

ANC25MA018

OPERATIONAL FACTORS

Attachment 12

Aviation Safety Reporting System Data

August 19, 2025

ACN: 1511571

Time / Day

Date : 201801

Local Time Of Day : 1201-1800

Place

Locale Reference.Airport : ZZZ.Airport

State Reference : US

Altitude.AGL.Single Value : 0

Environment

Weather Elements / Visibility : Icing

Weather Elements / Visibility : Snow

Light : Dusk

Aircraft

Reference : X

ATC / Advisory.CTAF : ZZZ

Aircraft Operator : Air Taxi

Make Model Name : Caravan 208B

Crew Size.Number Of Crew : 1

Operating Under FAR Part : Part 135

Mission : Ferry / Re-Positioning

Flight Phase : Taxi

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Taxi

Function.Flight Crew : Pilot Flying

Function.Flight Crew : Single Pilot

Qualification.Flight Crew : Instrument

Qualification.Flight Crew : Flight Instructor

Qualification.Flight Crew : Multiengine

Experience.Flight Crew.Total : 2230

Experience.Flight Crew.Last 90 Days : 240

Experience.Flight Crew.Type : 1781

ASRS Report Number.Accession Number : 1511571

Human Factors : Situational Awareness

Events

Anomaly.Ground Event / Encounter : Object

Anomaly.Ground Event / Encounter : Loss Of Aircraft Control

Detector.Person : Flight Crew

When Detected : Taxi

Result.Aircraft : Aircraft Damaged

Assessments

Contributing Factors / Situations : Environment - Non Weather Related

Contributing Factors / Situations : Human Factors

Contributing Factors / Situations : Weather

Primary Problem : Human Factors

Narrative: 1

Started engine, aircraft started moving, brakes were not effective as well as no directional control. Shut down engine, still no brakes as well as no directional control, impacted hangar. Afterwards, I found there to be a layer of ice underneath the snow, as well as all this happening in a matter of a few seconds.

Synopsis

Pilot of a single engine turboprop aircraft reported starting up the engine and losing brake control due to slippery, icy ramp conditions resulting in impacting a hangar.

ACN: 1497503

Time / Day

Date : 201711

Local Time Of Day : 0601-1200

Place

Locale Reference.Airport : ZZZ.Airport

State Reference : US

Altitude.AGL.Single Value : 0

Environment

Flight Conditions : IMC

Weather Elements / Visibility : Icing

Light : Daylight

Aircraft

Reference : X

ATC / Advisory.TRACON : ZZZ

Aircraft Operator : Air Taxi

Make Model Name : Caravan 208B

Operating Under FAR Part : Part 135

Flight Plan : IFR

Mission : Cargo / Freight / Delivery

Flight Phase : Climb

Airspace.Class C : ZZZ

Component

Aircraft Component : Ice/Rain Protection System

Aircraft Reference : X

Problem : Design

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Taxi

Function.Flight Crew : Pilot Flying

Function.Flight Crew : Single Pilot

Qualification.Flight Crew : Air Transport Pilot (ATP)

ASRS Report Number.Accession Number : 1497503

Events

Anomaly.Aircraft Equipment Problem : Less Severe

Anomaly.Flight Deck / Cabin / Aircraft Event : Smoke / Fire / Fumes / Odor

Detector.Person : Flight Crew

When Detected : In-flight

Result.General : None Reported / Taken

Assessments

Contributing Factors / Situations : Aircraft
Primary Problem : Aircraft

Narrative: 1

Prior to aircraft loading I performed a Cold Weather preflight including ground test of the TKS system. Ground temp at Ramp departure was +02C with a ceiling of 600 ft overcast. I departed the Ramp with the aircraft's cargo compartment completely full from floor to ceiling. I turned the TKS system ON Hi during my taxi to the departure runway so that the wing would be "wetted" prior to entering the clouds after takeoff. After takeoff while climbing to 5000 ft MSL with the TKS system now ON Normal I turned on the Cabin Heat /Defrost and immediately smelled the telltale TKS alcohol odor. Wanting to avoid the throat and eye irritation that I have experienced in the past from TKS fumes in the cockpit I promptly turned OFF the cabin heat while leaving the TKS system ON until I topped the cloud layer. After exiting the clouds I turned the TKS system OFF and tried the cabin heat again. Once again, I immediately smelled the alcohol smell. When I turned OFF the cabin heat the alcohol odor was no longer present. To avoid breathing the TKS fumes while using the cabin heat I donned my mask and breathed O2 for the next 30 minutes until the alcohol smell was no longer detectable with cabin heat. TKS system total AM run time with ground test plus taxi out to topping the cloud layer was less than 10 minutes.

It is my opinion that TKS fluid mist shed by the prop slinger was being drawn into the cockpit from the air stream surrounding the aircraft nacelle via the aircraft bleed air system. I believe that the fact that the alcohol odor in the cockpit dissipated each time that I turned the cabin heat OFF while the TKS system was in use and later, after the TKS system had been turned OFF, until the prop slinger supply lines had sufficiently drained down in flight supports my position. This episode is a reminder of the necessity for pilots to have available and, when needed, to use supplemental O2 any time that the TKS system is used in flight when the Cabin Heat/Defrost is also used. This action will minimize the potential for pilot physical symptoms and/or possible mental impairment. As of yet there is no effective way to prevent TKS fumes from entering the cockpit under this and similar flight in icing scenarios.

Synopsis

Cessna Caravan pilot reported TKS fumes in the cockpit inhibiting the use of the cabin heater unless the oxygen mask is used.

ACN: 1333775

Time / Day

Date : 201602

Local Time Of Day : 1201-1800

Place

Locale Reference.Airport : ZZZ.Airport

State Reference : US

Environment

Flight Conditions : IMC

Weather Elements / Visibility : Icing

Light : Daylight

RVR.Single Value : 1200

Aircraft

Reference : X

ATC / Advisory.Center : ZZZ

Aircraft Operator : Air Taxi

Make Model Name : Caravan 208B

Crew Size.Number Of Crew : 1

Operating Under FAR Part : Part 135

Flight Plan : IFR

Mission : Passenger

Nav In Use.Localizer/Glideslope/ILS : Runway 28

Flight Phase : Initial Approach

Airspace.Class E : ZZZ

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Taxi

Function.Flight Crew : Pilot Flying

Function.Flight Crew : Single Pilot

Qualification.Flight Crew : Air Transport Pilot (ATP)

ASRS Report Number.Accession Number : 1333775

Human Factors : Situational Awareness

Human Factors : Time Pressure

Human Factors : Workload

Events

Anomaly.Deviation / Discrepancy - Procedural : Published Material / Policy

Anomaly.Inflight Event / Encounter : Weather / Turbulence

Anomaly.Inflight Event / Encounter : Fuel Issue

Detector.Person : Flight Crew

When Detected : In-flight

Result.Flight Crew : Requested ATC Assistance / Clarification

Result.Flight Crew : Executed Go Around / Missed Approach

Result.Flight Crew : Became Reoriented
Result.Air Traffic Control : Issued New Clearance

Assessments

Contributing Factors / Situations : Chart Or Publication
Contributing Factors / Situations : Procedure
Contributing Factors / Situations : Weather
Primary Problem : Weather

Narrative: 1

I was dispatched for flight and preflight planning showed that the flight could be conducted under VFR, and was confirmed and released after a preflight conversation with [Dispatch]. Accordingly I departed with VFR fuel requirements, without a planned alternate. The flight was unremarkable until I was 40 NM out of my destination, when I checked the AFIS broadcast. The AFIS reported 1/4 mile visibilities with RVR of 1200V2000. I did not have sufficient fuel to divert to another airport and decided to contact Center. Center issued me a pop up clearance and asked if I was able to join the hold at 9000 ft. I informed center that I was minimum fuel and would like to initiate the approach to rwy 28 immediately. My request was approved by Center and I initiated the approach which resulted in a missed approach. Center asked my intentions, and I stated that the visibility on the west end of the runway appeared to be better than the east end, and I requested the approach to rwy 10. This approach resulted in a successful landing on rwy 10. With the available fuel on board, about 40 minutes at the time of landing, I feel my decision to make the approach was my best, and safest option.

