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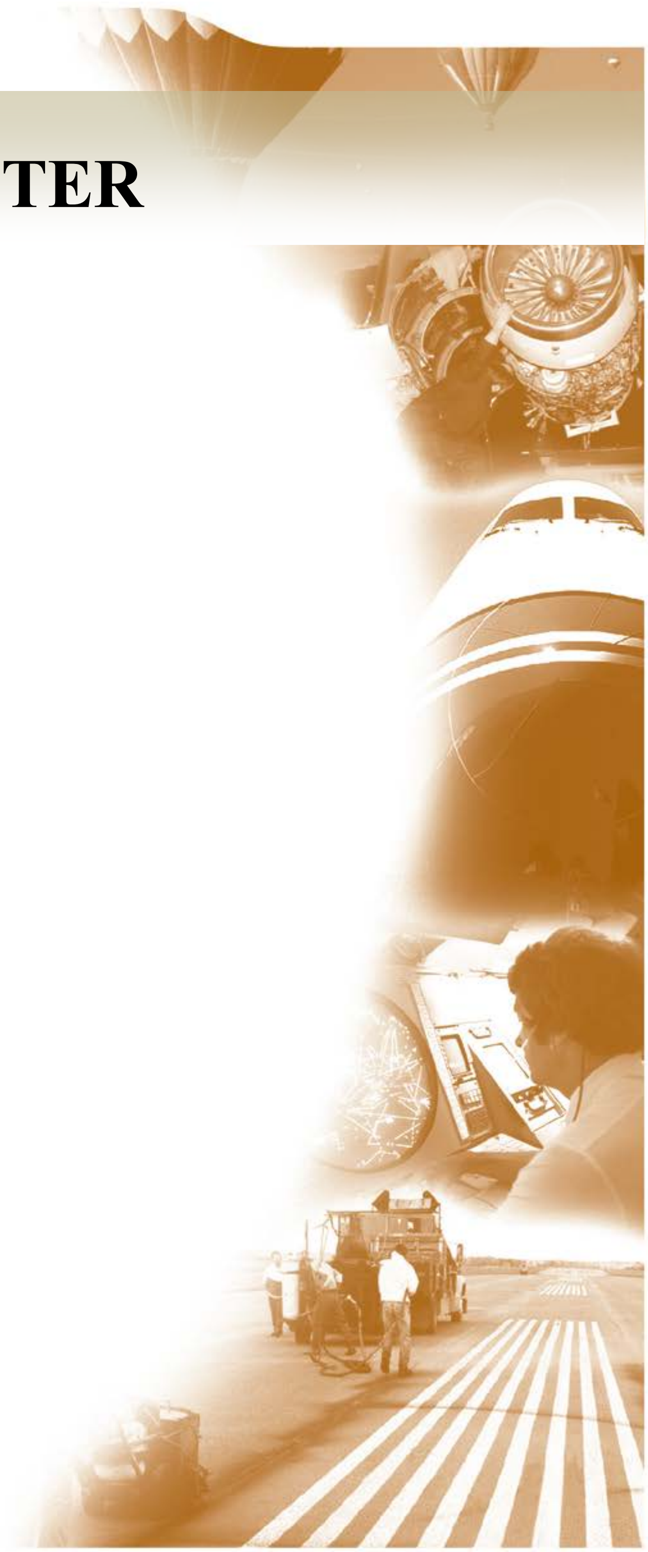
AVIATION SAFETY LETTER



In this issue...

Learn from the mistakes of others;
You'll not live long enough to make them all yourself…

Canada

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Letters with comments and suggestions are invited. All correspondence should include the author's name, address and telephone number. The editor reserves the right to edit all published articles. The author's name and address will be withheld from publication upon request.

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Guest Editorial

Civil Aviation—Transformed!

As you may have heard, Transport Canada (TC) has named two directors-general to lead the Civil Aviation Program. I am responsible for aviation safety oversight as well as the transformation project, and my colleague, Aaron McCrorie, is accountable for the aviation safety regulatory framework. In our new roles, we will both be in charge of leading TC's Civil Aviation Program while maintaining its world-renowned structure, stability and strong presence within the aviation community.

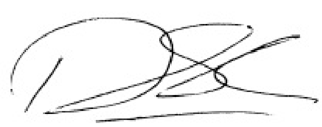
Denis Guindon, Director General

Aaron will look to continue shaping and strengthening the aviation safety program in an evolving industry where we must keep pace with all the changes. In my new role, I will focus on operations and on ensuring consistent program delivery across the country. Operations and program delivery are important as we find ourselves in the midst of changing industry needs, a growing manufacturing sector and ever-evolving technology.

The Transport Canada Civil Aviation Transformation (TCCAT) project will examine our organization and processes in view of accelerating the delivery of regulatory products and enhancing delivery of oversight surveillance activities and services. The goal is to position TC, both operationally and strategically, to meet existing and future challenges in the civil aviation sector.

When we hear the word "transformation", ideas may come to mind right away. In an organizational context such as with this transformation project, we may think that there could be a possibly significant impact on our contacts and regulatory service providers. Let me assure you now that I am confident that any changes are going to be minor managerial and/or organizational tweaks. The changes will be focused on accelerated means of producing regulatory framework products and more consistent delivery of oversight activities.

I am very excited to be leading this transformation project. I am working closely with our employees and meeting with and listening to the feedback of industry stakeholders like you. It is critical for me to better understand your business and processes as I move forward in my new role. Should you have questions or comments, I invite you to email the Civil Aviation Program at services@tc.gc.ca.



Denis Guindon
Director General, Aviation Safety Oversight and Transformation
Civil Aviation

Changes to the Aviation Safety Letter

Since its inception in 1973, the *Aviation Safety Letter* (ASL) has contributed immensely to the dissemination of safety information in Canada and throughout the world in the form of shared best practices, lessons learned, and increased awareness. The *Maintainer* and the *Vortex* were also part of delivering vital safety information. Often, our message has remained unchanged; but, with the changing times, information accessibility has improved, expectations of timely information have increased and there is a general movement towards paperless information products. Keeping up with these trends is part of attracting the attention of the aviation industry's up-and-coming generation. The new publication, which is currently being developed, will be available as an e-zine. It will continue to be published regularly but its format will allow for the timely diffusion of new articles, information, and announcements themed on a quarterly basis and updated on a continuous schedule. This publication will be accessible online.

A few changes to the format have already taken shape in this issue—expanded accident summaries that are more closely linked to the themes of the current issue and a list of Transportation Safety Board of Canada (TSB) final accident reports that can be accessed via TSB links. Class 5 incident summaries will only be included if they add value to the themes in the publication. There will also be a focus on regional aviation safety forum announcements, flight operations and maintenance-related articles and information, as well as other timely safety intelligence.

By trimming down certain areas and expanding others, we are introducing flexibility, timeliness and a fresh new look while maintaining the nature and objective of this publication. I hope that you will welcome this new approach, which will be fully implemented in 2016.

Edgar Allain
Editor, *Aviation Safety Letter*, Summer 2015

2014 David Charles Abramson Memorial (DCAM) Flight Instructor Safety Award

The recipient of the prestigious 2014 DCAM Flight Instructor Safety Award is Sherry Cooper, chief flight instructor at Sky Wings Aviation Academy, Penhold, Alta. The award was presented to Ms. Cooper by Adam Wright of Air Transat, who was representing the DCAM Award national administrator, Jane Abramson, who was unable to attend. The event took place on November 18, 2014, at the Air Transport Association of Canada (ATAC) Annual General Meeting and Tradeshow in Vancouver, B.C.

Several past winners of the DCAM Award were present at the 2014 event.

Left to right: Adam Wright (presenter, Air Transat), Chris Walsh (2013 winner), Kathy Fox (2011 winner), Keith (KO) Ostertag (2014 Legacy Award winner), Sherry Cooper (2014 winner), Clark Duimel (2005 winner), Bob Henderson (2008 winner), Wayne Gouveia (ATAC). (Photo: Mike Doiron)

Sherry Cooper is a mentor and role model for women in the flight training industry; she is totally committed to promoting aviation in central Alberta and beyond. Her contributions to aviation within the industry have been numerous throughout the years and she has served on various boards. Her enthusiasm for flying and her wish to share this fulfilling experience with others are an essential part of both her professional and personal life.

Special recognition was given to Amanda Welsh, assistant chief flight instructor at Moncton Flight College, Moncton, N.B., Cathy Press, chief flight instructor at Chinook Helicopters, Abbotsford, B.C., and Andrej Zile, professor of aviation, Seneca College, Toronto, Ont. The DCAM Legacy Award was given to Keith (KO) Ostertag, flight instructor at Chinook Helicopters, Abbotsford, B.C. Keith has created a significant training and instruction history for rotary wing pilots.

