Aviation Safety Letter

Transport Canada Safety and Security
Transports Canada Sécurité et sûreté

TP 185E
ISSN 0709-8103

Learn from what others are doing right... **Issue 1/97**

V_1 Decision

In the context of a balanced-field takeoff, V_1 is defined as the speed at which, after recognition of an engine failure, the pilot must have initiated action to reject the takeoff in order to stop on the runway remaining. At V_1, hands come off the throttles and the takeoff must be continued. But here comes the rider on the V_1 decision.

The takeoff should not be rejected once the aircraft has passed V_1 unless the pilot has reasons to conclude that the airplane is unsafe to fly. A rejected takeoff after V_1 guarantees that the aircraft will run off the end of the runway.

At V_1 plus a microsecond or two, all hell breaks loose. A thunderous explosive bang is heard by everyone on board and by witnesses two miles away. It is followed by more bangs and major airframe vibrations. At this point, the "Fates" say, "In this microsecond, the decision you make will make you a hero or a goat. If you are wrong, you and hundreds of people could die. If you are right, except for a brief frightening moment, everyone will live happily ever after. If you hesitate in this microsecond, the decision will be taken from you."

In Vancouver, on October 19, 1995, a McDonnell Douglas DC-10-30ER captain had to make this microsecond decision. He rejected the takeoff at V_1 plus two seconds. The brakes smoked as the aircraft ran off the end of the runway. The nose gear collapsed in the soft ground. But after the dust settled, none of the 257 people on board were hurt.

When the explosive bangs was heard, the captain thought: "BOMB." At the time, the captain's decision was logical. He doubted the airworthiness of his aircraft. Yes, there was expensive bent metal, but there were no injuries, no loss of life. After the decision, the entire crew performed flawlessly. (See *ASL 1/96, When Things Go Wrong — Doing It Right.*)

In retrospect, his hands were off the throttles, and the airspeed had passed V_1 when the No. 1 engine failed. With just an engine failure, he could have safely continued the takeoff, dumped fuel, and returned for an uneventful landing. The trouble was that the crew did not recognize the explosive and repeated bangs as compressor stalls and an engine failure. One can only speculate as to what would have happened to that engine had the takeoff continued. But a reject decision at V_1 plus leaves no doubt — you are going off the end.

Here is the accident sequence as reported in TSB's A95H0015 accident report (the full report can

aircraft accelerated to 95 knots. The first officer called V_1 at 164 knots. Two seconds later, there was a loud and startling bang followed by airframe shudder and considerable vibration. The captain called reject and retarded the throttles. The first officer advised the tower of the reject. The second officer manually deployed the spoilers, which activated the wheel autobrakes as the aircraft reached a peak speed of 175 knots.

When it became clear that the aircraft could not be stopped on the runway, the captain steered the aircraft to the right to avoid hitting the approach lights. The aircraft ran off the end at about 40 knots. As it rolled through the soft ground, the nose gear collapsed. It stopped about 400 feet past the declared end of the runway and about 225 feet past the end of the paved area off the end of the runway.

As the aircraft stopped, the flight attendant in charge reported to the cockpit for instructions. After checking with the tower for signs of fire, the captain ordered completion of the evacuation checklist and made the evacuation announcement over the public address system. With minor hitches caused by passengers attempting to take their carry-on baggage with them, the evacuation went smoothly.

be accessed on the Internet at http://bst-tsb.gc.ca/airlist.htp). The departure had been delayed for 75 minutes because of a problem with the No. 2 engine thrust reverser. The problem could not be rectified, so, under the aircraft's Minimum Equipment List, the thrust reverser was disabled and the aircraft cleared to fly.

(The locked-out reverser would not have kept the aircraft on the runway. The accelerate-stop distance would have been 134 feet shorter — still off the end, but less distance through the soft ground and the nose gear may not have collapsed.)

The aircraft was cleared for takeoff. As it moved out onto the runway, power was advanced for a rolling takeoff *(the rolling takeoff did not affect the eventual result).* By 80 knots, the power levers were positioned to the takeoff power range. The second officer called, "Thrust set," as the

Compressor Stall

Detailed investigation showed that the No. 1 engine had suffered a series of blade failures resulting in compressor stalls. The explosive bangs heard were not recognized by the crew as compressor stalls.

Major studies by the FAA and Boeing of rejected takeoffs have found that a number have involved crew uncertainty about the aircraft's airworthiness, uncertainty caused by unidentifiable loud bangs and vibrations that were later determined to be indications of engine stall or failure. The majority of inappropriate crew reactions to benign engine malfunctions involved loud noises. So the problem becomes one of experience, training and timing:

- none of the DC-10 crew members had ever experienced a compressor stall of this magnitude;
- engine and aircraft manufacturers have no specific information on the characteristics of high bypass ratio engine compressor stalls. They offer no such information in operational and training manuals or other guidance material on these symptoms; and
- current simulator and ground training programs do not provide the knowledge. Typically, engine failures are signalled by one or more of: a pronounced yaw, an engine fail light, engine instrument indications, and an announcement by the first or second officer of the nature of the emergency. Compressor stalls are simulated by a series of muffled thumps.