The lesson I have taken away from this event is that I will no longer trust the TAF to make my fuel planning decisions and will subsequently carry more fuel in order to allow myself an "escape plan" to a more suitable landing alternate in the future due to the possibility of deteriorating weather conditions at my intended landing airport.

Synopsis

C208B pilot was dispatched with minimum fuel to a remote airport forecasted to remain VFR. Upon arrival, the airport was IMC and he missed the first approach, but landed on the second approach on the runway opposite direction. TAF forecasts to remote airports should be questioned.

ACN: 1323399

Time / Day

Date : 201601

Local Time Of Day : 1801-2400

Place

Locale Reference.Airport : ZZZ.Airport

State Reference : US

Altitude.AGL.Single Value : 0

Environment

Flight Conditions : IMC

Weather Elements / Visibility : Icing

Weather Elements / Visibility : Snow

Light : Night

Aircraft

Reference : X

ATC / Advisory.Center : ZZZ

ATC / Advisory.Tower : ZZZ

Aircraft Operator : Air Carrier

Make Model Name : Caravan 208B

Crew Size.Number Of Crew : 1

Operating Under FAR Part : Part 121

Flight Plan : IFR

Mission : Cargo / Freight / Delivery

Flight Phase : Cruise

Component

Aircraft Component : Ice/Rain Protection System

Aircraft Reference : X

Problem : Design

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Carrier

Function.Flight Crew : Single Pilot

Qualification.Flight Crew : Air Transport Pilot (ATP)

ASRS Report Number.Accession Number : 1323399

Human Factors : Confusion

Human Factors : Situational Awareness

Human Factors : Physiological - Other

Events

Anomaly.Aircraft Equipment Problem : Less Severe

Anomaly.Flight Deck / Cabin / Aircraft Event : Illness / Injury

Anomaly.Deviation / Discrepancy - Procedural : Published Material / Policy

Anomaly.Inflight Event / Encounter : Weather / Turbulence
Detector.Person : Flight Crew
When Detected : In-flight
Result.General : Physical Injury / Incapacitation

Assessments

Contributing Factors / Situations : Aircraft
Contributing Factors / Situations : Human Factors
Contributing Factors / Situations : Procedure
Primary Problem : Human Factors

Narrative: 1

Aircraft departed IFR into low IMC conditions with full tank of TKS fluid. Aircraft was IMC entire flight. TKS system was on, aircraft encountered light icing while enroute to my filed destination. Pilot noted several symptoms consistent with TKS exposure warnings on MSDS, such as a "buzzed" feeling at the time of exiting the aircraft after landing. By end of flight, it took more concentration than normal to read back ATC instructions, complete approach in weather, and taxi around busy major airport, Aircraft landed with 5 gallons remaining of TKS fluid, enough for approximately 19 minutes of icing capabilities remaining at middle setting. Pilot was coughing after flight, not before, and voice had become raspy during flight

Aircraft has no range in IMC conditions due to TKS quantity and middle setting having approximately a range of 1:20 minutes. TKS has already been confirmed inside TKS Caravan aircraft type.

Synopsis

A C208 pilot described his physiological "buzzed" feeling after exposure to TKS anti-ice fluid in flight during freezing IMC conditions.

ACN: 1241686

Time / Day

Date : 201502

Local Time Of Day : 1801-2400

Place

Locale Reference.ATC Facility : ZZZ.ARTCC

State Reference : US

Altitude.MSL.Single Value : 6900

Environment

Flight Conditions : IMC

Weather Elements / Visibility : Icing

Light : Daylight

Aircraft

Reference : X

ATC / Advisory.Center : ZZZ

Aircraft Operator : Corporate

Make Model Name : Caravan 208B

Crew Size.Number Of Crew : 1

Operating Under FAR Part : Part 91

Flight Plan : IFR

Mission : Passenger

Nav In Use : GPS

Flight Phase : Climb

Route In Use : Vectors

Airspace.Class E : ZZZ

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Corporate

Function.Flight Crew : Captain

Function.Flight Crew : Pilot Flying

Qualification.Flight Crew : Commercial

ASRS Report Number.Accession Number : 1241686

Events

Anomaly.Deviation - Altitude : Excursion From Assigned Altitude

Anomaly.Inflight Event / Encounter : Weather / Turbulence

Detector.Person : Flight Crew

When Detected : In-flight

Result.Flight Crew : Returned To Departure Airport

Assessments

Contributing Factors / Situations : Weather

Primary Problem : Weather

Narrative: 1

While climbing enroute, we encountered icing at 6900 feet msl. We could no longer climb and maintain 120 knots. We advised Center that we were returning to [the departure] airport and requested direct to the runway initial approach fix. ATC advised that the minimum vectoring altitude in that sector was 7000 feet msl. We then advised Center that we would not be able to maintain 7000 feet msl. The ice continued to accumulate on the aircraft while we were enroute to the initial approach fix. In order to maintain 120 knots we maintained a descent rate of between 100 and 300 feet per minute. Despite being below the minimum vectoring altitude, we were able to stay well above the terrain during our slow descent and verified our terrain and obstruction clearance using Capstone and our Garmin GPS. At 4000 feet msl we were below the clouds and at 3500 feet msl the outside air temperature was above freezing and the ice began to break free of the aircraft. At approximately 3000 feet msl, we were able to cancel our IFR clearance and turn directly to the airport and landed without any further incident. Filing pilot reports on inflight icing conditions can prevent other aircraft from flying into those same conditions.

Synopsis

C208B Captain reported icing in flight that made it impossible to maintain minimum vectoring altitude in an area of high terrain. They descended to warmer air and landed safely at departure airport.

ACN: 1238028

Time / Day

Date : 201502

Place

Locale Reference.Airport : ORD.Airport

State Reference : IL

Altitude.AGL.Single Value : 0

Environment

Flight Conditions : IMC

Weather Elements / Visibility : Icing

Weather Elements / Visibility : Snow

Light : Night

Ceiling.Single Value : 200

RVR.Single Value : 4000

Aircraft

Reference : X

Aircraft Operator : Air Carrier

Make Model Name : Caravan 208B

Operating Under FAR Part : Part 135

Flight Plan : IFR

Mission : Passenger

Flight Phase : Taxi

Route In Use.Other

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Carrier

Function.Flight Crew : Captain

Function.Flight Crew : Pilot Flying

Qualification.Flight Crew : Instrument

Qualification.Flight Crew : Commercial

Qualification.Flight Crew : Multiengine

Experience.Flight Crew.Total : 2500

Experience.Flight Crew.Last 90 Days : 240

Experience.Flight Crew.Type : 1200

ASRS Report Number.Accession Number : 1238028

Human Factors : Situational Awareness

Events

Anomaly.Conflict : Ground Conflict, Critical

Anomaly.Ground Event / Encounter : Vehicle

Detector.Person : Flight Crew

Miss Distance.Horizontal : 5

When Detected : Taxi

Result.Flight Crew : Took Evasive Action

Assessments

Contributing Factors / Situations : Human Factors

Contributing Factors / Situations : Weather

Primary Problem : Human Factors

Narrative: 1

While taxiing in to our ramp in poor visibility conditions, just across the alpha bridge while on alpha moving towards our gate; An airport Maintenance (Yellow & Black) truck X failed to see us and drove straight towards us. By the time he saw us and slammed on the brakes, he came to a skidding stop not more than 5 feet from the propeller. I was only a split second away from an emergency shutdown. Ground controllers were informed and I was requested to contact the tower and report the issue on a recorded line. Note, our ground personnel at ORD witnessed the event as well.