The annual DCAM Award promotes flight safety by recognizing exceptional flight instructors in Canada and has brought recognition and awareness to the flight instructor community. The recognition of excellence within this segment of our industry raises safety awareness, which will hopefully be passed on for many years to come. The deadline for nominations for the 2015 award is September 14, 2015. For details, please visit www.dcamaward.com △

In this edition of the ASL, there are two underlying themes—unstabilized approaches and communications. Both of these themes include significant crew resource management (CRM) components and human factor issues. These themes are showcased in several articles as well as two accident summaries; one summary describes a hard landing, and the other summary describes a crash after an attempted go-around.

***Editor's Note**: To some degree, human factors are linked to all aviation accidents or incidents.*

COPA Corner—Pressure and Pride Can Cause Us To Bend Airplanes

Dale Nielsen is an ex-Armed Forces pilot and aerial photography pilot. He lives in Abbotsford, B.C., and currently manages a small airline and teaches part-time for a local aviation/university program. Nielsen is also the author of seven flight training manuals published by Canuck West Holdings.

Too many of us try to save a landing from an unstabilized approach, resulting in a hard landing, a bounced landing, a porpoise or a trip through the weeds.

During landing at a farm strip, a Cessna 182P porpoised twice; this resulted in separation of the nose gear. The aircraft settled onto its nose, damaging the propeller. There were no injuries to the pilot who was the only person on board. The emergency locator transmitter (ELT) activated briefly before the pilot deactivated it.

The first approach for a Cessna 206D to Runway 12 resulted in a missed approach due to gusty winds from the south. On the second approach, the aircraft began to porpoise on touchdown, which resulted in the nose gear's collapse and the aircraft's exit at the side of the runway.

A Cessna 337 was landing at the operator's private airstrip when the aircraft did not stop at the east end of the half-mile asphalt runway. The aircraft entered a ditch at slow speed and incurred some damage to one of the wings, landing gear and prop. There were no injuries. Poor braking action was reported, and tire skid marks were noted near the end of the runway. It was reported that the runway was covered with mist or dew, and that there was a slight quartering tailwind at the time of the occurrence.

A 1967 Piper PA-18 Super Cub was observed descending steeply toward Runway 34 and touched down at the mid-point of the runway at an estimated airspeed of 45–50 mph. There was a crosswind blowing at 310° and 8 kt. The aircraft bounced and the pilot regained control with full throttle application. The airplane was pointing straight down the runway when a wind gust reportedly picked up the left wing. The aircraft subsequently stalled with a right wing drop, resulting in the aircraft crashing through a perimeter fence to the right of the runway, hitting a small berm, and flipping over. Both occupants extricated themselves from the aircraft, and the passenger was taken to hospital for observation.

The pilot of a Mooney 20C was instructed by the tower controller to land long and exit at Taxiway BRAVO. The pilot did attempt to land long, but was fast; it looked like he was going to overshoot the taxiway. He forced the aircraft onto the runway—nose wheel first—causing the propeller to strike the runway. He was able to regain control and exit the runway.

The first two accidents listed were the result of pilots landing nose wheel first, which resulted in porpoising. It does not appear that any of the pilots attempted to overshoot at the first indication of a porpoise. The result of a porpoise is a collapsing of the nose gear on the second or third contact of the nose gear with the runway.

If an aircraft touches down nose gear first and bounces back onto its main wheels, this is the start of a porpoise. We have probably assisted this by pulling the control column back. The only way to regain control of the aircraft is to hold the control column aft and to add full power and overshoot. If we try to regain control and remain on the runway, we will always be one step behind the aircraft in the porpoise and the result will be nose wheel separation.

The Cessna 337 was either not paying attention to the wind and runway conditions or was ignoring them. A half-mile runway is more than long enough for a Cessna 337, so it likely landed long as well. The braking action on a wet runway with a tailwind was obviously not adequate. We get complacent with both wet runways and light tailwinds. We operate with one or the other frequently. The combination of the two should cause us to rethink the situation. If we decide to continue, which we might if the strip is one-way, we should make sure that we use a short field landing technique. If it looks like we are going to land the least bit long, we should overshoot.

The Super Cub pilot was not stabilized on the approach, which resulted in a long landing and a bounce. Because of the unstabilized approach, he was not able to judge the crosswind and was caught by surprise when it affected him during the bounce. Too much was now happening too quickly for him to control the aircraft during the overshoot. A steep approach to a long landing should have been the cues to overshoot much earlier. We all know that God lives in the control tower and we must do as He says—unless safety is involved. Attempting to force an aircraft onto the runway at too high an airspeed can result in a porpoise, a wheelbarrow or a prop strike. A Mooney 20C does not have a lot of prop/ground clearance at the best of times. An overshoot again was indicated.

Sometimes we are in a hurry—like the Super Cub pilot. The pressure we put on ourselves in such situations can cause us to ignore procedures that we would normally follow and impair our judgment. As the situation starts to deteriorate, we tend to focus on one thing at a time and lose situational awareness. We may not see that other things are going wrong as well. We try to follow the controller's clearances and instructions as best we can, as the Mooney 20C pilot did. When we are not able to do so for any reason, it is our responsibility to do what is safe; we can then inform ATC as to why we were not able to follow their instructions. We must not let an ATC instruction pressure us into attempting something that we are not safely able to do.

It appears that the first two pilots forced the aircraft onto the runway at too high an airspeed, likely because they felt they were running out of runway. The Cessna 206D pilot may have felt embarrassed to miss a second approach and may have put undue pressure onto himself to complete the approach.

The pressure we put on ourselves, and possibly pride, causes us to bend more airplanes than probably anything else. In the case of landing, overshooting is always an option if performed early enough. △

Too Few Misses

by Wayne Rosenkrans, Flight Safety Foundation, International Air Safety Summit (IASS)

New report from the FSF Go-Around Decision-Making and Execution Project advocates application of critical research findings.

Imminent strategic recommendations of the Go-Around Decision-Making and Execution Project, a research effort sponsored since 2011 by Flight Safety Foundation, will aim to reduce all-too-familiar risks during the approach and landing phase of airline flights. Attendees got a preview of the draft final report Nov. 12 during the Foundation's 67th annual International Air Safety Summit (IASS) in Abu Dhabi, United Arab Emirates. Its publication has been scheduled for early 2015.

A series of three articles in AeroSafety World by the principal investigators (ASW, 2/13, p. 22; ASW, 4/13, p. 24; and ASW, 6/13, p. 28) detailed the stages and interim findings of the project, said William F. Curtis, a captain and chairman of the FSF International Advisory Committee (IAC). He shared credit with the co-chair of this project—Tzvetomir Blajev, chairman of the FSF European Advisory Committee (EAC)—who did not attend IASS 2014.1 The project emerged from preliminary data analysis—corroborated by independent studies—that showed that "almost complete (97 percent) failure to call go-arounds as a preventive mitigation of the risk of continuing to fly unstable approaches constitutes the no. 1 cause of runway excursions, and therefore of approach and landing accidents," said Curtis, also senior adviser, organizational and operational safety, human factors risk management, The Presage Group.

The project's end-stage activities were designed to enhance understanding of the psychology of compliance and noncompliance with airline policies when pilots decide to continue to fly unstable approaches rather than call for go-arounds, he told the IASS. The Presage Group conducted research on pilot characteristics that differentiate these decision alternatives, the objective conditions most associated with continuing to fly unstable approaches and go-arounds, and awareness of competency differences as measured for each of nine psychological constructs comprising the Presage Dynamic Situational Awareness Model.

"The issue is our ineffective go-around policies," Curtis said. "It's almost hard to comprehend, but when we look at the go-around rate, it's on the order of one per 30 unstable approaches—3 percent. Approximately 65 percent of all the industry accidents have been approach and landing accidents … year in–year out … for the past few decades. [Yet] 83 percent of approach and landing accidents are preventable with a go-around. Very simple analysis and math—65 percent times 83 percent—[show that] potentially 54 percent of all our accidents could be prevented with a single decision to go around. Just think of the power of that go-around decision for a moment."

Project researchers concluded that the legacy criteria that flight crews use to identify an unstable approach, coupled with prevailing airline policies and guidance calling for a go-around when an approach becomes unstable, have become unrealistic and unmanageable. The discrepancy between official policy and actual practice creates negative side effects. Among explanations for this discrepancy is that pilots often have to factor into their go-around decisions subjective judgments and situational awareness about the level of risk in landing versus the level of risk in conducting the go-around maneuver in flight-specific (as opposed to generic) circumstances.