Training courses are now changing to ensure that flight crews operating high bypass ratio engines can correctly identify and respond to compressor stalls or surges.

TSB investigators considered

Transport Canada Safety and Security
Transports Canada Sécurité et sûreté

The **Aviation Safety Letter** is published quarterly by the Safety Programs Branch, System Safety, Transport Canada, and is distributed to all Canadian licenced pilots. The contents do not necessarily reflect official policy and, unless stated, should not be construed as regulations or directives. Letters with comments and suggestions are invited. Correspondents should provide name, address and telephone number. The ASL reserves the right to edit all published articles. Name and address will be withheld from publication at the writer's request.

Address correspondence to:
Editor, Leif Schonberg
Aviation Safety Letter
Transport Canada (AABB)
Ottawa, Ontario K1A 0N8
Tel.: (613) 990-5447
Fax: (613) 990-1301
E-mail: schonl@tc.gc.ca

Leif Schonberg

Regional System Safety Offices

Atlantic	Box 42 Moncton, N.B. E1C 8K6 (506) 851-7110
Quebec	700 Leigh Capreol Dorval, Que. H4Y 1G7 (514) 633-3249
Ontario	4900 Yonge St., Suite 300 North York, Ont. M2N 6A5 (416) 952-0175
Prairie & Northern	• Box 8550 15 - 333 Main St. Winnipeg, Man. R3C 0P6 (204) 983-2926 • Room #202 - 63 Airport Road General Aviation Centre Edmonton Municipal Airport Edmonton, Alb. T5G 0W6 (403) 495-3861
Pacific	4160 Cowley Cres., Room 318 Richmond, B.C. V7B 1B8 (604) 666-9517

Sécurité aérienne — Nouvelles est la version française de cette publication.

that the V_1 definition in the DC-10 flight manual might have been ambiguous, implying that even after V_1 some time is available for the pilot to reject. That definition is being reviewed, not only for the DC-10, but for all of the company's aircraft. Rewording will also highlight the consequences of a rejected takeoff initiated after V_1.

Wet Runways

As an aside, although the runway was bare and dry, TSB investigators considered the effect a wet runway would have had. Existing regulations, did not require wet runways to be considered in calculating balanced-field requirements — only snow, slush, ice, and standing water in excess of 0.25 inches had to be accounted for. Had the runway been wet from rain (we all know it rains a lot in Vancouver in the fall), an added 880 feet would have been needed to stop the aircraft. That may have taken the DC-10 into the ocean dikes with all the potential for structural failure and fire. The new CARs mandate a factor for wet runway takeoffs for new aircraft but do not affect performance requirements for older aircraft like the DC-10.

Engine Monitoring Program

The DC-10 engines are equipped with an exhaust gas temperature (EGT) warning designed to alert the crew when the EGT exceeds 940-960 degrees Celsius. During the takeoff run, the No. 1 EGT amber warning light would have illuminated about the time the loud bang was heard (temperature peaked at 1064 degrees about three seconds after the reject call). None of the crew noticed the rising temperature or the warning light.

The engines also incorporate engine fail lights. These may have illuminated briefly as the No. 1 engine speed decayed. Again, the crew did not see a warning light.

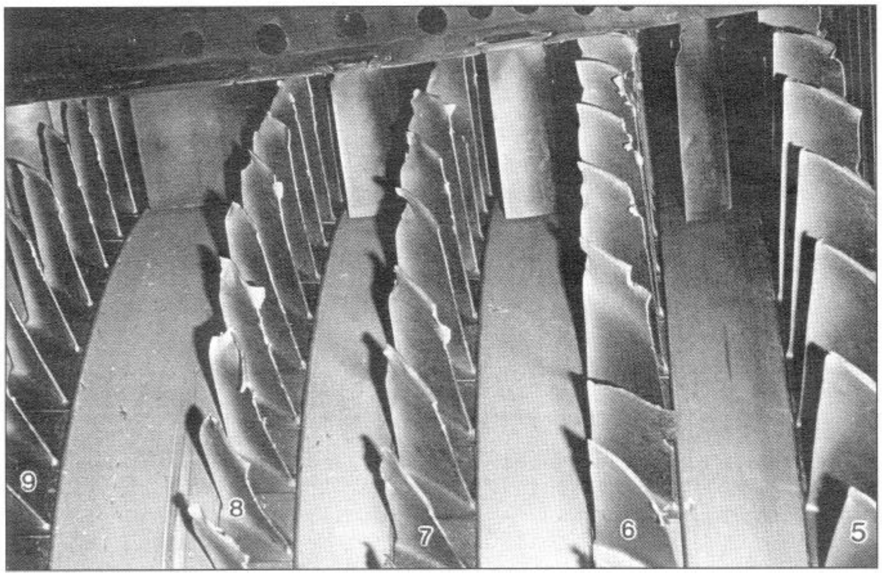
Both these warnings tell the crew that something has already happened. The company also operated an engine monitoring program that, if more timely, could have seen the event coming. Before the accident, engine data, recorded in cruise flight, was passed to a contractor when the aircraft landed at an airport with access to the contractor's mainframe computer. Data was then processed and forwarded to the company for analysis. This meant a delay of two and a half to four days before the readings could be acted on.

