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NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C.

Hageland CFIT-A Training Manual Excerpts

(12 Pages)

Attachment 3

to the Human Performance Specialist's Factual Report

ANC17MA001

Hageland CFIT-A Training Manual Excerpts

PREAMBLE

A CFIT accident is an event in which a mechanically sound airplane is inadvertently flown into the ground, water, or an obstacle.

Controlled Flight Into Terrain (CFIT) has been and continues to be the dominant reason for accidents involving airplane hull losses and fatalities. The most prevalent primary factor for hull losses and fatalities with known causes is the flight crew.

In any critical review of Controlled Flight Into Terrain (CFIT) incidents or accidents, it becomes evident that there are many interrelated factors that contribute to the causes of CFIT accidents. All of these factors are derived from some level of decision making. It is accepted that the flight crew is the last line of defense in preventing a CFIT accident, and that they make operational decisions that are critical to a safe flight.

There are two basic causes of CFIT accidents; both involve flight crew situational awareness. One definition of situational awareness is an accurate perception by flight crews of the factors and conditions currently affecting the safe operation of the aircraft and the crew. The causes for CFIT are the flight crews' lack of vertical position awareness or their lack of horizontal position awareness in relation to the ground, water, or obstacles. More than two-thirds of all CFIT accidents are the result of altitude error or lack of vertical situational awareness. The contributing factors associated with this cause often have to do with the barometric altimeter.

Simply stated, flight crews need to know where they are and the safe altitude for flight. The underlying assumption is that a flight crew is not going to knowingly fly into something. It follows then that CFIT accidents occur during reduced visibility associated with instrument meteorological conditions (IMC), darkness, or a combination of both conditions.

The largest CFIT losses now are found with Air Taxi aircraft, operating under Part 135 with less than ten seats. The greatest CFIT hazard remains the non-precision Approach.

Unstable approaches contribute to many incidents/accidents. Operational pitfalls include high rates of descent in close proximity to terrain. This type of operation is dangerous. They result in increased risk of CFIT, high flight crew workload, and reduced margins of safety. These operational pitfalls must be mitigated to the maximum extent possible.

Resource Management (RM) whether it involves a crew or single pilot operation is essential for safe, orderly, and profitable operation of an airline's flights. It is paramount that the efficient and effective use of resource management be the norm.

Airlines that are considered the safest in the industry all have a complete training program that includes CFIT prevention. Most are already teaching their flight crews about the factors and causes of CFIT accidents as well as techniques to avoid getting into these situations in the first place.

PREAMBLE

This document, the CFIT Avoidance Training Manual, is one product of Hageland Aviation's overall effort to reduce CFIT accidents. CFIT prevention is a primary goal.

There are many factors that lead to CFIT accidents. We all accept that the flight crew has the final responsibility for preventing a CFIT accident, but if many of the factors normally associated with these accidents were eliminated, or at least mitigated, the potential for flight crew errors would be lessened.

Many studies show that airlines with established, well thought out and implemented standard operating procedures (SOP) have consistently safer operations. Clear, concise, and understandable SOPs need to be developed by each airline. Through these procedures and behaviors, the airline sets the standards that the flight crews are required to follow. Flight crews, on the other hand, must be able to inform management when these procedures are not producing the desired results. All levels of decision making throughout the airlines must ensure that appropriate SOPs are in place and flight crews are trained to use them. These SOPs must address not only the needs of the airline, but the responsibilities of both management and operations. If these policies are not understood by either party, changes must be proposed, agreed to by all concerned, and implemented. Remember, this is an ongoing process. As situations change, the policies must be reevaluated for comparable change. Flight crews need to know what is required of them.

It is imperative that the CFIT accident rate be lowered.

GENERAL

MITAGATION

Proper management of flight crew workload at night and during IMC requires that precise and unambiguous procedures be established.

To this end, numerous procedures have been implemented in the GOM and the approved Operation Specifications. Periodic reviews of these documents are necessary to remain in compliance with Hageland Aviation policies and procedures.