"First of all, you have to have guidance that is trusted and believed in," Curtis said. "If your employees don't believe in the [go-around] policy, they will find a way around it. Equally as important, maybe more important, is the management of that policy … by the managers."

In simplified terms for the IASS report preview, a go-around decision involves objective conditions (factors the flight crew must respond to but cannot control, such as weather, runway in use or condition/serviceability of the aircraft); effectiveness of situational awareness (which can be influenced by training); and pilots' risk assessment that leads to the go-around decision during flight.

Situational Awareness

The Presage constructs used in the project's research included the gut feeling for threats of pilots faced with this decision (which Curtis described as the "visceral, brain stem response to something that the subconscious is telling you … very powerful and very often correct and right, and you should follow it"). Another construct was functional awareness, which means expertise in performance metrics such as how well the pilots understand their flight instruments and equipment. Situational awareness also involves relying on experience, which in the case of go-arounds during line operations, many pilots rarely, if ever, experience. "Experience is not always working in your favor," Curtis said.

Another psychological construct studied was anticipatory awareness, or how well pilots will predict threats such as those generated by weather in front of the aircraft. Pilots also are affected by the construct of knowing the limits and boundaries, such as landing distances and crosswind limits. Another construct, compensatory awareness, concerns how well pilots adjust to threats such as those introduced by a late change in the wind or runway condition. Researchers also considered a construct called relational awareness, the concept of flight crewmembers' interaction and communication "to keep each other safe." Another construct was hierarchical awareness, referring to mastery of and adherence to standard operating procedures. The last construct noted in the preview was how well pilots know and perceive safety-related support from their airline.

Chronic Noncompliance

As noted, research activities looked separately at the go-around issues related to pilots and those related to airline managers. Participating pilots most often self-identified either with the pilot category that usually continues to land from an unstable approach (called unstable-approach pilots) or the pilot category that usually conducts a go-around when stable-approach criteria are not met (called go-around pilots).

"Unstable-approach pilots … scored significantly lower on all of the situational [awareness–construct] components," Curtis said, noting, for example, that they communicated less in the cockpit. "Unstable-approach pilots feel discomfort in challenging other crewmembers in the cockpit, and particularly when [they] have a steep authority gradient. … They feel overall—[and] the go-around pilots [feel this] as well—that the go-around criteria that we give them are unrealistic for the world they operate in.… They're telling us that they don't believe in [the go-around policy/guidance]. Pilots indicate there is no disincentive for noncompliance. That is, 'Management is not concerned, so I can basically do what I think is the best for my crew, for my flight at the time.' 'No disincentive' … just means … they will get no feedback one way or the other if they don't comply with this policy."

Compared with unstable-approach pilots, four times as many go-around pilots told project researchers that the pilot monitoring or another crewmember on the flight deck typically prompted go-arounds.

Curtis said that airline managers as a whole were relatively reluctant to participate in this research, a posture that researchers attributed to discomfort about the mentioned disconnect between the go-around policy in force and actual data showing low compliance with it. "[As managers,] we're responsible to manage that policy, [and] we know the compliance rate is very low, so we haven't been that effective so far—but how come?" Curtis said. "Management is disengaged from the issue. [Survey data indicate that] 68 percent of management [respondents] did not know the [go-around] compliance rate in the industry, and only 16 percent estimated a rate close to the actual rate of 3 percent. More than half, 55 percent, did not know their own company's rate of compliance."

Overall, the participating managers—like the unstable-approach pilots—scored low on all situational components in the constructs. "Of those who did score higher, they saw their own policies as unrealistic and the [stable-approach] definitions as too narrow," he said. "Generally, we have found that the industry tends to focus on minimizing unstable approaches, [which] is only going to have an effect on half of the [runway] excursions. There's very little focus on go-around decision making and little focus on unstable landings."

Strategic Recommendations

The forthcoming report will propose strategies to improve go-around decision making and execution, presenting comprehensive details about rationale, scope and implementation—some elements derived from practices already implemented by a few airlines engaged in resolving this issue.

One strategic recommendation calls for the airline industry to minimize the subjectivity of pilot decision making during approach and landing, tapping improved procedures, data sources and technology. Today, flight procedures and pilots' passive calls provide relatively little objective information, but this could be improved by introducing active calls during approach (e.g., approach callouts at 1,000 ft, 500 ft and decision altitude—plus active calls during landing for threshold-crossing altitude and touchdown-zone end, the latter based on elapsed seconds from the threshold crossing or pilot observation of runway markings). Lateral and vertical guidance to flight crews also would help them consistently assess and respond to unstable approaches, Curtis said.

Although new stable-approach monitoring systems show promise at this early stage of their development, it should be possible in the near future to introduce unstable approach–alerting systems as robust as traffic-alert and collision avoidance systems or enhanced ground-proximity warning systems, he said.

Another recommendation calls for increased go-around noncompliance awareness within airlines and the entire industry. "Set go-around compliance rate targets and monitoring programs in your companies," Curtis told IASS attendees. "As a manager, if you set rates and compliance targets, you're going to put processes in place to achieve them. Without those targets, you're going to manage something else that day."

Another recommendation calls for optimizing existing stable-approach definitions/criteria and go-around policies "to really improve the relevancy of those policies for not only the flight crews but management," he said. A practical objective of such revisions is to exclude very low risk approaches.

"We don't want to have [flight crews] go around for every single unstable approach," he said. "We need to separate the profile heights from energy-management criteria heights. We need to separate the stable-approach definitions from the decision-point definitions. [We need to] allow for some variable objective environments … some non-prescriptive, but guided, decision making."

Going forward, an organization such as the Foundation ideally should track aggregated, de-identified noncompliance data and publish annual reports about go-arounds from unstable approaches to gauge the effectiveness of risk-reduction efforts, he added.

"To help encourage operators to set their own internal programs and targets, we're recommending that state and industry audit programs such as the International Air Transport Association Operational Safety Audit include go-around noncompliance standards and recommended practices in the audits," Curtis said.

The new report also will detail other rationale and considerations—such as go-around effects on air traffic control in congested airspace—behind the strategic recommendations, including the safety factors in the transfer of risk from a continued-approach profile to a go-around profile.

"In conclusion, the threat of go-around noncompliance is quite large," Curtis said. "Mitigation is available now, and it's not that complex. The impact of smart go-around decision making can be significant to our industry's accidents." △

TSB Final Report—A13O0098—Hard Landing and Tail Strike

The following occurrence summary describes an unstabilized approach that led to a hard landing and tail strike. This occurrence was not a typical unstabilized approach, which is often characterized by an unstable condition throughout a large portion of the approach profile. Instead, this approach became unstabilized during the transition to landing below 90 ft, which is a critical phase of flight. The combination of pitch changes, glide path deviations, and reduction in airspeed made it impossible to maintain the desired performance. This accident occurrence is a reminder of how critical stabilized approaches are. It underlines how important it is for flight crews to have a clear understanding of what constitutes a stabilized approach and demonstrates the very important role of pilot monitoring in order to communicate deviations from the desired state.

*On June 27, 2014, Transport Canada (TC) released Civil Aviation Safety Alert (CASA) 2014-03 entitled "*Using SMS to Address Hazards and Risks Associated with Unstable Approaches*". Further analysis is currently ongoing and a safety awareness promotional campaign on this topic is being developed to reach out to a larger audience.—Ed*

On the 26th of May 2013 Bombardier DHC-8-402 was on a scheduled flight from Billy Bishop Toronto City Airport, Ontario, to Sault Ste. Marie Airport, Ontario. During touchdown on Runway 30 at 2216 Eastern Daylight Time, the tail struck the runway. After landing, the aircraft taxied to the gate, where the passengers were deplaned. There were no injuries to passengers or to the crew; however, there was substantial damage to the aircraft. The occurrence took place during the hours of darkness. The emergency locator transmitter was not activated.

Analysis

The flight crew was qualified in accordance with regulations. The aircraft was certified, equipped and maintained in accordance with regulations. The weather is not considered to be a causal factor in this occurrence. The flight from the time the autopilot was disconnected until 500 ft above the touchdown zone (HAT) was uneventful and in accordance with standard operating procedures (SOP). The analysis will therefore examine the approach profile from the time the autopilot was disconnected 3 min before touchdown and the final 43 s from 500 ft HAT to touchdown.

From the point the autopilot was disconnected and the pilot flying (PF) started hand-flying the aircraft, there were minor deviations both above and below the ideal 3° glide path. These deviations could be considered normal as the PF adjusted to hand-flying the aircraft. The deviations were corrected by small changes in aircraft pitch attitude and engine power. When the aircraft was above the ideal glide path, pitch attitude and engine power were reduced slightly. When the aircraft was slightly below the ideal glide path, pitch attitude and engine power were increased slightly.