Due to the restricted visibility from the ice on the windshield from the landing, I did not see the truck until it was in my Forward Field of view (FOV)! though my first officer noticed the vehicle failing to stop, and informed me before the truck came into my FOV. It looked like the vehicle was performing some sort of support for ramp deicing and the driver's head was turned towards the other snow plows instead of monitoring where they were going. When they slammed on the brakes, we were already at a stop, my hand was on the condition lever for an emergency shutdown.

Synopsis

C208 Captain reports a near ground collision with an airport vehicle that is supervising the snow plows but apparently not looking ahead. The C208 had stopped and was about to shut down the engine when the truck driver noticed the aircraft and stopped quickly.

ACN: 1238014

Time / Day

Date : 201502

Local Time Of Day : 1201-1800

Place

Locale Reference.ATC Facility : T75.TRACON

State Reference : MO

Altitude.MSL.Single Value : 4000

Environment

Flight Conditions : IMC

Weather Elements / Visibility : Rain

Weather Elements / Visibility : Icing

Weather Elements / Visibility : Snow

Weather Elements / Visibility.Visibility : 4

Light : Daylight

Ceiling.Single Value : 1500

Aircraft

Reference : X

Aircraft Operator : Air Carrier

Make Model Name : Caravan 208B

Operating Under FAR Part : Part 135

Flight Plan : IFR

Mission : Passenger

Flight Phase : Initial Approach

Route In Use : Direct

Route In Use : Vectors

Airspace.Class B : STL

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Carrier

Function.Flight Crew : Captain

Function.Flight Crew : Pilot Flying

Qualification.Flight Crew : Instrument

Qualification.Flight Crew : Commercial

Qualification.Flight Crew : Multiengine

Experience.Flight Crew.Total : 2500

Experience.Flight Crew.Last 90 Days : 240

Experience.Flight Crew.Type : 1200

ASRS Report Number.Accession Number : 1238014

Human Factors : Situational Awareness

Events

Anomaly.Inflight Event / Encounter : Weather / Turbulence

Detector.Person : Flight Crew

When Detected : In-flight

Result.Flight Crew : Requested ATC Assistance / Clarification

Result.Flight Crew : Landed in Emergency Condition

Result.Air Traffic Control : Provided Assistance

Assessments

Contributing Factors / Situations : Weather

Contributing Factors / Situations : Aircraft

Primary Problem : Weather

Narrative: 1

While flying into STL, conditions rapidly deteriorated from what was forecast. About 40 miles from the field, once handed off to STL Approach we were informed that STL just put out a new METAR including freezing rain. We had already reported moderate ice to the previous controller and they were aware we were looking for alternative altitudes and solutions. The STL controller immediately gave us the updated METAR and several pireps for the area including moderate ice reports and one severe from the direction we just came from about 15 min behind us. I checked with the controller what the weather at our filed alternate was as well as several other airports in the vicinity. Unfortunately this freezing rain was a rather wide band covering a very large area.

Due to these rapidly deteriorating conditions, I asked for a short approach and any assistance they could give us to get down quickly, and informed them we were receiving moderate to severe icing. I decided that the quickest way in was in fact our primary airport. Alton was closer distance wise but when I asked about it, the controller told me that due to the traffic already going in it would be quicker to go to STL, so this is what we did.

The aircraft was light ,just the crew on board, no passengers and this helped keep our minimum icing speed and even allowed me to climb back up to a higher altitude in between layers just the freezing rain to help with the icing problem. The controller got us in as quick as they could. We were able to maintain positive control and airspeed without any upsets or control abnormalities all the way down the approach. Once we landed and inspected the exterior, we saw all the indications of severe ice, however only one inch or so had accumulated in the unprotected areas, and none above the wing. However the bottom of the wing had run back ice that had formed up to almost a foot back. Fortunately the top of the wing was clear and I believe the airspeed helped here.

Several aircraft behind me our company and others were also scrambling to get out of the wide spread icing condition. This was the worst icing encounter I have ever experienced. Unfortunately there was no real way to avoid this encounter as it was unforecast and by the time it was reported to us, we were already in it, limiting our options.

Honestly, I wish our aircraft were equipped with TKS anti-ice systems instead of boots. This would have seriously reduced the risk of the freezing rain encounter in my opinion, as more of the surface areas are protected. Too bad you can't make an Airworthiness Directive that requires operators to convert to that system.

Synopsis

C208 Captain reports encountering unforecast freezing rain approaching his destination, with similar conditions throughout a widespread area. The reporter elects to continue to destination with the help of ATC to achieve a rapid descent and approach.

ACN: 1227580

Time / Day

Date : 201412

Local Time Of Day : 0601-1200

Place

Altitude.AGL.Single Value : 0

Environment

Flight Conditions : IMC

Weather Elements / Visibility : Icing

Light : Daylight

Aircraft

Reference : X

Aircraft Operator : Air Taxi

Make Model Name : Caravan 208B

Crew Size.Number Of Crew : 2

Operating Under FAR Part : Part 135

Flight Plan : IFR

Flight Phase : Parked

Component

Aircraft Component : De-Icing Fluid

Aircraft Reference : X

Problem : Improperly Operated

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Taxi

Function.Flight Crew : First Officer

Function.Flight Crew : Pilot Not Flying

Qualification.Flight Crew : Commercial

ASRS Report Number.Accession Number : 1227580

Human Factors : Other / Unknown

Events

Anomaly.Aircraft Equipment Problem : Less Severe

Anomaly.Flight Deck / Cabin / Aircraft Event : Other / Unknown

Anomaly.Deviation / Discrepancy - Procedural : Published Material / Policy

Anomaly.Deviation / Discrepancy - Procedural : Maintenance

Anomaly.Inflight Event / Encounter : Weather / Turbulence

Detector.Person : Maintenance

When Detected : Aircraft In Service At Gate

Result.General : Maintenance Action

Assessments

Contributing Factors / Situations : Procedure
Primary Problem : Procedure

Narrative: 1

We took aircraft the aircraft round trip. We were in and out of IMC both there and back. Temperature was above freezing on first leg, but on return we momentarily picked up some trace ice. De-ice system was activated normally per the company SOP and aircraft POH. System was only used in the normal position for a few minutes. Later that afternoon while preparing to take the same aircraft for another flight, I was informed that glycol was added to the TKS fluid tank. Neither the captain nor myself had knowledge of this prior to departing and only became aware later that afternoon.

Synopsis

A C208 crew was informed after flight in icing conditions that the aircraft's TKS system was mistakenly serviced with glycol instead of the authorized fluid.

