Statistics show cabin depressurization events are almost always survivable when recognition of a problem is made early and the appropriate emergency procedures are carried out expeditiously. Whether an unpressurized cabin at altitude is brought about by structural failure or human error the number one concern is always hypoxia. Victims of hypoxia rarely are aware they are just seconds away from unconsciousness. They commonly lose critical judgment and start to feel euphoric while their cognitive ability and muscle coordination quickly diminishes. Severe hypoxia can take affect within seconds, making a quick response crucial to the situation's outcome. Reviewing the past experiences of other flight crews reveal the circumstances under which depressurization events commonly occur and the challenges associated with donning an oxygen mask and troubleshooting a time critical emergency.

I’m going down, down, down, down...

PA-46 enters a rapid descent that was not coordinated with ATC

After experiencing a rapid decompression, we began our [rapid] descent prior to advising ATC of the need to descend. At some point after the [rapid] descent began, ATC queried us on our altitude. At that point I advised ATC that we were in an "emergency descent". After further clarification, ATC cleared us to descend and maintain 11,000. Shortly thereafter, we diverted to [a nearby airport].
Shake it up baby...

Ruptured beverage can in the cockpit of an EMB-145 caused rapid cabin decompression

The Reporter stated that his Company’s Flight Crew Operations Manual has a prohibition about placing liquids on or passing them over the Center Console because of its vulnerability to liquid incursion. In this case, a closed beverage can was passed over the Center Console but dropped before it could be put in the cup holder near the Captain’s side window. The pressurized mist sprayed everywhere and ultimately dripped off the overhead panel onto the Center Console. After the liquid got into the Pressurization Controller, located on the Center Console, the pressurization system failed to control the cabin pressure and the rapid decompression followed. The Reporter believes the Center Console should be better protected from liquid because his event is not the first such failure because of liquid incursion and will not be the last because of design issues.

Not feeling the pressure...

A ERJ145 EICAS alerted "CABIN" as the cabin climb through 10,000 FT

Climbing through approximately FL270 we received a "CABIN" aural warning. No EICAS messages were displayed. The cabin pressure on the EICAS was over 10,000 FT and quickly rising toward 11,000 FT. We confirmed that the cabin was depressurizing and ran the memory items for rapid cabin decompression. We initiated an emergency descent since the cabin altitude continued to climb. Shortly after performing the memory items for the emergency descent I informed ATC that we needed lower and immediately afterward declared an emergency. Cabin pressure was still climbing, so we deployed the passenger oxygen masks. ATC gave us a descent down to 11,000 FT and finally 10,000 FT. During the descent we communicated with the flight attendant that she should make sure everyone
Face it...

A CE-560 Captain reported loss of cabin pressurization at FL400.

We were approaching the VOR [and] had just been cleared to begin our initial descent to FL370 from our cruise altitude of FL410. We had completed the descent checklist, and as we were descending through FL400, we noted the cabin rate-of-climb indicator "spiking" to a maximum rate-of-climb (6000+ fpm). We had red cabin altitude and master warning lights illuminating and initiated the cabin decompression and the emergency descent checklists. I ensured that the passenger oxygen masks were deployed and instructed our two passengers to don their oxygen masks, advised them that we had a pressurization problem and observed that they in fact had donned their masks and received a "thumbs up" from them. We observed that the pressurization safety valves had apparently closed because the cabin altitude was limited to approximately 13000 ft. We requested a further descent to the lowest MEA altitude, but were initially restricted to FL290, due to (apparently) active military airspace below us. We clarified that we were declaring an emergency, and were subsequently given a heading for further descent, after a brief delay, down to 12,000 feet MSL. We subsequently confirmed with ATC that our pressurization problem was "stabilized" as we approached 12,000 ft. on descent. We discussed airport alternatives, and we concluded that a conservative option would be to change our destination to ZZZ, as there would be better support capabilities if required. We had requested ATC to advise our Operations Command Center of our situation and intentions. We briefed several options, and decided on executing the VOR approach and landing. We landed the aircraft without incident or injury and safely taxied to the FBO. We attended to our passengers, who indicated that they were not injured, but were very ap-
Feeling a little too fine...