At 500 ft HAT, the aircraft was on track and configured for landing, the rate of descent was approximately 400 ft per minute (fpm), and the speed was 127 knots indicated (landing reference speed [VREF] +6). At this time, the aircraft met all company-defined requirements for a stabilized approach, and the appropriate “Stabilized” call was made by the pilot monitoring (PM).

The flight data recorder (FDR) data show that, seconds before crossing 500 ft HAT, the aircraft had drifted slightly below the glide path and that a correction had been applied back to the glide path. As the approach continued, the aircraft continued to drift above the glide path. The PF attempted to correct with slight nose-down pitch and minor engine power reduction. When the aircraft passed through 300 ft HAT, the indicated airspeed had increased to 131 knots; this was still within VREF +10. The aircraft, however, continued to drift above the ideal 3° precision approach path indicator (PAPI) glide path. Seconds later, as the aircraft passed through 250 feet HAT, the PF reduced the engine power from 13% to approximately 5% flight idle and pitched the nose down slightly. This power reduction would have significantly decreased the airflow and lift over the wings. As well, the fact that the profile drag from the propellers would have been in fine pitch at flight idle would have slowed the aircraft. The indicated airspeed began to decrease immediately. However, the aircraft continued to drift above the glide path and, at 0.4 nautical miles and 200 ft HAT, reached the 3.5° PAPI glide path, at which point the vertical descent rate began to increase.

As the aircraft passed through approximately 90 ft HAT, the airspeed dropped below VREF and continued to decrease. At the same time, the vertical speed was increasing above -800 fpm and the aircraft was drifting below the ideal 3° PAPI glide path. The PM did not notice the increased rate of descent, most likely because he was monitoring the visual approach out the window at this point and not the aircraft instruments. As a result, no call-out for a go-around, as required by the company SOP, was made by the PM when the airspeed dropped below VREF. Continuing the approach when an aircraft does not meet the criteria for a stabilized approach is cited by the Flight Safety Foundation as being a contributing factor in 66% of approach and landing accidents and serious incidents. Neither crew member identified that the airspeed had dropped below VREF; the flight no longer met the requirements of a stabilized approach, and an overshoot was required.

Below 500 ft HAT, the SOP is very specific: if the aircraft is no longer stabilized, then a call for a go-around is required. The PM knew the PF had reduced power at 250 ft HAT to correct for the increased airspeed and high approach, but did not realize how much the power had been reduced. Everything still appeared to be relatively normal at this point and within the company-defined parameters of a stabilized approach. When the airspeed dropped below VREF, the approach was no longer stabilized as per the SOP. By the time the PM realized there was something wrong, there was no time left to react or take corrective action. If SOP do not clearly define the duties of the PM, there is an increased risk that unsafe flight conditions could develop.

At 40 ft HAT, the PM realized that the aircraft had slowed too much and was descending too rapidly, and told the PF to add power just before impact. The PF reacted by applying aggressive nose-up control followed by an increase in the engine power. However, the airspeed was decreasing through 113 knots (VREF -8), and the vertical speed had increased to over -900 fpm and was still increasing. When a higher rate of descent occurs near the ground, the manufacturer recommends that pilots use power versus nose-up pitch to reduce the rate of descent and limit the nose-up attitude to 6°. Both flight crew members had received pitch awareness training and were aware of the need to limit pitch on touchdown and use power to control the descent rate.

The PF had limited experience on an aircraft the size of the DHC-8-400 and had only just completed line indoctrination 2 months prior to the occurrence. During the PF’s training on the DHC-8-400, the appropriate management of approach power/pitch and the elimination of large power changes in descent to chase speed were areas identified that needed improvement. Initially during this approach, the PF was correcting the glide path and airspeed with small power and pitch changes. During the approach, the aircraft's deviations above and below the glide path were relatively constant; however, after the aircraft passed 500 ft HAT, these minor changes were no longer as effective because there was less tolerance and time for the changes to take effect. With the aircraft drifting farther above the glide path and the airspeed increasing, the PF overcorrected by reducing the engine power to flight idle. As the aircraft rapidly approached the ground, the PM called for more power to reduce the descent rate and the PF instinctively reacted by pulling back on the control column increasing the pitch attitude. The PF pitched the nose up beyond the limits stated in the SOP and the manufacturer's pitch awareness training. This action did not achieve the desired result of slowing the rate of descent. The high rate of descent with power coupled with the high nose-up attitude of the aircraft resulted in the hard landing that compressed the struts and allowed the tail to strike the runway.

The company SOP defines the criteria for a stabilized approach; however, one item that is not mentioned is glide path when using visual glide scope indicators such as the PAPI. There are indications for instrument landing system (ILS) glide slope deviation, which would be applicable during an ILS approach, but no limits for the visual approach. The FDR data clearly indicate that the aircraft was constantly deviating above and below the glide path after the autopilot was disconnected, yet by company SOP the aircraft met all the criteria for a stabilized approach while passing through 500 ft HAT. The only defined parameter that made the approach unstable was when the indicated airspeed dropped below VREF at 90 ft HAT. If SOP do not clearly define the requirements for a stabilized visual approach, there is an increased risk that continued flight could result in a landing accident.

Findings

Findings as to causes and contributing factors

1. Neither crew member identified that the airspeed had dropped below landing reference speed; the flight no longer met the requirements of a stabilized approach, and an overshoot was required.
2. The pilot monitoring did not identify the decreasing airspeed and increasing descent rate in time to notify the pilot flying or intervene.
3. In response to the pilot monitoring's warning to add power, the pilot flying pitched the nose up beyond the limits stated in the standard operating procedures and the manufacturer's pitch awareness training.
4. The high rate of descent coupled with the high nose-up attitude of the aircraft resulted in the hard landing that compressed the struts and allowed the tail to strike the runway.

Findings as to risk

1. If standard operating procedures do not clearly define the requirements for a stabilized visual approach, there is an increased risk that continued flight could result in a landing accident.
2. If standard operating procedures do not clearly define the duties of the pilot monitoring, there is an increased risk that unsafe flight conditions could develop.

Safety action taken

Immediately following this occurrence, the airline initiated a safety management system investigation. Part of the immediate corrective action involved a revision of the *Pitch Awareness Training* document (Rev 6.0 / 29 May 2013) to highlight previous occurrences and the need to arrest high descent rates with power and not pitch.

As well, the company initiated the following actions:

- Conducted a review of training for training captains and line pilots;
- Reviewed the use of flap settings on approach;
- Provided further clarification on the stabilized approach procedure; and
- Re-emphasized hazards associated with nighttime operations.

This report concludes the Transportation Safety Board's investigation into this occurrence. The Board authorized the release of this report on 28 January 2015. It was officially released on 12 February 2015△

Planning to fly in mountainous areas?

Take a few minutes to read Transport Canada's

"Take-Five" pamphlet on mountain flying!

Pilots vs. Engineers or Us vs. Them: A Question of Safety

by Wade Pelly, Pilot Instructor Helicopter, Conception Harbour, Newfoundland. Reprinted from Maintainer, Issue 1/2004.

There's a state of mind that can ruin your base. It can crush morale, interfere with getting the job done and make you want to be elsewhere. I've seen it where I'm working now and I've seen it on other bases. It can be divisive of any two groups of people, but for now I will focus on how it divides engineers and pilots. It's hard to put a label on it. Instead I'll try to describe it. If any of this seems all too familiar, I hope some of the ideas which follow will help fix the problem.

How it divides engineers and pilots. The successful operation of any base requires cooperation between engineering and pilot staff. A friendly rivalry may exist between us but, at times, rivalry can combine with individual conflict and develop into open warfare. The problem is not specific to any one type of operation. I've observed it in emergency medical services (EMS), in the bush, overseas, in flight training and in the military. It just as easily divides captains and co-pilots, line-staff and management, or field workers and office staff, and it is usually centered on those few people who refuse to cooperate. When battle lines get drawn, they bump everyone into two groups—Them or Us.

I've wondered why it continues to be an issue. The people I work with are professionals striving to conduct business safely and reliably. It's bad enough when a rift develops between individuals, but when it divides whole crews, it can become difficult to keep the operation working at all—let alone smoothly. When morale heads south, mistakes increase and though we get the job done, not one of us is happy. I will discuss some of the factors that I believe contribute to these conflicts getting out of hand. They may or may not apply to your situation but they do apply to many I've seen. I'm not a psychologist by any stretch of the imagination, but I'm willing to offer some opinions based on what I've witnessed. If you think I'm way out in left field with no business being there, please let me know.