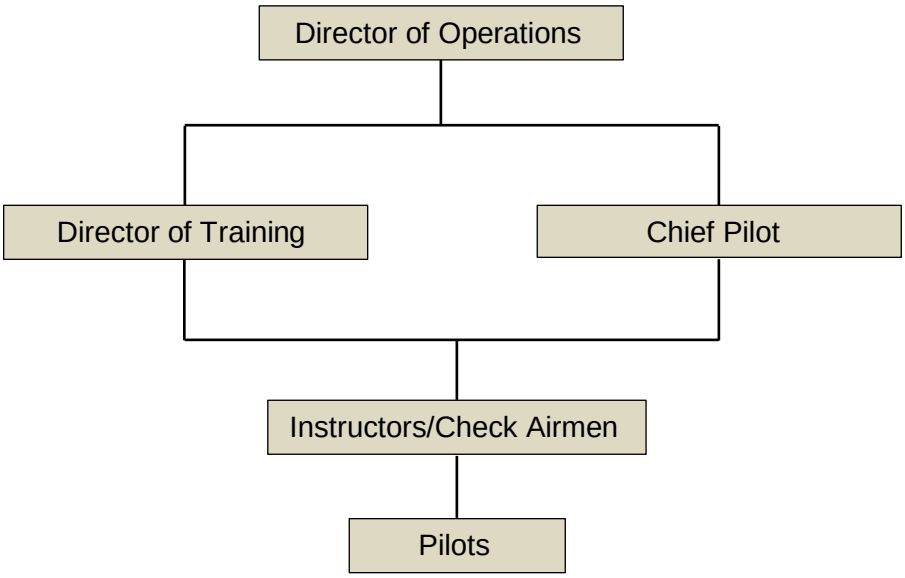
Furthermore, all reports, whether preliminary or factual, published by the NTSB for the previous year regarding Hageland Aviation operations will be included in this manual for review.

SUMMARY AUDIT REPORT

The effectiveness of the procedures, policies and content of this manual will be audited by the Director of Training each year. The audit will follow the procedure as outlined on Form F-7. In addition, the program will also be reviewed each year and documented on Form F-8. Senior management shall review and endorse the program annually. The Director of Training will change the procedures, policies, and/or content of this manual in accordance with these findings.

Feedback regarding any aspect of this program may be directed to the Director of Operations, Chief Pilot, or Director of Training. Feedback shall be taken into consideration to determine if a revision is necessary.

CFIT ORGANIZATION CHART



Note: This organizational chart is applicable to the CFIT Accident Prevention Training Program only.

POLICY

A. No Hageland Aviation pilot will fly into IMC conditions without an IFR clearance. If at any time IMC conditions are encountered while VFR, the pilot shall take immediate action to exit the IMC conditions. The pilot must make their own assessment on whether or not to turn around, climb, enter the ATC system, or declare an emergency. We expect all pilots to follow the procedures as outlined in this manual, except that these procedures are to be used as generalizations only, and due to various conditions which only the pilot can factor in, each pilot will use his or her best judgment in executing any maneuver required to exit IMC conditions. As a general rule of thumb, when in nonmountainous terrain the pilot will turn around using instrument references to return to VFR conditions. In mountainous terrain the pilot will execute a high performance climb to a safe altitude for that sector, declare an emergency if necessary, and request an IFR clearance. In addition, pilots flying airplanes equipped with TAWS systems are expected to execute emergency actions when warning systems are activated, as outlined in the equipment supplement.

B. In some situations pilots will encounter flat light, white out, and/or deteriorating conditions. Flat light in Alaska primarily occurs when snow covered ground refracts light that blends into an overcast sky. This condition inhibits visual cues, creating the inability to distinguish distance and closure rates.

White out conditions are recognizable when the pilot becomes engulfed in a uniformly white glow caused by blowing snow.

Deteriorating visibility is recognizable when the features on the ground are increasingly difficult to see.

C. All of Hageland Aviation's aircraft are equipped with GPS receivers. Inflight visibility can be estimated by using the GPS and ADS-B to identify reference points on the surface. The "nearest" feature may be used to pick airports in a close proximity to the aircraft to help determine visibility en route. In addition, flight visibility may be determined by using the nose cutoff angle method. Deteriorating weather that appears to be below VFR will be avoided by all VFR pilots by turning around or acquiring an IFR clearance. Flying in flat light can be safely accomplished by using good judgment, proper training and planning. In flat light conditions, the pilot may continue the flight by increasing reliance on the flight instruments. Continuation in flat light conditions requires that the pilot ensures that the altimeter is set to the current altimeter setting for the area of flight. Furthermore, it is paramount that the pilot verifies the aircraft is being flown above any terrain for the route of flight by using appropriate, current charts and/or ADS-B equipment. Pilots will not continue flight into white out conditions.

D. Reviewing the instrument approach chart that will be used is critical to IFR pilots before executing an approach. Therefore, all pilots operating under IFR will review all aspects of the instrument approach charts prior to flying the selected approach. In aircraft that are operating with multiple crewmembers, the pilot will also brief all aspects of the instrument approach to the other crewmember before attempting to fly the approach.