ACN: 1225858

Time / Day

Date : 201412

Local Time Of Day : 0601-1200

Place

Locale Reference.ATC Facility : ZZZ.ARTCC

State Reference : US

Environment

Flight Conditions : IMC

Weather Elements / Visibility : Icing

Aircraft

Reference : X

ATC / Advisory.Center : ZZZ

Make Model Name : Caravan 208B

Crew Size.Number Of Crew : 1

Flight Phase : Cruise

Airspace.Class E : ZZZ

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Function.Flight Crew : Pilot Flying

Function.Flight Crew : Single Pilot

Qualification.Flight Crew : Air Transport Pilot (ATP)

ASRS Report Number.Accession Number : 1225858

Human Factors : Situational Awareness

Human Factors : Time Pressure

Human Factors : Troubleshooting

Human Factors : Workload

Human Factors : Physiological - Other

Events

Anomaly.Aircraft Equipment Problem : Less Severe

Anomaly.Flight Deck / Cabin / Aircraft Event : Smoke / Fire / Fumes / Odor

Anomaly.Flight Deck / Cabin / Aircraft Event : Illness / Injury

Anomaly.Deviation / Discrepancy - Procedural : Published Material / Policy

Anomaly.Inflight Event / Encounter : Weather / Turbulence

Detector.Person : Flight Crew

When Detected : Pre-flight

When Detected : Aircraft In Service At Gate

When Detected : In-flight

Result.General : Physical Injury / Incapacitation

Result.Flight Crew : Took Evasive Action

Assessments

Contributing Factors / Situations : Aircraft
Contributing Factors / Situations : Company Policy
Contributing Factors / Situations : Environment - Non Weather Related
Contributing Factors / Situations : Human Factors
Contributing Factors / Situations : Procedure
Contributing Factors / Situations : Weather
Primary Problem : Ambiguous

Narrative: 1

While in flight with the TKS system operating in HI mode in icing for approximately 15 minutes during cruise flight and instrument approach and again after blocking in, I experienced separate sustained coughing events ("coughing fits") that led to my seeking treatment at the local hospital walk in clinic/ER for my symptoms. These symptoms included throat irritation, a burning sensation in my chest and an overall feeling of fatigue in addition to uncontrollable coughing.

In response to the onset of coughing while in flight I immediately donned my personal O2 mask and began breathing 100% O2, noting that the coughing subsided quickly thereafter and did not further interfere with my flying the remainder of the flight. Prior to my "coughing fit" I did not note the TKS alcohol smell in the cockpit with the TKS system operating in HI mode and with the cabin heat turned OFF. I did, however, smell alcohol after donning my personal O2 mask after I later turned ON the cockpit heat/defroster system while the TKS system was still operating during times when I needed to adjust my O2 mask away from my face in order communicate with ATC using my head set boom mic.

After landing while securing my wet plane at the ramp with TKS fluid running off/draining to the ramp from it my coughing once again became uncontrollable. In response, I immediately donned the paint vapor mask that I use for all pre/post-flight activities outside of my plane during icing season whenever the TKS system must be ground-tested and/or the panels purged. Once wearing the vapor mask on the ramp my coughing gradually subsided, but not as quickly as it had from my breathing 100% O2 while in flight. After closing out the flight legs with Dispatch I informed the dispatcher of my condition and my intention to seek medical treatment then left the airport for the hospital clinic.

At the hospital the attending MD interviewed me about my experience and my symptoms, listened to my lungs and diagnosed me as having "chemical bronchitis". The MD explained that the only treatment action to be taken was to have me continue to breathe fresh air away from the chemical fumes source (per the MSDS for the TKS fluid, a copy of which I provided to the ER staff). He also stated his concern that my lungs were very congested and prescribed a 6-day protocol of Prednisone to alleviate the inflammation. He then released me back to duty and told me that I was good to fly the PM legs back if I felt comfortable doing that. I assured him that I did then left the hospital early afternoon and contacted Dispatch with an update to my situation. I told the dispatcher that I felt good to fly the PM flight legs and that I planned to breathe O2 my entire time in flight back whether or not I used the TKS and/or cabin heat defrost systems. I also informed the dispatcher that after consulting with the Medical Certification Office about the implications of my flying with the Prednisone prescription, I would begin the protocol [for 6 days], with my prescription levels being low enough by [in 5 days] for me to legally fly that day. The PM flight legs back were flown without incident with my being especially careful to wear the paint vapor face mask at all times when working outside the plane as well as my personal O2 mask while in the cockpit from engine start to engine shut down. While breathing 100% O2 with my personal mask during the PM flight legs I noted no adverse

effects from TKS fumes even though I used the TKS system in HI mode on the flight leg for one leg and used the cabin heat/defrost system intermittently during both legs. As it was forecast to be an above-freezing night and I did not want to further expose myself to TKS fumes while securing my plane after blocking in at the ramp I did not perform the post-landing purge of the TKS panels/ops check of the system that pilots have been requested to perform on nights when the temperatures are forecast to be below freezing.

This latest event is the 5th such major fumes episode that I have experienced in the years that I have been operating TKS-equipped Caravans in icing conditions and my most severe to date. Three and a half years ago during my first fumes/vapors exposure episode I unknowingly breathed in TKS fluid fumes and raw fluid spray entering directly into the cockpit from behind the aircraft's instrument panel glare shield due to a faulty windshield spray bar installation. This episode was followed by 3 successive major cockpit fumes exposure events while flying during that caused symptoms similar to those that I experienced on this date. In addition, I have experienced numerous, subsequent less-serious fumes episodes since in the past three years while operating the TKS-equipped aircraft. As a result of my continued exposure to the TKS fluid's chemical vapors, I feel that I have developed a level of sensitivity to the fumes that has required me to continually escalate my efforts to protect myself from their effects. In addition, I have observed that my voice now sounds raspy when I talk (a symptom regularly reported by pilots suffering effects from the fumes), when this had not been the case previously and that my throat now constantly feels strained while I am engaged in normal-level talking.

I flew in IMC during the flight legs for a total of 1.4 hours (out of 1.6 hrs flight time) and although I was in light icing conditions nearly the entire time I elected not to run the TKS system until necessary to prevent measurable ice buildup on the plane in order to preserve the amount of fluid on board and also to forestall my experiencing the negative effects of breathing the TKS fluid fumes. PLEASE NOTE: A point that is frequently overlooked when discussing the TKS system's operation, that is also contrary to what is published about it, is the fact that it will NOT keep ice from building up on the airframe/windshield even in light icing conditions UNLESS the system is run in HI mode for a significant length of time and the windshield spray bar is used regularly. From my years of experience flying with the TKS system on the Caravan, operating it for as much as 18 flight hours per week in all types of icing conditions during a 6 - 8 month icing season and from the experiences of our other pilots as well, it is my contention that operating the system in the NORMAL mode prior to entering icing conditions in order to "wet" the plane down to forestall ice buildup on the airframe (as recommended in the literature) accomplishes little except to use up precious fluid prematurely. From my experience with the system I have observed that operating it in HI mode or greater is the only effective way to control ice accumulation on the airframe in any conditions greater than "very light icing". Unfortunately, operating the TKS system in HI mode also yields a maximum of 80 minutes fluid duration, assuming that the aircraft is operating with a fully filled TKS fluid tank and that the quantity gauge is reasonably calibrated to the actual "full" fluid level in the tank. Consequently I, and all of the pilots that I know who fly with the TKS system in ice daily, cycle between running it in Normal and High modes as well as turning the system OFF entirely for extended periods of time even when in the ice (while monitoring ice buildup and IAS closely) in order to preserve fluid for an event(s) when it REALLY may be needed, such as when needing to keep the windshield clear enough of ice to allow the pilot to see a snow-covered runway through an ice-free patch of windshield as small as 4" X 6" in size on a night approach to minimums with a strong crosswind and blowing snow.