Human nature. Common sense says, we don't get along with all the people all of the time. We cope, recognizing the problem or problems we have with any one person, putting distance between ourselves or working it out with others as professionals, if not necessarily as friends. In the kind of operations in which we work, distance is not always an option. We may have limited space in which to work and few places to go in off-hours. It is necessary for us to keep our eyes open for anyone losing their sense of humour and help them keep their perspective. If the simplest things are making someone crazy, either back off or find out what the real problem is. It is important, as we get on each other's nerve, to make allowance for personality quirks. It is also important not to apply a problem we have with one person to the whole group. Just because I keep adding 2 and 2 to get 5, doesn't mean all pilots are out to botch up the journey log for the engineers

Duty day differences. Hours worked and the *Canadian Aviation Regulations* (CARs) strictly control minimum crewing for pilots. As a result, we tend to get a reasonable work schedule even in 24-hour operations. The exceptions are seasonal high intensity jobs. Customers usually prefer to fly daylight hours during the workweek, which sets the pilot's schedule nicely. This leaves the maintenance department with limited time to complete inspection and repairs. They end up getting time during less desirable hours of the day. But we aren't going to change the schedule. We need to deal with it—ensuring that each operation has the people, pilots and engineers it needs. No more single machine, 24hour, and seven days a week operations being staffed by six pilots and one engineer.

One common reason why training fails. Why is it then, I hear pilots complain about engineers not working hard enough and vice versa? Consider the size of the operation. A single pilot and engineer working together on one machine in the bushes have rarely complained about the other. They see and understand each other's role and either get along or understand the problems are personal, not a function of somebody's trade. They have mutual respect. When we are assigned to a base with a large number of crews, we loose touch with the nitty gritty details of each other's work and tend to look at things from our own perspective. It is easy to get irritated watching someone else kick back in the sun or complain about not having enough ice in his drink at lunch, while I'm sweating bullets trying to keep up with the job at hand. I need to remember; he will be feeling the same about me when I'm sitting down to a steak dinner and a cold one, while he's swatting malaria-laced mosquitoes trying to finish a 25-hour inspection after dark. As I said, it's all about perspective.

Lack of education. To clarify, a lack of education is what I mean. All too often, new entrants to the business of flying or maintaining helicopters are told next to nothing about whom they will be working with. In early training, the only information I was given about engineers and technicians was how to make sure I wasn't caught by their mistakes, and how to deal with engineers who didn't like pilots. Great stuff upon which to build a working relationship—no! Almost nothing was said about how I could learn from the experience of others; how closely we would be working together; or how often he would save my bacon. I've found from working with engineers, their experiences were similar. The solution is simple. From day one, educate and mentor student pilots and apprentice engineers. We need to teach them about their own jobs and about the importance of the people with whom they will be working. If we can instil an understanding and respect for each other's importance in getting the job done, then working together should be easier and we will help clear up the next point.

Communication is the key. Pilots talk about engineers, what they're like, what they do. Usually it's just good-natured ribbing, but for some it gets way too serious. These are the people who forget how closely we need to work together and how similar our situations are.

Unfortunately, our attitudes are shaped, as any teacher or instructor will tell you, by our earliest experiences. They become very inflexible and difficult to change. The later in our career or life we try to make a change, the harder it is. Again, this is why early education and mentoring is so important when we bring new blood into our organizations.

The heart of this article is about respect and professionalism. We may not become best friends and chum around together or change the structure of the world, but we need to have a level of professionalism and personal respect for each other in what we contribute to the operation. One group can't function without the other. Communication is the key to developing and maintaining respect. The earlier we teach this to the apprentice or newly licensed pilot, the better the situation will become and the fewer problems we will have to deal with or correct down the road. Maybe, one day, we will get ambitious enough to try to take the same approach with management. △

Crew Resource Management Case Study: Crash During Attempted Go-Around After Landing

The following is based on a SKYbrary summary of a fatal accident in the United States of America in 2008 with a significant crew resource management (CRM) implication and some fatigue consideration. We encourage our readers to become familiar with the event and for operators in particular to learn from this occurrence. Text cited below comes from the National Transportation Safety Board (NTSB) Final Report AAR-11/01.

Summary

On July 31, 2008, the crew of a Hawker Beechcraft HS125-800A attempted to reject a landing at Owatonna, Minn., USA, after a prior deployment of the lift-dump system, but their aircraft overran the runway then briefly became airborne before crashing. The aircraft was destroyed and both crew members and all six passengers were killed. The investigation attributed the accident to poor crew judgement and general cockpit indiscipline in the presence of some fatigue. The investigation also considered that it was partly consequent upon the absence of any regulatory requirement for either pilot CRM training or operator standard operating procedure (SOP) specification for the type of small aircraft operation being undertaken.

Investigation

An investigation was carried out by the NTSB. Recorded data relevant to the investigation was recovered from the cockpit voice recorder (CVR), but the aircraft was not fitted with a flight data recorder (FDR) and was not required to be so equipped. No evidence was found to suggest that the aircraft had been anything other than airworthy. It was also concluded that the aircraft had been loaded within normal weight and balance limitations. The focus therefore moved to the performance of the pilots.

It was established that the 40-year-old aircraft captain had been pilot flying (PF). He was experienced in command on the aircraft type and in the same role on the operator's Learjets. The 27-year-old first officer was found to have joined the company from flight school some nine months earlier and to have accumulated almost 300 hr flying since that time, nearly all of it on the HS125.

The aircraft was radar vectored around the worst of some widespread and active convective weather as it neared the destination and eventually went onto the instrument landing system (ILS) for Runway 30 at the request of the PF. The ILS approach was uneventful and visual reference was acquired in good time. The aircraft subsequently touched down within the touchdown zone (TDZ) at correct speed. It was concluded that the captain had probably "applied sufficient pressure on the brakes during the initial part of the landing roll to take full advantage of the available runway friction", but that he had not deployed the lift-dump system (a mechanically interconnected combination of an extreme trailing edge flap deflection and air brake lift spoilers installed as an alternative to thrust reversers) immediately after touchdown in accordance with company procedures.

About 20 s after touchdown, the lift-dump system appeared to have been stowed followed by thrust being applied to initiate a go-around. The aircraft then overran the end of the 1 676-m long runway by approximately 300 m before striking the ILS antenna as it became briefly airborne for about another 360 m before finally coming to a stop in a field beyond an unsurfaced access road that borders the airport some 650 m from the end of the runway.

Subsequent calculations indicated that at the time the go-around was initiated, the rate at which the aircraft was decelerating was such that had that action not been taken, the aircraft would have left the runway at a ground speed of between 23 and 37 kt and stopped with a maximum overrun of 90 m, well within the 305 m runway end safety area (RESA). It was concluded that "it can be reasonably assumed that, at some point during the landing roll, the captain likely became concerned that the airplane would run off the runway end and had to decide whether it was preferable to overrun the runway or attempt a go-around". It was noted, however, that there was no evidence to indicate that the captain was "prepared for the possibility of a go-around".

About 8 min prior to landing, the final weather given to the crew by ATC was a surface wind of 320° at 8 kt, but the controller cautioned that this was already about 20 min old. The weather conditions subsequently found to have been recorded by the airport automated weather observation system (AWOS) at the time of the accident gave a wind velocity of 170° at a mean speed of 6 kt, and calculations using all the evidence available indicated that there had been an 8-kt tailwind component for the landing. However, although it was raining and the runway had been wet, there was no evidence that either reverted rubber or dynamic hydroplaning had occurred on what was found to be an ungrooved concrete runway in good condition and not prone to the accumulation of standing water.

It was noted from the CVR evidence that during the descent and approach, both pilots repeatedly failed to complete the various required checklists properly, "demonstrating that neither was focused on proper checklist execution". It was considered that the captain had "allowed an atmosphere in the cockpit that did not comply with well-designed procedures intended to minimize operational errors, including sterile cockpit adherence, and this atmosphere permitted inadequate briefing of the approach and monitoring of the current weather conditions, including the wind information on the cockpit instruments; inappropriate conversation; nonstandard terminology; and a lack of checklist discipline throughout the descent and approach phases of the flight". It was also concluded that both pilots had "exhibited poor aeronautical decision-making and managed their resources poorly, which prevented them from recognizing and fully evaluating alternatives to landing on a wet runway in changing weather conditions, eroded the safety margins provided by the checklists, and degraded the pilots' attention, thus increasing the risk of an accident".

It was noted that "both pilots had excellent performance records as individual pilots but functioned less effectively as a crew". The first officer had essentially been treated as a trainee and was given minor tasks such as contacting ground operations and resetting the transponder at critical times during the approach "when both pilots should have been attentive to the landing". It was considered of particular note that "the captain [had] never discussed the first officer's role in initiating or supporting a go-around decision, a role which may have provided a decisive advantage in the accident situation".