BE1900 flight crew reports detecting symptoms of hypoxia while cruising at FL190.

During cruise flight at FL190 near Laramie VOR I noticed the onset of mild hypoxia symptoms that reminded me of my prior general aviation flying experience at altitudes between 10,000 feet and 14,500 feet without supplemental oxygen. No red annunciators (to include CAB ALT HI) were illuminated. I glanced at the cabin altimeter and noticed that the cabin altitude was indicating somewhere between 12,000 feet and 13,000 feet. I was somewhat in disbelief due to the lack of CAB ALT HI being illuminated, so I asked the Captain to verify that I was reading the cabin altitude gauge correctly. Upon confirmation of the high cabin altitude, we donned oxygen masks, and requested a lower altitude from ATC which was granted. Communication was immediately established using the oxygen mask microphones, and our communication with ATC was not compromised. However, there was significant background noise due to breathing as we left the hot interphone switch on for most of the event. During descent the Captain ran the emergency checklist for cabin decompression. The Captain checked all annunciators using the “press to test” feature and they tested normally. There were no signs of a rapid decompression or explosive decompression. No emergency was declared since we were given an immediate descent when we requested it. At the lower altitude the cabin had descended somewhat to below 12,000 feet. Because of this and the initial cabin altitude noted at below 13,000 feet, we elected not to deploy cabin oxygen masks. After descending further, with cabin altitude below 10,000 feet, we removed our oxygen masks and continued normally. On this particular flight and the leg prior to it (DEN to SHR) the left environmental system was MEL’ed (21-14), placarded, and we reviewed the MEL and associated procedure prior to each departure. We noted a cold cabin temperature on both legs of the flight and had ensured that the cabin temperature was set to maximum during each flight. We attributed the low temperature to the inoperative left environmental system and outside air temperature below standard. The cabin pressurization was checked during the climb checklist on both flights and no anomalies in...
pressurization during initial climb were noted. I also observed the Captain test the annunciators prior to each flight and I did not observe any malfunctioning annunciators.

The CAB ALT HI annunciator should warn of cabin altitudes in excess of 10,000 feet. We believe this part of the aircraft’s systems failed. Without this operational our only warnings of high cabin altitude are instrument scan and physiological symptoms. I believe my prior experience in general aviation flight at altitudes above 10,000 feet and my prior attendance of an FAA high-altitude physiology course (including altitude chamber training to recognize my personal symptoms of hypoxia) helped to identify the issue quickly. Despite the maximum altitude of the B1900 being restricted to FL250 I believe this training would be useful for other flight crews in our aircraft and would like to request that the company subsidize this training for flight crew members who have not yet experienced it.

Unplanned trip to the dump...

B1900 Dump Valve was mistakenly left ON.

After takeoff when the cabin would not pressurize, the flight crew returned to the departure airport.

My First Officer and I accepted a plane that had been used by Maintenance earlier that day to perform the first flight of the day run up. We did not realize it at the time but Maintenance had left the Dump Valve ON from their run up. As it is not part of the run up SOP to leave the Dump Valve ON, we were later confused at it being ON.

As it is not part of any Flows, Checklists, or even Emergency procedures (for cabin decompression) to check the valve, I did not check it until it sparked in my brain on final approach. By that time we had already called air return to Dispatch and did not think it wise to cancel my landing and just continue on.

There should be at least one checklist/ flow checking the dump valve. The emergency checklist for cabin decompression should reference it.
Don’t use your head...

**Owner of a GIII hit his head on an electrical gang bar in the cockpit causing loss of electrical power and cabin decompression**

We were flying at FL430 when the Flight Attendant notified crew that there was a flood in the lavatory. Captain went back to investigate while First Officer flew aircraft. Owner went up to flight deck and hit his head on emergency electrical gang bar in cockpit. All electrical power was lost and cabin began depressurization. Captain returned to flight deck and tried to reset electrical power and began emergency descent. We could not notify [Center] of our descent because our radios were inoperative due to electrical power unable to restore. Passengers and flight crew all donned O2 masks except owner, who passed out due to hypoxia. Captain was finally able to restore electrical power at 16,000 FT. First Officer was now able to contact...Center and advise of the situation. We were able to then land. In the future no one except flight crew is allowed to enter flight deck during flight, not even aircraft owner.