In addition, after turning on the TKS system in flight a pilot does not know exactly how much fluid remains in the fluid tank at any given time UNLESS he/she tracks the running

time in each mode at the different fluid flow rates and then does the mental math in order to determine fluid used/remaining while also flying single-pilot in IMC in the ice, communicating with ATC and preparing for a possible night approach to minimums. The narrative of the previous paragraph goes to the reason why the operation of the TKS system in HI mode (or greater) for extended periods of time while in icing conditions with its subsequent effect on the ground and cockpit environments is important to understand. With the system's much higher fluid flow rate in HI mode compared to that of the NORMAL mode the wing, lift strut, tail surface panels and especially the prop slinger, weep/throw off a much greater volume of fluid into the airstream surrounding the plane in flight. The spray from the prop slinger, in addition to coating parts of the airframe with fluid also sprays fluid into the airstream surrounding the engine cowl and air intake where a significant amount of fluid is sucked past the Inertial Bypass, and is ingested by the engine where it vaporizes and becomes part of the bleed air that is used for cockpit heating/windshield defrosting system of the plane. This dynamic has been confirmed through random cockpit air sampling, the in-flight experiences of pilots and from observations by FAA personnel conducting operations and maintenance checks. It is my contention that the higher the TKS fluid flow rate(mode) required in order to mitigate airframe ice build-up, the greater the potential for high concentrations of TKS fluid fumes/mist entering the cockpit via the heating/defrost system and/or through possibly poorly-sealed windshields, wing and fuselage fresh air vents. I believe that these factors could help to explain, in part, the sometimes wide variations in the severity of cockpit fumes events experienced by pilots flying the same aircraft.

The effect of the HI mode (or greater) TKS fluid flow rate being in use for extended periods of time while in icing conditions also manifests itself in greater fluid weepage/fluid drain-down/dripping from all "wetted" surfaces with the wing/tail surface panels and all system fluid lines being above the level of the fuselage lift-strut attachment points and the prop slinger (no check valves appear to be present in the fluid lines). Once shut down, an aircraft that has had its TKS system in operation for an extended period of time in HI or greater mode will drain/weep fluid to the ramp surfaces around it continuously often for up to 24 hours after the plane has flown. Large puddles of fluid collect on the ground beneath the prop slinger and the fuselage lift-strut attachment points. Fluid also runs off the wet fuselage, wing and tail surfaces while the weeping panels aid in painting the aircraft's outline on the ramp with drained fluid that also drips constantly onto maintenance/ramp personnel working under and around the fuselage, wings and tail. If a post-flight TKS panel purge is also performed due to anticipated forecast sub-freezing overnight temperatures the amount of residual fluid present on the ramp round the plane is much greater. The normal cold-weather AM pre-flight system ground test required for flight into known icing conditions further adds to the amount of puddled TKS fluid present on the ramp surfaces. Due the large volume of TKS fluid drained on the ramp from up to 7 planes during periods of high system usage necessitated by widespread sustained in-flight and ground icing conditions it is often possible to smell the tell-tale TKS alcohol odor when exiting the ramp office building for the parked aircraft at a distance of well over 100 feet. As a result of this high concentration of airborne fluid vapors in the ramp areas, I often begin to involuntarily cough from the fumes shortly after leaving the ramp office for the ramp and before proceeding any further towards the parked aircraft have to don the paint vapor mask that I wear while conducting the aircraft Cold WX pre-flight and TKS system checks in order to walk to my plane without discomfort. I have also noted that if I do not wear my vapor face mask while at the ramp on icing days that I not only begin coughing while walking to/from the parked TKS-equipped aircraft and while working around them before and after flights, but that I continue to cough for some hours after I leave the airport each night on the days that I fly. This has been the case so far during the current icing season as it also was during the last one.

I began my day's AM flight preparations using the method that I have developed over the 2+ years that I have been operating the TKS system installed on our planes. Shortly after arriving at my plane already smelling the TKS alcohol smell, feeling a scratchiness in my throat and beginning to involuntarily cough, I donned my paint vapor mask and proceeded with my Cold WX pre-flight (with enroute icing conditions to both destinations anticipated) and the required TKS system checks. I have used this type of vapor face mask for two winters now and it has appeared to generally be effective at blocking the alcohol smell and moderating my symptoms. Also over the past two winters I have observed the need to replace the mask regularly as the carbon membrane in it with time becomes saturated with inhaled alcohol/ethylene glycol vapors rendering it ineffective in blocking them. On this day I noticed the alcohol smell even while wearing my mask and I continued to randomly cough. Unfortunately, I had forgotten to bring along an extra mask in my flight bag so I was forced to continue using the ineffective mask. During cargo loading I often have to remove my vapor mask multiple times in order to communicate with the loading crew. Each time that I remove the face mask I again feel symptoms. On this day, I spent approximately 1.5 hours on the ramp at my plane while wearing/not wearing the vapor mask as required to complete my flight prep and the cargo loading. Once inside the cockpit with the door closed I began to breathe easier with less coughing and by takeoff time my coughing spell appeared to have ended.

As I stated previously, enroute I flew in icing conditions for almost the entire flight. As only slight ice accumulation was encountered until nearing my destination and also during holding while waiting for the visibility to come up to approach minimums I ran the TKS system in NORMAL/HI mode for approximately the last .3 hrs out of a 1.1 hr flight (including the run time during system ground check before departure, total system run time in all modes for this flight leg was less than .4 hrs). During the flight with the TKS system mostly turned off I used the cabin heat/defroster sparingly out of experienced caution as I did not want have to wear my personal O2 mask until it was necessary for me to operate the TKS system and the cabin heat at the same time. Also as a result of this caution, with the TKS system operating, I elected to not use cabin heat during holding and on the ILS approach (a number of other pilots who have had issues with TKS fumes in the cockpit prefer also to fly "cold" rather than use the cabin heat while the TKS system is operating). During this time operating the TKS system in HI mode I do not recall smelling the alcohol smell, but I was also very busy dealing with a fluid WX situation, communicating with ATC and tower, flying the approach, etc. and may just have not noted it. However, once I was on the ground outside the aircraft while working with the others to get the aircraft off-loaded with my wet plane's TKS pressure lines and panels now draining fluid down to the ramp I again began to cough, a fact noted by the Ramp Agent present who commented that my cough sounded pretty bad.

Synopsis

A C208 pilot diagnosed with chemical bronchitis described in depth his method of dealing with TKS fluid vapor exposure during ground and flight operations.

ACN: 1225857

Time / Day

Date : 201412

Local Time Of Day : 1201-1800

Place

Altitude.MSL.Single Value : 11000

Environment

Flight Conditions : IMC

Weather Elements / Visibility : Icing

Weather Elements / Visibility : Rain

Weather Elements / Visibility : Snow

Light : Dusk

Aircraft

Reference : X

ATC / Advisory.Center : ZZZ

Aircraft Operator : Air Taxi

Make Model Name : Caravan 208B

Crew Size.Number Of Crew : 1

Flight Plan : IFR

Flight Phase : Cruise

Airspace.Class E : ZZZ

Component

Aircraft Component : De-Icing Fluid

Aircraft Reference : X

Problem : Design

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Taxi

Function.Flight Crew : Captain

Function.Flight Crew : Check Pilot

Function.Flight Crew : Pilot Flying

Qualification.Flight Crew : Air Transport Pilot (ATP)

ASRS Report Number.Accession Number : 1225857

Human Factors : Troubleshooting

Human Factors : Physiological - Other

Events

Anomaly.Aircraft Equipment Problem : Less Severe

Anomaly.Flight Deck / Cabin / Aircraft Event : Smoke / Fire / Fumes / Odor

Anomaly.Inflight Event / Encounter : Weather / Turbulence

Detector.Person : Flight Crew

When Detected : In-flight

Result.General : Physical Injury / Incapacitation

Assessments

Contributing Factors / Situations : Procedure

Contributing Factors / Situations : Aircraft

Primary Problem : Aircraft

Narrative: 1

Preflighted TKS system prior to flight into possible icing. Ramp personnel complained of TKS fluid chemical odor at plane. Prior to climbing into cloud layer (OAT 0°C +/-) turned on TKS anti ice system in "Normal" mode for possible icing. Flight continued in and out of rain/snow mix. Heater off, all vents closed. Noted TKS odor in cockpit, burning of eyes, throat irritation, and slight difficulty breathing. Noted although forward side vents closed still had airflow entering cockpit and flappers closed but pointed up directing air into eyes. Then noted strong air flow entering cockpit through closed cockpit side window, air entering through rear seal on window.