Finally, a review of the evidence led the investigation to conclude that the performance of both pilots was probably "impaired by fatigue that resulted from their significant acute sleep loss, early start time, and possible untreated sleep disorders" and that "fatigue might have especially degraded the captain's performance and decision-making abilities when he had to decide while under time pressure whether to continue the landing or initiate a go-around". It was discovered that the first officer had taken "a prescription sleep aid for which he did not have a prescription" the night before the accident, but concluded that "because of the short duration of its effects for most individuals", it was unlikely that this would have degraded his performance by the time the accident occurred.

The investigation found that the **probable cause** of the accident was "the captain's decision to attempt a go-around late in the landing roll with insufficient runway remaining".

It was additionally determined that **contributory factors** were:

1. "the pilots' poor crew coordination and lack of cockpit discipline;
2. fatigue, which likely impaired both pilots' performance; and
3. the failure of the Federal Aviation Administration to require CRM training and SOPs for Part 135 operators."

As Canadian operators already know, science-based fatigue rules and mandatory CRM training for 703 and 704 operators are on the short horizon for regulatory action in Canada. We encourage operators to implement those proven processes voluntarily, ahead of the regulations. —Ed. △

Canadian Aviation Regulation (CAR) 604 Private Operators, Maintenance Managers and Maintenance Control System Components

by Cynthia Harrison, Senior Officer, Safety Promotion and Education, Airworthiness, Transport Canada

Canadian Aviation Regulation (CAR) 604 Private Operator Registration Document (PORD) holders must have a maintenance control system for their aircraft fleet. PORD holders appoint the maintenance manager. Per CAR 604.126, the maintenance manager is responsible and accountable for the company's maintenance control system. An effective maintenance control system will ensure that the aircraft fleet is airworthy, equipped and configured for the intended flight(s). The company's operations manual contains the details of the maintenance control system being used.

The PORD holder's maintenance control system must contain procedures to ensure that the approved aircraft maintenance schedule is followed. Maintenance schedules should include details such as maintenance inspection intervals, Airworthiness Directives, life limited items, etc. Private operators are responsible for ensuring the continued effectiveness of their approved maintenance schedules. Defects should be reported and controlled through the maintenance control system. Aircraft maintenance service information documentation should be routinely assessed, tracked, updated and recorded into the appropriate systems and aircraft technical records per CAR 605.92. The maintenance control system ensures that aviation parts are controlled, inspected, stored and certified to meet applicable airworthiness requirements. Operators could use a parts pooling system, which must then be detailed in the company's operations manual. Established maintenance contracts are another element of the maintenance control system. These written agreements authorize, detail and describe the maintenance or elementary work to be performed. Copies of these contracts must be retained for two years.

Under the maintenance control system, PORD holders can authorize individuals to perform elementary work provided that qualified training is completed and documented in the appropriate files per the CAR requirements. Aircraft empty weight and balance control journey log requirements are another component of the maintenance control system.

Photo by J. Perez, Transport Canada (FLICKR)

Whether the maintenance control system is simple or complex, electronic or paper-based, it must be able to answer one key question—can it provide a quick snapshot of the status of all its components to confirm to both the PORD holder and the maintenance manager that the company's operations are safe, effective and meet the regulatory requirements? Remember that a maintenance control system that is well-established and effective protects the aircraft, clients and the company. It also keeps the organization running smoothly, ensures client satisfaction and is good for business. △

TSB Final Report Summaries

The following are a listing of TSB Final Accident Reports that can be accessed on the TSB website.

TSB Final Report A11Q0170—Risk of Collision

The following occurrence is one of the most serious runway incursions in recent Canadian history. Readers are strongly encouraged to read the entire report on the TSB Web site and operators may want to use or discuss the scenario as part of company crew resource management/pilot decision-making (CRM/PDM) training. —Ed.

TSB Final Report A12P0008—Engine Power Loss and Hard Landing

On January 17, 2012, at 13:51 Pacific Standard Time (PST), a Eurocopter AS 350 B3 helicopter with only the pilot on board, took off from an open field near Cultus Lake, B.C., on the outskirts of the city of Chilliwack. The helicopter slowly travelled nearly 260 ft to the north, and then hovered at about 80 ft above ground level (AGL) for approximately 30 s. Suddenly, a distinct noise and a puff of grey/white vapour from the engine area occurred, followed by a rapid loss of rotor revolutions per minute (rpm). The helicopter descended quickly, and within seconds, landed heavily on the snow-covered terrain. Upon impact with the ground, the helicopter fuselage collapsed and the fuel tank ruptured. There was no fire. The helicopter was destroyed, and the pilot was fatally injured. The emergency locator transmitter (ELT) activated and was detected by the search and rescue satellite system. The accident occurred in daylight at an elevation of about 650 ft above sea level (ASL*). The TSB authorized the release of this report on March 12, 2014.*

Wreckage

TSB Final Report A12C0154—Loss of control and collision with terrain

On November 18, 2012, a Cessna 208B departed Runway 21 at Snow Lake Airport (CJE4), Man., en route to Winnipeg, Man., with the pilot and 7 passengers on board. At approximately 0956 Central Standard Time, shortly after take-off, the aircraft descended and struck the terrain in a wooded area approximately 0.9 nautical miles beyond the departure end of the runway. The pilot was fatally injured, and the 7 passengers sustained serious injuries. The aircraft was destroyed by impact forces, and a small fire ensued near the engine. The aircraft's emergency locater transmitter activated. First responders attended the scene, and the injured passengers were taken to area hospitals. The aircraft's fuel cells ruptured, and some of the onboard fuel spilled at the site. *The TSB authorized the release of this report on April 16, 2014.*

Cessna 208 and crash trail near Snow Lake Airport, Manitoba

Ice on edge of wing before the accident flight

TSB Final Report A13W0009— Loss of control and in-flight breakup

On January 27, 2013, a Robinson R44 Raven II helicopter was being used to conduct monitoring of well sites southwest of Fox Creek, Alta. At 1311 Mountain Standard Time, the helicopter departed from its base of operations at the Horse Facility gas plant camp for the day's activities. After several flights, including one with a passenger, the helicopter landed at a roadside security gate, dropped off the passenger, and departed at 1735 with only the pilot on board. The helicopter broke up in flight over a wooded area 5 minutes later. The pilot was fatally injured. There was no post-crash fire. Although the emergency locator transmitter activated on impact, no signal was received due to impact damage to the emergency locator transmitter. *The TSB authorized the release of this report on May 21, 2014.*

Main wreckage

Detached main rotor blade

TSB Final Report A13O0045—Runway Incursion and Risk of Collision

The following occurrence was another very real and very serious runway incursion, which reads as if it were a scene straight out of a movie, except it ended well by some degree of luck. This one is truly for everyone. Feel free to read the whole report on the TSB Web site.—Ed.

TSB Final Report A13A0033—Nosewheeel Failure on Landing

Occurrence aircraft after coming to rest off the side of the runway (Source: RCMP)

On March 27, 2013, a de Havilland DHC-6-300 Twin Otter aircraft was landing at St. Anthony Airport, N.L., with two crew members and eight passengers on board. The aircraft first contacted the runway with the left tire, bounced, and became airborne before touching down hard on the nose wheel. The nose landing gear collapsed, and the aircraft skidded on its nose, coming to rest 96 ft off the north side of Runway 10. There were no injuries. The aircraft was substantially damaged. The 406-MHz emergency locator transmitter (ELT) did not activate. The accident occurred at 12:53 Newfoundland Daylight Time (NDT). *The TSB authorized the release of this report on April 16, 2014.* △

Regional Safety Forums

Atlantic Region

Regional Aviation Safety Council (RASC)
Wednesday, October 7, 2015, from 9:00 to 16:00
Delta St John's in St John's, N.L.

For more information, please contact Jean-Marc Mazerolle at 506-851-7275 or jean-marc.mazerolle@tc.gc.ca

38th Annual Atlantic Region Aircraft Maintenance Conference (ARAMC)
Wednesday, April 6 to Friday, April 8, 2016
Moncton, N.B.