On the morning of the occurrence, analysis of data taken earlier showed a small upward drift of nine degrees in the EGT. However, since a similar small variation had been noted a month earlier amid readings in the normal range, it was considered as a normal variation or scatter. Had the data for the two preceding days been available, it would have shown the trend continuing upward to 27 degrees, accompanied by increases in fuel flow and engine core speed (N2). A shift of that magnitude would have resulted in an immediate borescopic inspection of the engine and detection of the progressive blade failures in the high-pressure compressor.

The company now uses ACARS to relay the engine data direct to their own computer as they are recorded in flight. This provides near real-time acquisition, processing and evaluation of engine trends.

Evacuation

Airport firefighters heard the loud bangs and responded immediately. The first vehicle was at the aircraft within a minute of dispatch. Nine vehicles responded. The first ambulance arrived within seven minutes. A triage area was set up. A total of



Compressor stage 5-9.

26 ambulances responded. Evacuation was ordered within a minute after the aircraft came to a stop. It went smoothly and was completed within two minutes. Six passengers suffered minor injuries going down the slides. The success of the operation is a tribute to airport preparedness and company training. But there were some problems and lessons to be learned.

The first officer tried to confirm with the tower for signs of fire before the captain ordered the evacuation. However, unbeknownst to the pilots or the company, with emergency power switched ON, there is no power to audio panel 2. So the captain had to make the transmission. The DC-10 community now knows about this aircraft limitation.

Normal procedures would initiate evacuation by the captain's "Evacuate, Evacuate" order followed by the evacuation signal. But the signal was not recognized by the cabin crew when it was activated prior to the captain's order. Although the company does combined flight- and cabin-crew evacuation training, the DC-10 simulator had no signalling device. Nor had the signal ever been used in the generic evacuation trainer as the sole cue to get out. Both problems have been addressed by the company.

A minor problem with the evacuation slide/raft covers partially blocking the exit doors has resulted in modification of the whole DC-10 fleet.

The company could not quickly transport uninjured passengers and crew to the terminal, because there was a 45-minute delay in getting the passengers from the site to the warmth of the terminal. The airport kept operating, and it took time to coordinate the movement of all the buses across active runways and taxiways.

Load Control

One added passenger, 23 more pieces of baggage, more fuel than planned, and a shorter taxi time than planned all meant that the aircraft began its takeoff roll not under max gross, but almost 3000 pounds over. Not significant when dealing with a 590,000 pound aircraft; it's less than half of one percent. Nevertheless, the company has since tightened its load control.

Computer Programs

The company uses a computer program to complete takeoff calculations for the crew. Two glitches were uncovered in the program during the accident and subsequent investigation. The program uses three types of engine power settings — STANDARD power, MAX power, and BLACK power. MAX power had been calculated by the program as sufficient. However, knowing that one thrust reverser was locked out and correctly assessing that BLACK power would give him additional runway for stopping in the event of a reject, the captain asked for BLACK power to be calculated. However, the computer could not provide those settings, having calculated a lower one was sufficient. The captain later manually calculated and used the BLACK setting of 112 percent N1.

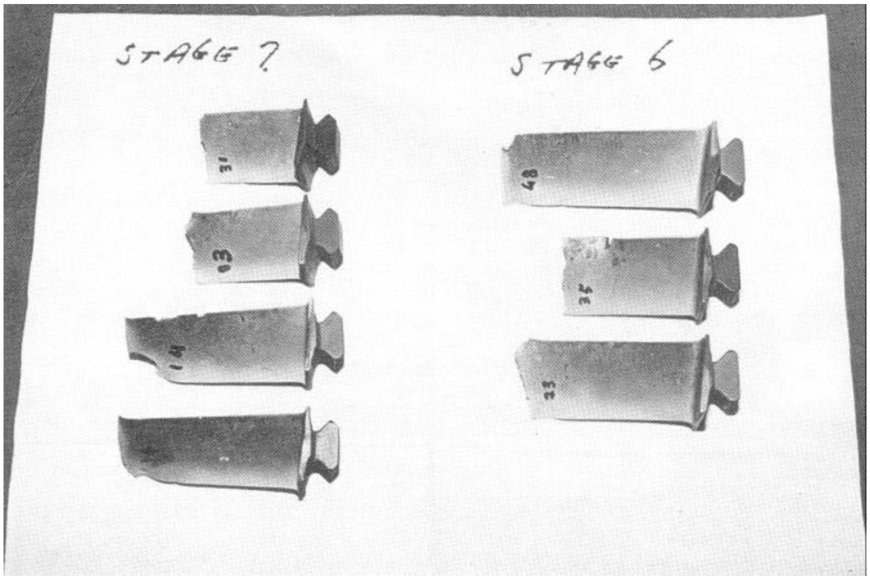
The program also incorrectly computed increased thrust performance at pressure altitudes below sea level (the DC-10 flight manual and the engine performance manual also failed to incorporate a performance reduction for below sea level altitudes). The computer has been reprogrammed.