Aircraft is not pressurized so it is not air tight thus TKS mist entering cockpit.

Synopsis

A C-208 Captain reported eye irritation and breathing difficulty after using TKS in flight. The fluid seemed to enter through the closed cockpit side window's rear seal.

ACN: 1224925

Time / Day

Date : 201412

Local Time Of Day : 0601-1200

Place

Locale Reference.ATC Facility : ZLA.ARTCC

State Reference : CA

Altitude.MSL.Single Value : 9200

Environment

Flight Conditions : IMC

Weather Elements / Visibility : Turbulence

Weather Elements / Visibility : Icing

Aircraft

Reference : X

ATC / Advisory.Center : ZLA

Aircraft Operator : Air Taxi

Make Model Name : Caravan 208B

Crew Size.Number Of Crew : 2

Operating Under FAR Part : Part 135

Nav In Use.VOR / VORTAC : LHS

Flight Phase : Cruise

Route In Use.Airway : V459

Airspace.Class E : ZLA

Component

Aircraft Component : Pitot/Static Ice System

Aircraft Reference : X

Problem : Malfunctioning

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Taxi

Function.Flight Crew : Single Pilot

Function.Flight Crew : Pilot Flying

ASRS Report Number.Accession Number : 1224925

Human Factors : Situational Awareness

Events

Anomaly.Aircraft Equipment Problem : Critical

Anomaly.Deviation - Altitude : Excursion From Assigned Altitude

Anomaly.Deviation / Discrepancy - Procedural : Clearance

Anomaly.Inflight Event / Encounter : Weather / Turbulence

Detector.Person : Flight Crew

When Detected : In-flight

Result.Flight Crew : Became Reoriented
Result.Flight Crew : Overcame Equipment Problem

Assessments

Contributing Factors / Situations : Aircraft
Contributing Factors / Situations : Human Factors
Contributing Factors / Situations : Weather
Primary Problem : Aircraft

Narrative: 1

Altitude deviation, few miles south of LHS VOR on V459 at 10,000 feet. IMC with light icing condition. Airspeed indicator showed slow decrease from 135 KIAS. I checked that pitot heat switch was on position and wing boots clear the ice. I thought that ice was over and or under the wing. As the airspeed indicator approached 110, I requested 9,000 feet to ATC. ATC said "stand by". Airspeed indicator kept decreasing. Airspeed approached 100, I reported "unable to maintain 10,000" and lowered the pitch [to] gain airspeed. But airspeed did not increase, then I tried to recycle pitot heat switch. Few second later airspeed showed normal, and I climbed back to 10,000. I deviated 800 feet.

Cause:

1. Pitot/Static heat switch did not work properly.
2. I did not check other side of instruments (lack of scan).
3. When I requested 9,000, I should say why (due to icing etc.)
4. When I started to descend, I should declare emergency.

Synopsis

C-208 pilot reported deviating from assigned altitude when he experienced abnormal airspeed indications while in icing conditions, pitot/static heat switch problem was suspected to be a factor.

ACN: 1068362

Time / Day

Date : 201212

Local Time Of Day : 1801-2400

Place

Locale Reference.ATC Facility : ZAB.ARTCC

State Reference : NM

Altitude.MSL.Single Value : 16000

Environment

Flight Conditions : Mixed

Weather Elements / Visibility : Icing

Weather Elements / Visibility : Turbulence

Light : Night

Ceiling.Single Value : 14000

Aircraft

Reference : X

ATC / Advisory.Center : ZAB

Aircraft Operator : Air Taxi

Make Model Name : Caravan 208B

Crew Size.Number Of Crew : 2

Operating Under FAR Part : Part 135

Flight Plan : IFR

Mission : Passenger

Flight Phase : Cruise

Route In Use : Vectors

Component

Aircraft Component : Oxygen System/General

Aircraft Reference : X

Problem : Improperly Operated

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Taxi

Function.Flight Crew : First Officer

Function.Flight Crew : Pilot Not Flying

Qualification.Flight Crew : Instrument

Qualification.Flight Crew : Multiengine

Qualification.Flight Crew : Commercial

Qualification.Flight Crew : Flight Instructor

Experience.Flight Crew.Total : 650

Experience.Flight Crew.Last 90 Days : 160

Experience.Flight Crew.Type : 400

ASRS Report Number.Accession Number : 1068362

Human Factors : Physiological - Other

Human Factors : Training / Qualification
Human Factors : Communication Breakdown
Communication Breakdown.Party1 : Flight Crew
Communication Breakdown.Party2 : Other
Communication Breakdown.Party2 : Flight Crew

Events

Anomaly.Aircraft Equipment Problem : Critical
Anomaly.Flight Deck / Cabin / Aircraft Event : Other / Unknown
Anomaly.Deviation / Discrepancy - Procedural : Published Material / Policy
Anomaly.Deviation / Discrepancy - Procedural : FAR
Anomaly.Inflight Event / Encounter : Weather / Turbulence
Detector.Person : Flight Crew
Were Passengers Involved In Event : Y
When Detected : In-flight
Result.General : None Reported / Taken

Assessments

Contributing Factors / Situations : Equipment / Tooling
Contributing Factors / Situations : Human Factors
Contributing Factors / Situations : Procedure
Contributing Factors / Situations : Weather
Primary Problem : Procedure

Narrative: 1

On our return flight the Captain filed an IFR flight plan. Before the flight the Captain gave no briefing, but merely said we were going a little high, and directed me to brief the passengers. I didn't know how high we were going so I just prepared the masks and briefed the passengers on how to use them and when; but none agreed to use them.

After we departed the Captain told me he filed for 14,000 FT and we went on oxygen passing 10,000 FT. Once we reached cruise altitude I did ask the passengers to put the oxygen masks on but, again, no one did so. We later asked Center for higher due to clouds at our altitude and we did pickup a lot of ice at 16,000 FT MSL around 50 NM from our destination.

Later, Center asked us to go higher for traffic and at some point, we were at 19,000 FT [FL190] for about 13 minutes, then we got cleared for lower. At all times we did ask the passengers to use oxygen masks [but none did so]. After we landed we asked everyone how they felt and no one complained or commented.

I believe what caused the problem was there was no communication with the Captain (who is new) and I didn't confirm what he meant by "going high" so I could prepare the oxygen masks and place them in each seatback pocket for easy access by the passengers. The masks are normally stored in the front seat area in a plastic bag.