For more information, please contact Anneke Urquhart at 902-873-3997 or anneke.urquhart@sobeys.com

Quebec Region

Annual Safety Symposium
Dates TBA, Marriott Airport Hotel in Dorval, Que.
By Invitation

For more information, please contact Reggie Chavannes at 514-633-3249 or reggie.chavannes@tc.gc.ca

Ontario Region

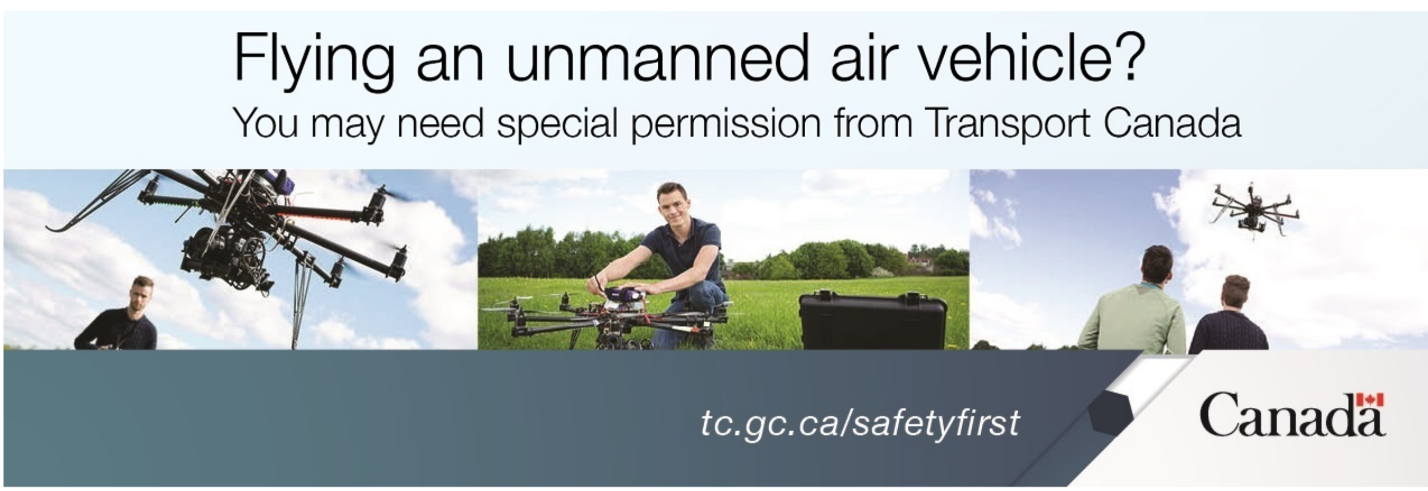
2015 Ontario Aircraft Maintenance Engineers (AME) Symposium
Thursday October 1, from 8:30 to 17:45 and Friday October 2, from 8:45 to 15:00
Hilton Meadowvale Resort and Conference Centre in Mississauga, Ont.

For more information, please contact Cara Tweyman at 905-405-1870 or cara@precisionaerocomponents.com

Prairie and Northern Region

Aviation Safety Council (ASC) Meeting
Wednesday, September 16, 2015, from 09:00 to 16:00
Executive Royal Hotel in Calgary, Alta.

For more information, please contact Linda Melnyk at 780-495-7441 or linda.melnyk@tc.gc.ca △



Answers to the 2015 Self-Paced Study Program

1. an aircraft, vehicle or person
2. With flags, cones or wing bar lights.
3. 15 kt or above
4. (a) send radio messages clearly and concisely using standard phraseology whenever practical

   (b) plan the content of the message before transmitting

   (c) listen out before transmitting to avoid interference with other transmissions
5. follow normal communications failure procedures; 7600
6. Issue times: 12Z, 14Z, 20Z; period of coverage: 12-03Z.
7. (per the CFS)
8. hatched areas enclosed by a dashed green line
9. SIGMET; AIRMET
10. 200 ft overcast.
11. 1300Z.
12. 6+ SM.
13. 9900.
14. true
15. 5/8 SM; 700 ft AGL
16. The pilot.
17. Inform ATC of this fact since acknowledgement of the clearance alone will be taken by a controller as indicating acceptance.
18. A, B, and C; D or E
19. (a) a power-driven, heavier-than-air aircraft shall give way to airships, gliders and balloons
    (b) an airship shall give way to gliders and balloons
    (c) a glider shall give way to balloons
    (d) a power-driven aircraft shall give way to aircraft that are seen to be towing gliders or other objects or carrying a slung load
20. 2 000 ft AGL
21. Odd thousands plus 500 ft above sea level (ASL).
22. 3; 1 mi.; 500 ft
23. a clearance; establish two-way communication with the appropriate
24. permission has been obtained from the user agency
25. 1-866-WXBRIEF (1-866-992-7433);
    1-866-GOMÉTÉO (1-866-466-3836)
26. 6.4 kg or 14 lb for each passenger.
27. an ATC unit, a flight service station (FSS), a community aerodrome radio station (CARS), or a rescue coordination centre (RCC)
28. the termination of all alerting services with respect to search and rescue notification
29. 5
30. 24
31. (a) 126.7 MHz

    (b) local VFR common frequency

    (c) local area control centre (ACC) instrument flight rules (IFR) frequency listed in the CFS

    (d) 121.5 MHz

    (e) high frequency (HF) 5680 kHz, if so equipped
32. 14:00; March 26, 2014
33. +/- 50 ft
34. 100
35. will not
36. (most recent AIC)
37. water depth; tire pressure; lower
38. lowest
39. Water-fog whiteout; blowing snow whiteout; or precipitation whiteout
40. mast bumping
41. Increasing forward speed; entering autorotation
42. upper wing tip
43. Immediately release from the aerotow.
44. forward
45. ambient temperature; actual and forecast winds

The First Defence
Effective Air Traffic Services - Pilot Communication
No proper readback?
Challenge poor communications.
Use standard phraseology to reduce errors.
NAV CANADA
Transport Canada
Transports Canada
COPA
CANADIAN OWNERS AND PILOTS ASSOCIATION
FSS
AIR LINE PILOTS ASSOCIATION, INT'L
alpa
ATAC
CATCA / ACCTA
CAW / TCA 5454
cbaa
Jazz
WESTJET
AIR CANADA

Transport Canada Transports Canada

TP 2228E-41
(09/2015)

TAKE FIVE...

for safety
Five minutes reading could save your life!

Curiosity Killed the Cat

The mighty C-130 Hercules is a workhorse for the Royal Canadian Air Force. We use this aircraft to carry supplies, drop troops, perform air-to-air refueling, and conduct search and rescue operations.

The Herc is large, with a 132-ft wingspan and a maximum gross weight of more than 150 000 lb; it can move along at a good pace, but it sure isn't a CF-18 Hornet. No 7-g turns for this aircraft. In the search and rescue role, we take the aircraft down low to help our spotters in their job to look for wreckage or signs of survivors. It can look very impressive to see a big airplane like that flying around at low level.

A recent encounter while on a search and rescue training mission is the impetus for this *Take Five*. We were down low practicing our search procedures when another pilot announced his presence in the area. He was flying a small, single-engine general aviation (GA) airplane. We let him know that we were there too, and he called visual on us. We are hard to miss! We carried on with our training, but then to our surprise, the traffic alert and collision avoidance system (TCAS) gave a warning of traffic closing in on our position. Our flight engineer saw the other aircraft too and suggested a turn to move away from the traffic. We turned away from the other aircraft and, with our speed advantage, the collision threat was eliminated.

It was probably the first time our GA friend had ever seen a Hercules down low and so close. "Wow that is cool!" is likely a thought that went through his head and then the curiosity kicked in and he decided to get a closer look. We get it—this was a once-in-a-lifetime chance to see a Herc up close.

Lucky for all of us, he had his transponder on and our TCAS picked him up. That warning made us look for him and then avoid him. What if that had not been the case? He would have had no idea what manoeuvres we were going to do, and we might have turned right into him. Radar returns showed our targets merged with a vertical separation of 300–900 ft. Very close indeed!!

This event could have turned tragic. The last few seconds could have been filled with horror—a windscreen full of a 100 000+ lb airplane with a closure rate of 4 mi./min. No escape. Our Herc had seven crew members on board and of course there was at least one pilot in the GA airplane.

We are proud of the work we do to save lives. We also understand the public's curiosity but we need to be able to do our job safely. Your cooperation is essential. If you see us down low or near you, tell us you are there and then give us a wide berth. On the other hand, if you see us parked at your local airport, stop by and maybe we can give you a tour. We love to show off our aircraft!

Canada

2015 Flight Crew Recency Requirements
Self-Paced Study Program

*Refer to paragraph 421.05(2)(*d*) of the* Canadian Aviation Regulations *(CARs).*

*Completion of this questionnaire satisfies the 24-month recurrent training program requirements of CAR 401.05(2)(*a*). It is to be retained by the pilot.*

All pilots are to answer questions 1 to 36. In addition, aeroplane and ultra-light aeroplane pilots are to answer questions 37, 38 and 39; helicopter pilots are to answer questions 39, 40 and 41; glider pilots are to answer questions 42 and 43; gyroplane pilots are to answer question 44; and balloon pilots are to answer question 45.