Checklist

To improve rejected takeoff performance, the company has amended its checklist to ensure that the second officer "deploys the spoilers without command" as soon as the throttles are closed. This eliminates any potential delay that could result from relying on the selection of reverse to deploy the spoilers to activate the auto-brake system.

Minimum Equipment List MEL)

Although the locked-out thrust reverser was not a factor in this overrun, the company has amended its MEL to require that, when the aircraft is at high weight and/or runway limited, both the captain and the chief pilot must agree before the aircraft can be dispatched with a disabled reverser.



Compressor blades.

V_1 is a cast-in-concrete fly/no-fly decision speed. But could all these lessons have been learned if the captain had continued the takeoff? Would they have been? On second thought, maybe the captain was right.

The company calculates the cost of the accident at $15 million to repair the aircraft. Add all the associated expenses and the actual cost approaches $40 million. You can learn the lessons free.

Dangerous Cargo

The aircraft was on vectors for final approach when the flight attendant advised the cockpit that there were fumes of unknown origin in the cabin. As the cabin crew continued their attempt to identify the fumes and locate the source, they discovered that the floor in the area of the landing gear was hot. The pilot immediately lowered the landing gear and completed a safe landing. As he taxied clear of the runway, the cabin reported that the floor was now hot and mushy, and there were wisps of smoke. An immediate ground evacuation was smoothly completed.

When the middle cargo bay was opened, the smoke and heat proved the immediate evacuation had been prudent.

It turned out that illegally shipped caustic lye, marked "Laundry Equipment," had started a chemical reaction. Heat in the cargo bay had reached 600-800 degrees. Because of structural damage, the aircraft was considered a write-off.

Other examples of illegal hazardous cargo include:

- a box marked "Class 3 Explosive — Do Not Load On Passenger Aircraft" loaded as regular checked baggage;
- tear gas containers carried by police officers in their baggage;
- gasoline spilled from a generator; and
- jet fuel from a boxed engine fuel control unit.

Even everyday items like insect repellent, polish remover and household cleaning fluids can leak and create dangerous fumes and chemical reactions.

A couple of recent incidents involve carry-on baggage:

- immediately after takeoff, the cabin of a Boeing 737 filled with kerosene fumes. The fumes were traced to a passenger's carry-on baggage containing a 250 ml can of kerosene; and
- on another departure, petroleum fumes were also noticed, again traced to a passenger's carry-on baggage. This time the offender had carried a small camp stove through security.

Shipment of dangerous cargo is strictly regulated. However, mislabelled items occasionally slip through the safety net. In large airports, security screeners work on behalf of the airline to ensure that hazardous material is not carried on board by passengers. But again, there is the odd slip.

At smaller airports serviced by the commuter lines, there is little if any passenger screening. While there are few incident reports from those operators, the potential gives cause for serious concern. △

Sounds Like..? — The Final Step in Forging the Accident Chain

Step Five —
Writing It Up
There was no record in the aircraft logs that the lock had been reported as unserviceable.

Steps Four and Five go together. If you decide to live with it and don't write it up, it's not going to get fixed, and it's going to turn back and bite you.

This is the tale of a PA31 gear-up landing. It starts with an open nose baggage door. But let's go back to the beginning to see how this crew came to do a belly flop and a 1000-foot slide with the sparks flying.

Step One — Design
The first Murphy in the aircraft design is the nose baggage door warning system. The door is equipped with a warning light that will also activate the Master Caution. The door light is activated whenever the nose door is unlatched and the Battery Master switch is ON. However, to activate the master caution light, the system must first be armed. To do that, the nose baggage door must first be latched. If it is not latched when the Battery Master is turned ON, the system is not armed.

Neither light activated during the accident sequence. Although post-slide checks showed both to be functioning normally.

Step Two — Design
The aircraft is equipped with both a landing-gear warning horn and a stall warning horn. Here comes design Murphy number two. Both are solid-tone warnings. The gear warning sounds at 510 +/- 25 hertz; the stall warning at 675 +/- 25 hertz. The human ear does not easily discriminate between frequencies this close in range, making it difficult to determine quickly which warning is sounding the alarm — stall or gear? Perhaps one should be a steady tone while the other is an undulating one.

To lessen stress on the open door, the captain had flown the approach at a deliberately low airspeed. When the horn sounded during the landing flare, he assumed it to be the stall warning and he continued the landing.

Step Three — Maintenance
The baggage door closes using a key to turn the lock. The lock tumblers were so worn that any key would turn the lock. Routine maintenance check might have detected the wear, leading to timely replacement.

Step Four — Living with It
On the day prior to the accident, the pilot did not have a key. He used his thumbnail to turn the lock. Tight fit?

Step Six — A Sense of Urgency
As the flaps and gear were retracted after takeoff, the captain noticed the nose baggage door ajar. He elected to make a tight teardrop turn back to land on the reciprocal runway (the winds were calm).