POLICY

E. Pilots will be briefed on and given an informational packet during initial and recurrent training containing pictures and descriptions of high-risk airports. High-risk airports, as identified by Hageland Aviation, are airports which have unique terrain, weather, or other characteristics that may pose a hazard to flight operations in that area. This packet must be carried by each pilot and referenced whenever that pilot is first dispatched to a base that he or she is unfamiliar with.

F. Unstable approaches have been a historic cause of many CFIT accidents. It is important that all pilots execute stabilized approaches whether VFR or IFR. A stabilized approach for IFR aircraft means that the aircraft is on speed and properly configured during all phases of the approach according to the maneuvers guide. Inclusive with this definition is that the aircraft is being operated at or above all minimum altitudes published on the instrument approach chart.

The term “STABILIZED APPROACH” as used in this program is not intended to be construed in the same context as the term utilized in large aircraft operation. The term as utilized in this program means that the aircraft is in a position where minimum input of all controls will result in a safe landing. Excessive control input at any point could be an indication of improper planning. The term “stabilized approach” is not limited to IFR operations but applies to any approach, whether IFR or VFR.

G. When flying an instrument approach, pilots will not attempt to locate the runway after passing the missed approach point. If the necessary visual references are not available at the missed approach point, an immediate missed approach shall be executed. In multi-crewmember aircraft, the pilot monitoring will look for the runway at or before the missed approach point.

H. TAWS equipment is installed in all 208s, 406s, and 1900s. Pilots will follow the manufacturer’s recommendations on required actions to be taken when TAWS warnings occur. In addition, pilots will monitor the normal callouts provided by TAWS equipped aircraft while on approaches. 1900 pilots will utilize the standard callouts during an approach as explained in Hageland Aviation’s 1900 Standardization Letter.

PTS OBJECTIVE

To determine the applicant can accurately assess risks associated with terrain and obstacles, maintain accurate awareness of terrain and obstacles, and can use appropriate techniques and procedures to avoid controlled flight into terrain or obstacles by using all resources available. The applicant should:

1. Use current charts and procedures during the planning of the flight to ensure the intended flight path avoids terrain and obstacles.

2. Be aware of potential terrain and obstacle hazards along the intended route.

3. Explain the terrain display, TAWS, and/or GPWS as installed in the aircraft.

4. Use the terrain display, TAWS, and/or GPWS of the navigation displays as appropriate to maintain awareness and to avoid terrain and obstacles.

5. Plan departures and arrivals to avoid terrain and obstacles.

6. Alter flight as necessary to avoid terrain.

7. Plan any course diversion, for whatever reason, in such a way to insure proper terrain and obstruction clearance to the new destination.

8. Explain and understand aircraft performance limitations associated with CFIT accidents.

GROUND TRAINING

Ground Lesson—CFIT, Flat Light, White Out, and Transition To IFR

A. Objective

1. To Instruct the pilot on the risks of CFIT and the meteorological environments that can exist in Alaska;

2. To explain and emphasize the importance of proper pre-flight planning;

3. To discuss in-flight visibility estimation; and

4. To inform pilots of company weather minimums and how to make a competent go/no go decision before and during flight.

B. Set-up

1. Play the Medallion Foundation CD or FAA Flat Light and White Out Video;

2. Review pre-flight procedures;

3. Discuss methods of estimating visibility; and

4. Discuss decision-making on the ground and while airborne.

C. Exercises

1. Discuss the following risks of flying VFR into instrument meteorological conditions (IMC):

a. Loss of situational awareness;

b. Loss of spatial orientation;

c. Loss of aircraft control;

d. Reduced reaction time to see and avoid rising terrain or obstacles;

e. Becoming lost or deviating from the preplanned flight path and impacting obstacles or terrain;

f. Reduced pilot reaction time in the event of a mechanical problem due to low or lowering ceilings and altitude;

g. The danger of failing to adequately understand the weather conditions that result in deteriorating conditions; and

h. The hazards of failing to comply with federal regulations.

GROUND TRAINING CONTINUED

2. Discuss pre-flight procedures and how it should influence your decision making, including:

a. Obstruction & terrain clearance;

b. Precipitation & possible icing conditions; and

c. Deteriorating visibility.

3. Discuss inflight operations, including:

a. Types of visibility;

b. How to estimate flight visibility;

c. Slant range visibility by looking over the cowling or nose cone;

d. Time and distance to a chosen point; and

e. Special VFR Clearances and their associated risk.

4. Review the decision making process and how Hageland's Safety Culture should influence the PICs to make decisions that err on the side of safety.

5. When airborne, how communication with the operations control center, other company aircraft, and Flight Service can help with PIREPS, company flight following, and en route decision making.