***Note:** References are listed at the end of each question. Many answers may be found in the* Transport Canada Aeronautical Information Manual *(TC AIM). Amendments to that publication may result in changes to answers and/or references. The* TC AIM *is available online at:*
http://www.tc.gc.ca/eng/civilaviation/publications/tp14371-menu-3092.htm

1. A runway incursion is any occurrence at an aerodrome involving the incorrect presence of ____on the protected area of a surface designated for the landing and takeoff of aircraft.

(GEN 5.1)

2. How are temporarily displaced thresholds marked?
____

(AGA 5.4.1 NOTE)

3. At a Transport Canada certified airport, a dry wind direction indicator (windsock) that is blown horizontal indicates a wind speed of __________.

(AGA 5.9)

4. When transmitting a radio message pilots should
(a)____;
(b) ____; and
(c)____.

(COM 5.9)

5. Before using a cell phone to contact the air traffic service (ATS) in the event of an in-flight radio communications failure, you should ____and squawk code _____.

(COM 5.15)

6. Refer to a recent copy of the *Canada Flight Supplement* (CFS). What are the aerodrome forecast (TAF) issue times and period of coverage for Îles-de-la-Madeleine, Que., Airport?
____

(MET 3.2.1 and CFS)

7. Open a recent copy of the CFS and locate the Planning section (section C). In "VFR Chart Updating Data", read the information for your region of Canada.
Record one of the topic names here: ___________________________

(CFS)

8. Areas of showery or intermittent precipitation are shown on a graphic area forecast (GFA) clouds and weather chart as ____.

(MET 3.3.11)

9. A ______ or _____ message automatically amends the current and relevant GFA.

(MET 3.3.13)

TAF CYJT 041136Z 041212 24010KT ½ SM -SHRA -DZ FG OVC002 TEMPO 1213 3SM BR OVC008 FM 1300Z 29012G22KT P6SM SCT006 BKN015 BECMG 2123 30010KT SCT020 RMK NXT FCST BY 18Z=

10. From the preceding TAF, what is the lowest forecast ceiling for CYJT? __________

(MET 3.9.3)

11. From the preceding TAF, at what time could you first expect to have visual flight rules (VFR) weather in the CYJT control zone? _______________

(MET 3.9.3)

12. From the preceding TAF, what is the forecast visibility for CYJT after 2300Z? _____________

(MET 3.9.3)

13. What coded group is used, in an upper level wind and temperature forecast (FD), when the wind speed is less than 5 kt? ______

(MET 3.11)

14. In an aviation routine weather report (METAR), wind direction is given in degrees true/magnetic.

(MET 3.15.3)

METAR CYBC 211700Z 0912G20 5/8SM BLSN VV007 M03/M05 A2969 RMK SN8 SLP105

15. In the preceding weather report, the prevailing visibility is ________ and the ceiling is _________.

(MET 3.15.3)

16. Who is responsible for obstacle avoidance when a VFR aircraft is being radar vectored? __________

(RAC 1.5.5)

17. If an air traffic control (ATC) clearance is not acceptable, what should the pilot-in-command immediately do?
____
____

(RAC 1.7)

18. Which classes of airspace require the use of a functioning transponder? All Class _____________ airspace and any Class _______ airspace specified as transponder airspace.

(RAC 1.9.2)

19. When two aircraft are converging at approximately the same altitude, the pilot-in-command of the aircraft that has the other on its right shall give way, except as follows:
(a)____;
(b) ____;
(c) ____________________________________; and
(d)____
____.

(RAC 1.10)

20. To preserve the natural environment of national, provincial and municipal parks, reserves and refuges, and to minimize the disturbance to the natural habitat, overflights of these areas should not be conducted below ______________.

(RAC 1.14.5)

21. What are the VFR cruising altitudes appropriate to an eastbound track above 3 000 ft above ground level (AGL)? ______________________________

(RAC 2.3.1)

22. In controlled airspace, the minimum VFR flight visibility is _____ mi., and the minimum distance from cloud is _____ horizontally and _____ vertically.

(RAC 2.7.3)

23. Before entering Class C airspace, VFR flights require _____________ from ATC and before entering Class D airspace, VFR flights must ____ ATC unit.

(RAC 2.8.3 and 2.8.4)

24. An aircraft could be permitted in Class F restricted airspace only if ____.

(RAC 2.8.6)

25. For flight planning, pilot briefing services are available at (telephone number): _____________________________. Bilingual pilot briefing services are available at (telephone number): _____________________________.

(RAC 3.2)

26. After asking the passengers for their personal weights, what weight should be added for clothing on a winter flight? ___________________________________

(RAC 3.5.1)

27. A flight itinerary may be filed with a responsible person. A "responsible person" means an individual who has agreed to ensure that an overdue aircraft is reported to ____ ________________.

(RAC 3.6.2)

28. The closing of a flight plan or flight itinerary prior to landing is considered as filing an arrival report, and as such, it will result in ____.

(RAC 3.12.2)

29. Where possible, pilots are required to report at least _____ min prior to entering a mandatory frequency (MF) or air traffic frequency (ATF) area.

(RAC 4.6.7)

30. Properly maintained emergency locator transmitters (ELTs) with serviceable batteries should provide continuous operation for a minimum of __ hr at a wide range of temperatures.

(SAR 3.1)

31. If your flight is interrupted due to bad weather and you cannot contact an ATS unit, you should attempt to contact another aircraft on one of the following frequencies in order to have that aircraft relay the information to ATS:

    a) _________;

    b) ___________________________;

    c) ____;

    d) _________; or

    e) _____________________________.

(SAR 3.5)

140230 CYUL ST-JEAN
CYJN UNMANNED AERIAL VEHICLE OPS RADIUS 1.1 NM CENTRE
451813N 732553W (APRX 6 NM WNW AD) SFC TO 600 FT MSL
1400-1900 DLY
1403261400 TIL 1403271900

32. Refer to the NOTAM above. The unmanned aerial vehicle (UAV) activity is expected to start at ________ UTC on _______________ (date).

(MAP 5.6.1)

33. An aircraft altimeter which has the current altimeter setting applied to the subscale should not have an error of more than _______ when compared to the known ground elevation.

(AIR 1.5.1)

34. The effect of a mountain wave often extends as far as _____ NM downwind of the mountains.

(AIR 1.5.6)

35. If the background landscape does not provide sufficient contrast you will/will not see a wire or cable while flying near power lines.

(AIR 2.4.1)

36. The NAV CANADA Aviation Weather Web Site is found at https://flightplanning.navcanada.ca/cgi-bin/CreePage.pl?Langue=anglais&NoSession=NS_Inconnu&Page=forecast-observation&TypeDoc=html

Go to the Forecasts and Observations Web page and familiarize yourself with the Aeronautical Information Circulars (AICs) and AIP Supplements.
Record the most recent AIC number here: _____

(NAV CANADA Web site)

AEROPLANE

37. Hydroplaning is a function of the ___________, _____________ and speed. Moreover, the minimum speed at which a non-rotating tire will begin to hydroplane is _____ than the speed at which a rotating tire will begin to hydroplane.

(AIR 1.6.5)

38. To achieve a turn of the smallest radius and greatest rate for a given angle of bank, fly at the _______ safe airspeed for the angle of bank.

(**use aeroplane references**)

AEROPLANE & HELICOPTER

39. In addition to the classic whiteout condition of unbroken snow cover beneath a uniformly overcast sky, name two other phenomena that are known to cause whiteout. ___________________, and ____.

(AIR 2.12.7)

HELICOPTER

40. On a two-bladed helicopter with a teetering rotor system, a flight manoeuvre that causes even a small amount of negative g force could result in ______________.

(use helicopter references)

41. What are the two methods of recovery from a vortex ring state? _________________________ or _______________________.

(use helicopter references)

GLIDER

42. During a medium banked turn on tow, the glider's nose should be pointed towards the towplane's _______________.

(use glider references)

43. What should you do when slack in the towline is excessive or beyond a pilot's capability to safely recover? _____________________________________

(use glider references)

GYROPLANE

44. If a gyroplane took off with its centre of gravity aft of the longitudinal limit, the aircraft may not be able to establish level flight, even with maximum ________ cyclic.

(use gyroplane references)

BALLOONS

45. No person shall operate a balloon over a built-up area without carrying on board sufficient fuel to permit the balloon to fly clear of the built-up area, taking into consideration the take-off weight of the balloon, the ___________________ and _________________________, and possible variations of those factors.

(**CAR 602.18**)

Answers to this quiz are found on page 18 of ASL 1/2015.