Noise from an open door can be distracting, but flying the aircraft and completing the checklist is vital. Over the past ten years, there have been 53 Canadian incidents involving open doors on all types of aircraft. The vast majority have concluded with uneventful landings. Some, when the pilots got distracted by the noise and sense of urgency, have resulted in gear-up landings. A few have had fatal results.

With very rare exceptions, open doors do not seriously affect aircraft performance. Fly the aircraft. Make your approach and landing as normal as possible. Complete the checklist. There is no critical urgency to get it on the ground.

Step Seven — Cockpit
Resource Management
The PA 31 captain decided to reduce approach speed by

10 knots to reduce aerodynamic loading on-the door. He instructed the co-pilot to complete the landing checklist, but he concentrated on accurately flying the reduced approach speed. Therefore, he did not fully monitor the co-pilot's pre-landing checks. Evidently, the co-pilot was also distracted by the open door. He missed the Gear Down step in the checklist.

Step Eight — Confirming the Warning

Many checklists or Standard Operating Procedures require that the crew's first step in reacting to a warning be "Confirm," i.e. "Master Caution — Engine Oil Pressure." Check the pressure gauge, and then call for the checklist procedure to be completed.

Perhaps the PA31 pilot expected to hear a stall warning because of his low approach speed, but he did not confirm. He assumed and continued to a belly flop slide down the runway.

Seneca Loss of Control

Witnesses who saw the fatal takeoff described the takeoff run as long; the aircraft looked slow and mushy; the wings were rocking immediately after lift-off; and it wavered from side to side before banking steeply into the ground.

Would-be rescuers arrived at the scene within seconds but found no survivors among the four on board.

The TSB accident report (A95W0153) records the aircraft as being 400 pounds (eight percent) overweight; the landing gear was down at impact; and the nose baggage door was open.

The Seneca III forward baggage door is located on the left side of the nose, is hinged at

the top and opens upward. The door is secured in the CLOSED position by rotating the spring-loaded latch handle 90 degrees clockwise to the horizontal position. This extends two pins into the doorframe. The key lock is then rotated 90 degrees clockwise to the LOCKED position, and the key is removed from the lock. If the key can be removed at other than the fully locked position, lock and key must be replaced.

A one-time Airworthiness Directives and Piper Service Bulletin requiring inspection of the forward baggage door had been complied with seven years earlier. In addition, one month before the accident, the 100-hours inspection of the door hinges, latches and locks had also been signed off as completed. Yet the investigators' examination found the key and lock tumblers were so worn that the key could be removed in any position. The aircraft was not equipped with a "Door Open" warning light.

The pilot/owner had been observed arguing with one of the passengers, a company employee, before departure. His construction project was behind schedule and four other employees had taken the day off. His distressed emotional state likely affected his pre-flight checks and handling of the aircraft.

He may have deliberately maintained a low airspeed to keep the airload from ripping the door away from the airframe. With the added drag of the forgotten landing gear and a higher stalling speed because of his overweight condition, the pilot stalled the aircraft at low altitude. Recovery was impossible.

Sudden opening of the door during takeoff would have been unexpected and visually distracting. The noise level, flight control feedback, possible airframe vibration and increased drag further diverted the pilot's attention from his primary job — flying the aircraft.

Flying is
a discipline . . .
safety is
an attitude

Controlled Flight Into Terrain (CFIT) — The "Why" is Never Easy

On June 1,1994, the Swearingen Metro II had completed a MEDEVAC from Coral Harbour to Churchill and was returning home to Thompson, Manitoba. The pilot was flying a localizer back course approach when the aircraft sliced through the HOTEL non-directional beacon tower (NDB) that marked the final approach fix (FAF) at Thompson. The aircraft was in a wings-level attitude but only 62 feet above the ground when it hit the 87-foot tower. It was over 800 feet below the published beacon-crossing altitude and almost 300 feet below the minimum descent altitude (MDA) for the approach.

The impact tore five feet off the right wing. The right prop ripped a tower support cable, toppling the tower to the ground. As the aircraft hit a second transmission tower, it rolled steeply into the ground. Both pilots died instantly. The MEDEVAC nurse, who was resting in the back, was thrown from the wreckage and, although severely injured, survived.

The captain was a very experienced 20,000-hour pilot with over 3000 hours flying MEDEVACs on the Merlin II. The First Officer had almost 4000 hours flight time.

Why did this experienced crew fly into the ground?

The TSB investigation (report A94C0088) "determined that the flight crew lost altitude awareness during the approach and allowed the aircraft to descend below a mandatory level-off altitude." Among contributing factors cited in the report were "deviation from published approach procedures, ineffective in-flight monitoring of the approach, and pilot fatigue."

The First Officer was in the left seat at the time of the accident and was the pilot flying (PF) (his grand total in the left seat of a Merlin was three hours). Over the two-week period leading up to the night of the accident, he had been holding various standby duties, accumulating 180 hours of standby. He had flown on nine of the 14 days on 19 separate legs totalling over 40 hours of flight time. Several days prior, he had been awake for 36 continuous hours. He had expressed concern to friends about the stress he was under.