One good thing that happened was that both pilots had iPads. We were able to still navigate even though aircraft lost electrical power. The IRs and navigation boxes were not able to power up for the rest of the short flight.

Lights out...

**TBM pilot notices a cabin decompression light passing 15,000 feet**

I was climbing out of 15,000 feet to FL230 when my TBM had a cabin decompression light come on. Everything else looked normal but I put on my mask and the told a lady controller I had a decompression light on and wanted to drop down and she asked if 11,000 would be ok and I said great and meant it. She was perfect. I then had to drop down to 10,000 to finish my trip. The next day another pilot and I took the plane to FL230 and everything checked out but I am going to take it the shop and have them check it out. I think it may have had a bad signal from one of the sensors which read false.
Decompression scenarios test an aircrew’s awareness and skill proficiency. Any significant delay recognizing a pressurization problem may result in the crew becoming infirmed or unconscious due to hypoxia. If this occurs, it may simply be too late to recover. The symptoms of hypoxia may differ significantly between individuals, and could be unrecognizable, especially if no prior hypoxia training has been conducted. The Time of Useful Consciousness (TUC) can range from minutes to seconds, depending on multiple factors, but primarily the ambient altitude.

<table>
<thead>
<tr>
<th>Altitude</th>
<th>Time of Useful Consciousness</th>
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<tbody>
<tr>
<td>FL 450 MSL</td>
<td>9 to 15 Seconds</td>
</tr>
<tr>
<td>FL 400 MSL</td>
<td>15 to 20 Seconds</td>
</tr>
<tr>
<td>FL 350 MSL</td>
<td>30 to 60 Seconds</td>
</tr>
<tr>
<td>FL 300 MSL</td>
<td>1 to 2 Minutes</td>
</tr>
<tr>
<td>FL 280 MSL</td>
<td>2 1/2 to 3 Minutes</td>
</tr>
<tr>
<td>FL 250 MSL</td>
<td>3 to 5 Minutes</td>
</tr>
<tr>
<td>FL 220 MSL</td>
<td>5 to 10 Minutes</td>
</tr>
<tr>
<td>FL 200 MSL</td>
<td>30 Minutes or more</td>
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</tbody>
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Aviation Physiology Training

The FAA Civil Aerospace Medical Institute (CAMI) offers a 1-day training course to familiarize U.S. civil aviation pilots and flight crews with the physiological and psychological stresses of flight.

Pilots who are knowledgeable about physiological phenomena encountered in the aviation environment are better prepared to deal with such potentially fatal in-flight events such as:

- loss of cabin pressure
- hypoxia
- spatial disorientation
- trapped gas problems
- decompression sickness
- acceleration forces leading to gray-out, black-out, or even unconsciousness
- noise, vibration, and thermal stress
- self-imposed stresses that can magnify any of the above physiological events.

For more information about our training courses and to view aviation survival tips, visit the FAA Civil Aerospace Medical Institute at — www.faa.gov/pilots/training/airman_education/
About ASRS
http://asrs.arc.nasa.gov

Summary
The ASRS is a small but important facet of the continuing effort by government, industry, and individuals to maintain and improve aviation safety. The ASRS collects voluntarily submitted aviation safety incident/situation reports from pilots, controllers, and others.

The ASRS acts on the information these reports contain. It identifies system deficiencies, and issues alerting messages to persons in a position to correct them. It educates through its newsletter CALLBACK, its journal ASRS Directline and through its research studies. Its database is a public repository which serves the FAA and NASA’s needs and those of other organizations world-wide which are engaged in research and the promotion of safe flight.

Purpose
The ASRS collects, analyzes, and responds to voluntarily submitted aviation safety incident reports in order to lessen the likelihood of aviation accidents.

ASRS data are used to:
⇒ Identify deficiencies and discrepancies in the National Aviation System (NAS) so that these can be remedied by appropriate authorities.
⇒ Support policy formulation and planning for, and improvements to, the NAS.
⇒ Strengthen the foundation of aviation human factors safety research. This is particularly important since it is generally conceded that over two-thirds of all aviation accidents and incidents have their...