6. Discuss how to determine center frequencies; how to communicate your situation, and the "pop-up IFR clearance".

7. Discuss radar communication phraseology including radar contact and radar vectors.

8. Ask how the trainee will maintain their own terrain and obstacle clearance at any given time and place.

9. Review pilot procedures in exiting IFR conditions and responding to alerts from TAWS equipped aircraft.

D. Completion Standards (Minimum Company Expectations)

1. The trainee shall be tested on CFIT, CFIT risk factors, white out and flat light conditions, and visibility estimation. The trainee must pass with at least an 80%.

2. The trainee shall understand the company's safety culture, company's attitude on flight in marginal VFR conditions and company limitations on special VFR operations.

3. The trainee shall understand company flight following policies and techniques and how to update the base station with flight plan changes.

SIMULATOR / FTD TRAINING

Flight Lesson 1—Flat Light, White Outs, Weather Problems & Instrument Approaches

A. Objective

1. To evaluate how the pilot reacts to various deteriorating weather conditions, when to turn around, how he or she handles sudden IFR weather, and the transition to IFR.

B. Set-up

1. The Scenarios may be set up using the Medallion "Constructing CFIT Scenarios" as a guide.

2. The pilot will depart their base visually and encounter weather en route that should force him or her into one of the intended scenarios.

a. VFR flight into IMC conditions;

b. Flight in flat light conditions deteriorating to a white out; or

c. IFR flight with a TAWS alert.

3. Enter into the ATC system with either a pop-up clearance or on a filed IFR flight plan

4. Navigate to a clearance limit and either hold or execute an approach

5. Handling unexpected situations and emergencies as they happen (e.g., structural icing, engine inlet icing, induction icing, partial panel, etc.)

6. Perform at least one non-precision approach to the missed approach point.

7. Perform an ILS approach to minimums.

8. Configure white out conditions and ensure the pilot executes an escape procedure or enters the IFR system once the pilot flies beyond the last point of reference.

C. Post-flight

1. Discuss possible pre-flight errors;

2. Discuss visibility estimation;

3. Discuss the risks of Special VFR flight; and

4. Discuss the transition to IFR and the clearance given.

SIMULATOR / FTD TRAINING CONTINUED

D. Completion Standards (minimum company expectations).

1. The student shall Demonstrate a competence level in a simulator or FTD that is at or above Commercial/Instrument Practical Test Standards;

2. Demonstrate the ability to adequately estimate the weather and has executed an escape maneuver or enters the IFR system according to company procedure; and

3. Satisfactorily demonstrate company procedures relating to recognition of flat light and white out conditions and VFR to IMC situations.

LESSON PLAN

Objective

Recognize flat light and white-out conditions. Practice escape maneuvers for situations where white-out or VMC to IMC conditions exist.

Emphasis

Have a plan. Know the company policies and procedures.

Set-Up

Choose an airport that the pilot is familiar with.

EXERCISES AND MANEUVERS

VMC to IMC scenario: The pilot will depart the area VFR to an altitude of 1,500 feet. The instructor will lower the weather (both ceiling and visibility) until it becomes IMC. The pilot will execute an escape maneuver when arriving at their personal limit or minimum company limits, whichever occurs first. The pilot will execute either a ~180^0 turn to an area of known VFR, or climb and request an IFR approach back to the departure airport. Upon returning to the airport, the weather will be such that they will have to fly an instrument approach to minimums.

Flat light scenario: The pilot will depart the area VFR to an altitude of 1,500 feet. The instructor will apply weather settings so the pilot is flying between layers, but still has a horizon. The simulator will be placed on "freeze" and the instructor will ask the following questions:

1. What type of weather phenomenon are you flying in right now? (Answer: flat light).
2. What is our policy at Hageland Aviation as it relates to flat light? (Answer: It's permissible to fly in flat light as long as you have a reference point ahead of you.)

Whiteout scenario

The Instructor will continue from the flat light scenario above by "un-freezing" the simulator so the pilot resumes flight. The Instructor will manipulate the weather gradually so that the weather will deteriorate until the pilot no longer has a discernable horizon. At this point, the pilot is expected to execute an escape maneuver. The pilot will execute either a ~180^0 turn to an area of known VFR, or climb and request an IFR approach to the departure airport. The simulator will be placed on "freeze" and the instructor will ask the following questions:

1. What type of weather phenomenon are you flying in right now? (Answer: whiteout.)
2. What is our policy at Hageland Aviation as it relates to whiteout? (Answer: it's in violation of company policy to fly in whiteout conditions.)

Completion Standards

The pilot shall recognize the deteriorating weather conditions and will execute at least one escape maneuver and return to the departure airport.