A few days prior to the accident, his efforts to secure employment with a scheduled air carrier had fallen through. Friends noted an out-of-character mood swing — discouragement, irritation and increased anxiety.

At the time of the accident, he had been awake for 17 hours and on duty for 9 1/2 hours.

The captain was fresh off an extended period off duty, but at the time of the accident had also been awake for about 17 hours.

The weather forecast called for 800-foot ceilings with visibilities of six miles, occasionally lowering to two miles in fog. The official observation, taken just prior to the accident, reported a 1200-foot ceiling with 15 miles visibility. The expectation of being in visual conditions may have caused the crew to relax their procedures. However, fog was rapidly developing northeast of the airport, and the crew may not have been in visual conditions when the accident occurred. Weather conditions, forecast or actual, do not, however, justify being more than 800 feet below the published beacon-crossing altitude when conducting an IFR procedure.

In reconstructing the aircraft's flight profile, TSB investigators determined that the crew could not have flown the published procedure but had flown direct to the FAF. The aircraft was in a high-rate descent when intercepting the localizer just prior to the NDB. Both pilots were coping with a high workload.

In the right seat, the captain was performing the duties of the pilot-not-flying (PNF). However, his instruments were not set up to effectively monitor the approach. Although the ILS frequency was dialled in, neither the course setting nor the heading bug were set. Nor was the altimeter set to station pressure. In addition, the altitude alerting system was found set at

5400 feet — it was either never set to assist the pilots in their descent, or it had been cranked up to an arbitrary altitude to deactivate it so that the bright yellow light and aural warning would not distract them during the final approach.

The last altitude warning available to the crew would have been the radar altimeter. It was found set to the MDA and the warning light was ON at impact. However, the light is located by the pilot's right knee and may not have been part of the pilot's normal instrument scan prior to passing the beacon inbound. In the high ambient noise of the Merlin cockpit, the audio warning, a pulsating 80-decibel sound, would have been barely audible to the crew wearing headsets.

The insidious factor in this CFIT accident is fatigue.

The accident occurred after midnight and both pilots had been awake for 17 hours and on duty for 9 1/2. The pilot flying had been holding standby duties for extended periods. His sleep patterns had been disrupted by issues related to both the job and his personal life. He was operating with elevated stress levels. Even for the captain, 17 hours awake would alone have induced some level of fatigue.

The combination of circadian rhythm, hours awake and workload placed both pilots in a fatigued state.

A tired person is more likely to take risks. His or her performance of cognitive and vigilance tasks is impaired. Failing to perform the routine, or taking a shortcut, are much more likely than when a person is refreshed and alert.

Private Pilots Need Ultralight Type Check

The pilot held a private pilot licence, aeroplane category, when he decided to try out the Beaver RX550 he had just bought. He also owned a Piper J3, but had never flown an ultralight. He started the engine and a witness heard it quit, then restart. Shortly after the aircraft took off, the witness called someone who lived by the airport to say an aircraft had crashed. It was discovered inverted in a few feet of water with the pilot's body floating nearby.

A couple driving on the highway also saw the aircraft, apparently on downwind, carry out a tight left turn, then nose-dive to the ground and crash. They were unable to approach the aircraft from the highway due to the deep water.

The aircraft engine was not operating on impact and the seat belt was broken on both sides. The autopsy showed the pilot drowned.

This is not the first time a private pilot licence holder has had a serious accident while trying to fly an ultralight without type training. Ultralights, with their lower speeds and different handling qualities, demand different skills compared to, say, a Cessna 150 or Piper J3. While the private licence permits a pilot to fly an ultralight without further training, it is considered poor judgement to do so. A prudent licence holder will normally obtain a "type check" from a qualified instructor before attempting solo flight in an unfamiliar aircraft, whether it be an ultralight or any other type.

A recent letter to the editor suggested that the ASL *write about ultralight incidents. We don't, normally (the above story was originally published in* Ultralight & Balloon 2/96). *The letter does point out that not everyone is aware of the family of aviation safety newsletters published by Transport Canada. So, aside from the* ASL, *here is the list:*

***Vortex (TP202E)** — edited by Bob Grant, for those of you of the fling-wing persuasion. Published six times a year,* Vortex *is distributed free to all Canadian licensed helicopter pilots.*

***Maintainer (TP3658E)** — edited by Joe Scoles for the benefit of all AMEs. Four issues yearly bring the latest maintenance concerns to all wrench benders with a current license.*

***Ultralight & Balloon (TP7317E)** — edited by Joe Scoles. Mailed twice a year to the balloon community and those pilots who fly the lightweights. The original ultralight mailing list was developed from the pilot licence list, but, with the new system, we have no way of knowing if you have switched from heavier types to ultralights or fly both.*

Distribution of all these newsletters is still free. However, that may change in the future for non-licensed recipients. In the meantime, if you want to be included on one of the mailing lists, fax the responsible editor at (613) 990-1301. △

