOPTER FUEL SYSTEM CONTAINED IRON OXIDE & WATER. THE MSP HAD A 6,000 GALLON IN-GROUND FUEL STORAGE TANK THAT HAD NOT BEEN MAINTAINED OR SECURED IN 14 YEARS (EXCEPT FOR A FILTER CHANGE BETWEEN 1984 AND 1986). FUEL SAMPLES FROM THE STORAGE TANK CONTAINED HIGH LEVELS OF RUST & WATER, AS WELL AS DEGRADED THERMAL PROPERTIES. FURTHER INVESTIGATION REVEALED THAT THERE WAS A LACK OF OVERSIGHT IN THE MSP AIR OPERATIONS & NO TRAINING, SAFETY, OR FUEL MANAGEMENT PROGRAM. RECORDS SHOWED THAT IN THE PAST FIVE YEARS, THE MSP PROVIDED THE PILOT WITH ONLY ONE TRAINING SESSION THAT CONSISTED OF A TWO DAY GROUND SCHOOL & ONE FORMAL TRAINING FLIGHT.

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