Synopsis

Poor communication between the Captain, the First Officer (reporter), and the passengers aboard a commercial C208B resulted in the passengers not donning provided oxygen masks despite operating at altitudes as high as FL190 due to weather.

ACN: 987609

Time / Day

Date : 201201

Local Time Of Day : 0601-1200

Place

Locale Reference.Airport : ZZZ.Airport

State Reference : US

Altitude.MSL.Single Value : 5000

Environment

Flight Conditions : IMC

Weather Elements / Visibility : Icing

Light : Daylight

Aircraft

Reference : X

ATC / Advisory.TRACON : ZZZ

Aircraft Operator : Air Taxi

Make Model Name : Caravan 208B

Crew Size.Number Of Crew : 1

Operating Under FAR Part : Part 91

Flight Plan : IFR

Mission : Ferry / Re-Positioning

Flight Phase : Cruise

Airspace.Class B : ZZZ

Component

Aircraft Component : Generator Drive

Aircraft Reference : X

Problem : Failed

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Taxi

Function.Flight Crew : Captain

Function.Flight Crew : Pilot Flying

Qualification.Flight Crew : Air Transport Pilot (ATP)

ASRS Report Number.Accession Number : 987609

Human Factors : Workload

Human Factors : Situational Awareness

Human Factors : Time Pressure

Human Factors : Training / Qualification

Human Factors : Troubleshooting

Events

Anomaly.Aircraft Equipment Problem : Critical
Detector.Automation : Aircraft Other Automation
Detector.Person : Flight Crew
When Detected : In-flight
Result.General : Declared Emergency
Result.Flight Crew : Landed in Emergency Condition
Result.Flight Crew : Diverted

Assessments

Contributing Factors / Situations : Aircraft
Primary Problem : Aircraft

Narrative: 1

I was flying a repositioning leg. I was flying at 5,000 FT in IMC when my STBY PWR ON caution light came on (GEN FAILURE and STBY ELEC PWR OFF warning/caution lights did not illuminate). Since I was in cruise and was being vectored around for the ILS 22L, I knew I had the time to try and diagnose any problem I might have. So I got out the emergency checklist only to find out that there is not a checklist for this specific situation. Looking at my generator, the amps showed around 50 (keep in mind I had just received a trace of rime ice, so all my de-ice systems were on), while my alternator amps showed around 30. Knowing there had to be reason for the caution light; I decided to test my alternator to see if it would take the entire electrical load (as it did successfully in my Before Takeoff checklist). I proceeded to monitor my alternator amps and tripped my generator offline. The alternator took the load and rose to about 50 AMPS. I then reset my generator to see if the generator would take the load and extinguish the light. However, the STBY PWR ON caution light remained illuminated. Since I had proven my alternator was working, I reduced my electrical load further down to about 30 AMPS to keep a healthy margin below the alternator's 75 AMP maximum. It was also at this time that I noticed that two circuit breakers had tripped, both being BUS 2 PWR circuit breakers (I found out there was more when I got on the ground). As I reached for my emergency checklist to see what it might say about BUS circuit breakers tripping, I saw, out of the corner of my eye, another circuit breaker tripping (turned out to be the STBY PWR circuit breaker) and some light smoke rising out of the circuit breaker panel coming toward me. As a result, I immediately donned my oxygen mask and declared an emergency with ATC. Approach responded by giving me vectors to a nearby airport and descent down to 2,000 FT. As I looked to my right to find the airport, I also noticed some of my engine gauges had stopped working since I had seen the smoke. The failed gauges were: Torque gauge, ITT gauge, fuel flow gauge, and right fuel quantity indicator. Leveling off at 2,000 and a heading of 130 (it was an emergency descent at 165-170 KTS), I was given a new heading of 170 for the airport and I saw it shortly thereafter. I then proceeded to land without incident. There was smoke in the cockpit. Therefore, I declared an emergency and landed the plane at the nearest suitable airport.

Synopsis

A C208 STBY PWR ON caution alerted while at cruise accompanied by popped circuit breakers. Shortly thereafter the cockpit filled with smoke so the pilot declared an emergency and landed at nearby airport.

ACN: 977543

Time / Day

Date : 201110

Local Time Of Day : 0601-1200

Place

Locale Reference.Airport : ZZZ.Airport

State Reference : US

Altitude.MSL.Single Value : 7000

Environment

Flight Conditions : IMC

Weather Elements / Visibility : Icing

Light : Daylight

Aircraft

Reference : X

ATC / Advisory.TRACON : ZZZ

Aircraft Operator : Air Taxi

Make Model Name : Caravan 208B

Crew Size.Number Of Crew : 1

Operating Under FAR Part : Part 135

Flight Plan : IFR

Mission : Cargo / Freight / Delivery

Flight Phase : Cruise

Airspace.Class G : ZZZ

Component

Aircraft Component : Aerofoil Ice System

Aircraft Reference : X

Problem : Design

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Taxi

Function.Flight Crew : Captain

Function.Flight Crew : Pilot Flying

Qualification.Flight Crew : Air Transport Pilot (ATP)

ASRS Report Number.Accession Number : 977543

Human Factors : Workload

Human Factors : Distraction

Human Factors : Human-Machine Interface

Human Factors : Situational Awareness

Human Factors : Time Pressure

Events

Anomaly.Aircraft Equipment Problem : Critical
Anomaly.Inflight Event / Encounter : Weather / Turbulence
Detector.Person : Flight Crew
When Detected : In-flight
Result.General : None Reported / Taken

Assessments

Contributing Factors / Situations : Aircraft
Contributing Factors / Situations : Human Factors
Contributing Factors / Situations : Weather
Primary Problem : Aircraft

Narrative: 1

Prior to flight, the TKS system was topped off and the sight gauge checked to ensure the system was full. The cockpit TKS gauge also indicated full. Forecast Icing charts (CIP/FIP) were reviewed. Widespread pockets of SLD were forecast throughout the southwestern, central and eastern area of the state for all altitudes up to 21,000 FT. Forecast icing severity showed light to occasional moderate icing throughout the same aforementioned coverage area and altitudes with heavier icing conditions for altitudes above 7,000 FT. The aircraft was deiced using types 1 and 4 fluids. Prior to start of takeoff roll from runway the TKS Normal mode was selected ON. About six minutes after takeoff while climbing from 4,000 FT through 6,000 FT, moderate icing was encountered and the TKS "HIGH" mode was selected. Upon reaching my final requested altitude of 7,000 FT, the icing conditions returned to light intensity and TKS was placed back in "Normal" mode. A short while later the icing conditions again became moderate in intensity and "High" mode was again selected. This scenario repeated itself over an 18 minute period. About twenty five minutes after takeoff the icing conditions changed to moderate intensity and the TKS had to remain in "High" mode for the remainder of the flight. On approximately three occasions during the flight, "MAX FLOW Airframe" had to be briefly used.

While being vectored for the ILS Runway 24 approach the Yellow Caution light on the TKS illuminated, but moderate rime icing conditions remained and the continued use of "High" mode was required to keep the aircraft nearly free of ice accumulation. During the initial ILS approach, at 2,600 FT MSL, I experienced a false glide slope indication and I executed the published missed approach procedure. I was then given vectors for another ILS approach which was completed successfully. After landing and while turning clear of the runway, the Red Warning light of the TKS System illuminated and TKS was then selected OFF. During my post flight inspection of the aircraft, I observed that the TKS system fluid supply was completely depleted. Throughout the entire flight duration the cockpit TKS gauge indicated full. Overall, the TKS system seemed to be very effective in keeping the aircraft mostly clear of ice accumulation, but the limitations of its "HIGH" mode is to me, somewhat concerning. Granted, an icing event such as this is an unusual occurrence for this geographical area, but this proves that it does indeed happen and the endurance of the TKS system, in "HIGH" mode proved to meet the demand. However, if the weather at my destination had dropped below approach minimums while I was being vectored for the second approach, or if a diversion to another airport had become necessary, for any reason, this would have necessitated the declaration of an emergency as there would not have been any ice protection remaining.