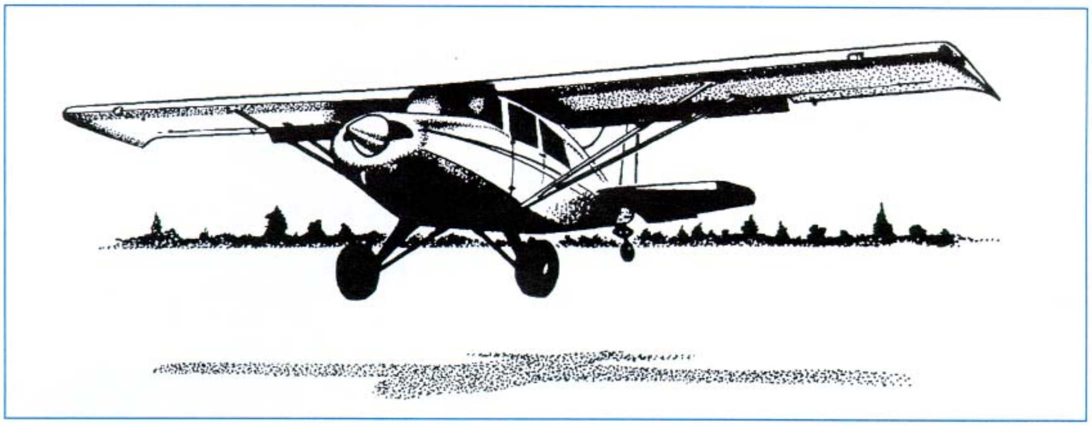
Self-Paced Study — Correction

The self-paced study program published in *ASL 4/96* contains an incomplete answer to Question **Seven.**
It should have read:

"Scattered at 10,000 feet, broken at 25,000 feet, with a possibility of broken at 10,000 feet and broken at 25,000 feet."

To all those who wrote or called the editor: "You pass." △

"NO" Story



He lived alone and only flew his wheel-ski equipped Maule Lunar Rocket within 25 miles of the farm's grass strip —just for the pure joy of it. When he died in the burning wreckage of his beloved Rocket, he had accumulated a total of about 330 hours in the air over the past 18 years — mostly alone.

But this is not a tale of a loner. It's a tale of NOs.

The pilot had obtained a Student Pilot Permit in 1977 and been issued a valid medical for private pilot privileges. But he had never completed training, and the student permit expired in 1978. He had NO pilot's licence.

There was NO record of any dual training in recent years. Never having completed training and without recent dual instruction, it's anybody's guess what degree of skill he had developed; to what degree those skills had deteriorated; or what pilot decision making skills he had ever developed.

He had left NO flight plan, flight itinerary or flight note. He was last seen on a Wednesday. The next morning a visitor to the farm found the pilot and aircraft gone. But it was not unusual for him to disappear for a few days without anyone knowing his whereabouts. So it was 10 days later before a serious search got organized. SAR almost immediately located the burned-out wreckage, only three miles north of home. It is unlikely that the delay made any difference in this case. But delays in SAR mean reduced probability of crash survival. NO flight plan means NO timely SAR response. And when SAR is finally alerted, they have NO idea where to look.

The aircraft had sustained landing and propeller damage some years previously, but the journey log contained NO reference to any repairs. Entries in the log dated December/85 and January/86 had been obliterated using "white-out" — a NO-NO. Air Regs specifically state that no person shall alter or erase an entry made in a log.

The ELT was destroyed in the post-crash fire. It had been installed under the pilot's seat — a NO-NO. That location is vulnerable to impact and fire damage. Regs require that the ELT be located and mounted so as to minimize the probability of damage by fire or crushing as a result of crash impact.

The TSB investigators found alternator damage indicative of a previous sudden engine stoppage. The journey log contained NO record.

The investigators also found that the engine had sustained extreme heat distress due to lack of lubrication. They recovered some oil at the site but suspected that, because of low oil pressure, the pilot was attempting to either return to the farm strip or to complete a forced landing in the field. The engine was very close to seizure but still operating at the time of the high speed impact. An annual inspection had been completed two flight hours before the accident and the pilot had flown at least five trips. There were NO records found that would indicate oil consumption.

Our solitary farmer is past help, but if you see any of his NOs around your flying friends, do something!

How's Your Passenger Briefing?

The Piper Navajo was only a few minutes en route when the overwing Emergency Exit panel opened and departed the aircraft. Luckily, its departure did no other damage to the airframe.

The pilot immediately initiated a return to base and landed safely. It turned out that a curious passenger had removed the plastic cover over the exit handle, and then operated the Emergency Exit release handle.

The pilot and five of the six passengers were no worse for wear. The sixth passenger complained of frostbite — perhaps that was our curious friend.

Passenger safety briefings need to do more than just point out where the exits are. Some do's and don'ts need to be included. Obviously, common sense isn't common. △

DON'T WALK OUT... Stay in the Prime Search Area

Walking, they say, is as good as running. But not always. If you're trying to stay in shape, walking can indeed be as good as running. But if you're trying to get your shape back to the jungle we call civilization, walking can be hazardous to your health.