Therefore, while flights are normally limited in duration due to fuel supply and regulatory requirements, TKS brings with it the same considerations concerning its fluid supply while planning and conducting flight operations in icing conditions. This means that my future

selection of an alternate airport should be within the TKS "HIGH Mode" fluid flow range as well as required fuel range and depending on meteorological conditions, this may not be possible. This, combined with the lack of an adequate operational cockpit TKS gauge, causes me to remain very skeptical about the reliance on the TKS System to provide a safe flight operation when escape from icing conditions may not be available. In such meteorological conditions, the need to constantly recalculate remaining TKS fluid quantity and endurance creates a huge distraction from other flight duties and at least significantly increases pilot workload.

Also, regarding the sight gauge in the TKS Fluid Tank, it lacks adequate markings to accurately indicate fluid quantities between 11.7 and 20.8 gallons, and I am told that even if the "ball" is at the top of the sight gauge, the system may still not be completely full. Depending on the slope and area of the parking ramp, an accurate reading using the sight gauge may not be possible, leaving determination of fluid quantity to be a "W.A.G." at best. I understand that it is for this reason that pilots must always have the system topped off prior to the aircraft's next departure, but this too could prove to be problematic and may cause operational delays. A larger TKS fluid tank capacity should be available to provide a safe operational margin when the conditions herein described occur. In this day and age of engineering and technology, there is no valid reason that an accurate TKS cockpit gauge can't be developed or installed. The fact remains that the TKS cockpit gauge is a part of a system installed in the aircraft and by regulation, like all other equipment installed in the aircraft, it must either be operational, or MEL provisions for its inoperative status be available.

Synopsis

A C208 pilot reported the TKS anti-icing system quantity indication system was unreliable, and because the HIGH mode was selected during prolonged moderate conditions the fluid was exhausted during flight. Reporter stated quantity gauge read "full" for the entire flight.

ACN: 881246

Time / Day

Date : 201003

Local Time Of Day : 1801-2400

Place

Locale Reference.ATC Facility : ZZZ.ARTCC

State Reference : US

Relative Position.Distance.Nautical Miles : 115

Altitude.MSL.Single Value : 7500

Environment

Flight Conditions : IMC

Weather Elements / Visibility : Icing

Weather Elements / Visibility.Visibility : 9

Light : Dusk

Ceiling.Single Value : 1100

Aircraft

Reference : X

ATC / Advisory.Center : ZZZ

Aircraft Operator : Air Taxi

Make Model Name : Caravan 208B

Crew Size.Number Of Crew : 1

Operating Under FAR Part : Part 135

Flight Plan : IFR

Mission : Cargo / Freight / Delivery

Flight Phase : Cruise

Airspace.Class E : ZZZ

Component

Aircraft Component : Aerofoil Ice System

Aircraft Reference : X

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Carrier

Qualification.Flight Crew : Instrument

Qualification.Flight Crew : Multiengine

Qualification.Flight Crew : Commercial

Qualification.Flight Crew : Flight Instructor

Experience.Flight Crew.Total : 1520

Experience.Flight Crew.Last 90 Days : 120

Experience.Flight Crew.Type : 35

ASRS Report Number.Accession Number : 881246

Human Factors : Time Pressure

Human Factors : Training / Qualification

Human Factors : Workload
Human Factors : Situational Awareness

Events

Anomaly.Inflight Event / Encounter : Loss Of Aircraft Control
Anomaly.Inflight Event / Encounter : Weather / Turbulence
Detector.Person : Flight Crew
When Detected : In-flight
Result.General : Declared Emergency
Result.Flight Crew : Diverted
Result.Flight Crew : Landed in Emergency Condition

Assessments

Contributing Factors / Situations : Aircraft
Contributing Factors / Situations : Procedure
Contributing Factors / Situations : Weather
Primary Problem : Weather

Narrative: 1

This is a report as to why the flight diverted. I was the pilot in command and had 1400 LBS of fuel on board. At XA:20 I checked the weather report via website for a standard briefing along my route of flight. The route to my final destination with one enroute stop. At XB:20 I called 800-WX-BRIEF to get a briefing on icing conditions and any hazardous weather along my route of flight. The briefer stated that there was light rime ice from a pilot report. I asked him if there were any other reports along the said route, and no reports were issued. At XB:45 I checked the weather via website again for any adverse weather, icing conditions and PIREPS. At this time there were no reports of any ice along the route of flight. At XC:15 I called Dispatch to let them know I was on duty. At XC:26 the courier arrived at the airport and dropped off 31 LBS of freight. At XC:32 I lifted off en route with stall heat and pitot heat on. On climb out passing through the first layer of clouds (1100 FT AGL), I reported to Center light rime ice was observed. After cruising flight at 7000 FT MSL I was between layers of clouds but would be entering IMC soon. I turned on the windshield anti-ice, prop anti-ice as well as putting out the inertial separator and turning on the ignition. I entered the clouds very quickly and reported to Center I was picking up moderate clear ice. I made use of the boots on the C-208 to break off the clear ice. After just 5 minutes I had asked Center for a higher altitude. I was told to maintain a block altitude from 7000 FT MSL to 11000 FT MSL. I started my climb but noticed the aircraft would only climb 200 FPM at 120 KTS. I reached 7500 FT MSL and could no longer climb. The aircraft could hold altitude at maximum power and 120 KIAS for a short time. After approximately 10 minutes the aircraft started to buffet at 120 KIAS and I reported severe clear ice. I pitched the aircraft nose down to keep from a stall. I notified Center that I would not be able to maintain my block altitude assignment and would need lower. I was given a block from 4500 FT MSL to 7000 FT MSL. As time progressed I continued using the boots on the airplane as well as trying to find VFR weather conditions. At 4000 FT MSL I had declared an emergency with Center, as I would no longer be able to hold altitude. The aircraft at this time was at maximum power and stalling at 120 KIAS. I was diverted to the closest airport to shoot the VOR DME approach. After Center had told me I had to cross the VOR at 4000 FT MSL, I replied I couldn't maintain altitude and I would not make it to my divert airport. I was told from my last known heading there was a small airport at 3 o'clock and 5 miles. I broke out of the clouds at 500 FT AGL and quickly started a steep turn to look for a field to land in, only being able to view from where the hot plate was. Center picked me up again and told me the airport was 1 o'clock and 4

miles. I asked Center for the frequency to turn on the landing lights. At this time another pilot flying out of the conditions turned the lights on for me. I would not make it to the north and south runway. I again had full power to maintain 125 KIAS and a 200 FPM descent. I landed on a closed runway after stalling the aircraft 10 FT above the field with maximum power at 120 KIAS and applied maximum braking and maximum reverse to stop the airplane. I contacted Center on the ground to inform them I had landed safely. After I had shut down the aircraft I then called Dispatch to let them know of the situation and then contacted the Assistant Chief Pilot. After I had notified the correct people, I went outside to assess the damage, to find there was none to the aircraft or myself.

Synopsis

A C208B pilot reported flying into unforecast icing at 7,000 FT which the aircraft's de-ice could not clear from the wings. Unable to control aircraft's descent, he diverted to a nearby airport and landed safely.