Years ago, when luckless aviators found themselves contemplating a wrecked biplane zillions of miles from the nearest outpost, they had no choice but to walk out. After all, they had just totalled the only aircraft in the area. And without a homing pigeon, they had no way of telling anyone where they were, and what had happened to them. So, back in the early days of aviation, walking out was de rigueur.

But it was at least 40 years ago when such teaching went out of style. With the advent of SAR forces, radios and, more lately, ELTs and satellites, the advice is to stay with the aircraft.

Why? Because when SAR starts looking for people, it goes to the last known point, then follows the proposed track. Although they're really looking for the people inside the airplane, they have long since learned that the aircraft is easier to see than the people. Thus the search tends to concentrate on that area between the last known point and the proposed destination.

The search isn't confined to that area, but it does start there, and initially concentrates there. During the search, SAR and CASARA crews look for anything unusual. You might think that a person wandering through the woods in a passionate purple T-shirt and bright yellow stretch pants would stand out, but such targets are pretty small. Even the larger remnants of, say, a single-engine Cessna or Piper are hard to see. But they are bigger than the average person.

Thus, SAR organizes the searches to find the downed aircraft. What does this mean to restless campers who think that walking out is showing admirable initiative? Unless they are retracing their proposed flight route, it means that they are moving away from the primary search area; away from possible detection.

Once in a very long while, there is a good reason to move away from the crash site. If the aircraft slides underwater, you don't want to sit in the middle of the lake for too long, amusing the fish. But you shouldn't go much farther than the nearest shore. If you're in the middle of a large forest fire, you'd probably want to move smartly to the upwind side. If you're surrounded by opposing factions in a hot war, walking — even running — out becomes an option. And, if you're in the middle of a Tyrannosaurus Rex family reunion, walking out could suddenly be an idea whose time has come. Better the idea's time should come than yours.

Failing any of the above, you might as well stay with the wreckage. If you can get at the ELT, move its function switch to ON. Then leave it there. The SAR tech who comes to your rescue can make any further switch selections.

Of course, you want to make yourself visible to SAR or CASARA crews. During the day, smoke gets attention. Your campfire, covered with pine boughs, will have local environmental wallahs on your case in no time. You can also add a touch of oil from the engine crankcase, just to make the smoke smokier.

Shiny bits from the aircraft can make signalling mirrors that you can flash into the SAR pilots' eyes. Or, as one pilot did recently, you can arrange larger chunks of aircraft in a nearby clearing to make it show up better for airborne searches. This isn't always an option, as Providence does not scatter nearby clearings to order, but it did work a few weeks ago.

Search efforts taper off at night, as SAR crews are not wild about flying into mountains. However, there are overflights, and most pilots are pretty good about reporting fires in areas where no fires had trodden before. Thus, an especially exuberant fire should get attention. However, you should take precautions to prevent being a feature attraction in the Great Forest Cook-off.

If you're an incorrigible Type A and think you must walk out — don't. Not unless you can see the lights of a nearby town, and the road connecting you to it. Even then, remember that distances are deceiving. If you must leave, leave a message of some sort. Let SAR know that you survived, and that you are walking northeast to salvation.

Salvation is fine. Too often however, it becomes eternity.

Stay with your aircraft.

You're on Fire! — OK. We'll Just Taxi to the Ramp.

Need one of these?

The Piper PA-31 was on a 20-mile final when the turbocharger on the right engine failed. The pilot continued inbound for an uneventful landing at the Sioux Lookout airport.

As the aircraft slowed to taxi speed on the runway, the alert Flight Service Specialist saw large amounts of smoke coming from the right engine. He immediately alerted the pilot. Undaunted, the pilot acknowledged and advised that he would continue to taxi and park the aircraft. (Access to the parking ramp at Sioux Lookout is via a steep up-hill taxiway. It requires significant engine power to climb up).

By the time the aircraft was parked and the pilot was shutting down, flames were visible beneath the engine nacelle and lower wing. The specialist once again alerted the pilot. But by now, available fire extinguishers could not bring the fire under control.

Firefighters from town were called and, after the expected delay involved in their high-speed drive from town, finally put the fire out.

As expected, the fire source was traced to oil leaking from the failed turbocharger. It's hard to believe, but, despite how long the fire was evident, the insulation blanket around the turbocharger actually contained the fire and prevented major damage to the aircraft. A quick parts change, and the aircraft was back in the air the next day.

However, one has to wonder at the thought processes of a pilot who is safely on the ground, and who continues to run the engines in the face of powerful evidence that he is about to be turned to ashes.

CASS 97 – April 22-23, 1997 – Calgary
Canadian Aviation Safety Seminar

Meeting the Challenge of the Changing Environment — How Do We Survive?

This year's seminar will be held in Calgary, Alberta, at the Bow Valley Hotel.
A series of training seminars will precede the seminar on April 21.
Registration costs $150.
Contact: Carol Beauchamp – Tel.: (403) 495-2258; Fax: (403) 495-7355