Powdery snow is the skier's delight, but for the unsuspecting sling-winger, it could be the old "bag over the head" trick.

Whiteout!

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Pilots have a natural dislike for taking off and landing without visual references to the outside world. We are trained to overcome this, but there is one situation in which doing so becomes extremely difficult. Rotor-wingers flying in snow country face this hazard and find it as dangerous as flying with a bag over their head. It's caused by the whirling, powdery snow kicked up by the rotor blades and is called "whiteout."

Whiteout severity increases sharply during applications of collective near the ground during takeoff and landing. Loose snow can completely engulf the aircraft, leaving the pilot a couple of nasty options: an instrument takeoff or a whiteout landing. Completing an ITO under these circumstances is possible although it can be a tense situation if you're not prepared. The real kicker is trying to determine where sky ends and terra firma begins during a landing attempt. In such a situation, a pilot is most susceptible to vertigo, and this is not the place to try to figure which way is up.

Learning how to compensate for a whiteout will help those who have never experienced it. While education can't replace experience, it can help the uninitiated prepare for the worst. The following fictional account of a crew experiencing whiteout during a SAR mission illustrates the dangers involved in operating a helicopter near snow-covered surfaces and the symptoms to look for in whiteouts.

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RCC notified the helicopter alert crew that a civilian pilot was down in a mountain pass a few miles from the base. A ground rescue team was on the scene, but RCC didn't have radio contact with it; therefore, a SAR scramble was laid on to attempt a rescue of a possible survivor.

The aircraft commander quick-

ly worked out a flight plan as his crew readied the helicopter for flight. A check with the weatherman revealed a grim forecast for the crash site: 500 feet obscured, a half mile visibility in snow showers. But there was a slim chance that the weather might improve, so the pilot elected to give the mission a try.

Maintenance men removed static wires and engine covers as the pilot reached the aircraft; the waiting flight crew had "cocked" the helicopter, so in a few minutes the cold, damp chopper taxied to the runway. Methodically performing the "before takeoff" checklist, the pilot responded to his copilot's challenge, "Accel-decel, flat-pitch, and free-wheeling check complete." Events were going smoothly.

After the helicopter lifted off, the pilot steered it cautiously toward the pass. The low ceiling and poor visibility made the going rough. Cruising at 70 knots, the pilot cross-checked pilotage against tacan. As the chopper climbed up the valley toward the pass, the weather worsened.

"We'd better set it down. Metro said the weather should improve, slightly," the pilot told his crew. He decided to land on a small plateau and wait it out awhile.

As he eased the big chopper down, wisps of snowflakes rose to meet the descending aircraft. Most of the snow had been blown away from the landing area so the pilot had little difficulty with his touchdown.

"Sure wish we had a way to contact that ground rescue team that's at the crash site. We can't wait too long. I'm afraid the pilot may be in bad shape."

Snow continued to fall as fog masked rising hills on either side of the idling helicopter. A half hour after their unscheduled landing, ceiling and visibility improved. Once again the rotor blades bit into the arctic sky and the helicopter continued on to the crash site.

The crew scanned frantically for obstacles to flight and for signs of the plane's wreckage. Finally they spotted the aircraft's twisted tail perched on a snowbank. The ground team surrounded it, waving to the helicopter as it circled overhead.

"Ten seconds out for smoke bomb drop," said the pilot over interphone. Opening the cabin door, the helicopter mechanic deployed a smoke bomb on the pilot's command. Again the chopper circled as the colored smoke pointed out the surface wind direction. Satisfied that he had a safe spot on which to land, the pilot started the approach.

He flew the approach slightly faster than normal, attempting to land before the rotor wash created instant whiteout. The technique worked well. The main landing gear had just touched the surface as snow began swallowing up the chopper.

"Standby to engage the rotor brake," said the pilot matter-of-factly. The centrifugal force on the blades slowly dissipated under the strain of the brake. The mechanic and pararescueman jumped out of the helicopter to examine the civilian pilot, but the pilot was dead. Their flight through the bad weather had been for nothing.

The pilot decided to recover the body and return it to the base.

The ground team and flight crew hoisted the body onto the helicopter. In a few minutes the crew had reengaged rotors and was preparing for liftoff.

Visibility had deteriorated during the last few minutes and the pilot briefed his crew on his departure intentions.

"We'll head back down the valley. If the viz gets too bad, we'll just put it down until things clear up."

He pulled the chopper into the air and eased it forward. Snow whipped up around the fuselage, making outside visual reference almost impossible. But in a few seconds the aircraft passed through translational lift and whiteout conditions disappeared. Visibility suddenly worsened again so the pilot pointed his aircraft in the direction of what appeared to be a suitable landing area. Unfortunately, a heavy accumulation of powdered snow blanketed the intended landing spot.

The pilot barely got the helicopter on the ground as a frenzy of snow covered the windshield and side windows. Feeling out the landing spot for firmness, he slowly lowered the collective. Almost immediately outside references returned as flat pitch blades no longer whipped the snow around the cockpit.

Visibility seemed better out of the copilot's side. "Take the aircraft and I'll back you up," he told the copilot. "See if you can take off and get us down the valley; I can't see out this side."

"I can see a few hundred feet over here," answered the copilot. "I'll head toward some trees over there and use them for reference — and if we have to, we can stop again."

Whiteout!

As the left-seater pulled in collective, the snow whirled around the machine. Forward motion didn't improve visibility since the chopper was close to the ground and moving below translational lift speed.

Apprehensively, the pilot took control of the aircraft. Now they were in a precarious situation. They had left their landing spot, but couldn't distinguish outside references. The helicopter gyrated wildly as the pilot tried to maintain control.

The helicopter mechanic attempted to monitor aircraft movement by watching the ground from the cabin door. He watched with horror as the chopper's forward motion stopped and the helicopter staggered into a hover. Back and forth, the aircraft hovered. Then it eased backward as the pilot strained for something outside to focus on. Failing to identify anything through the whiteout, he began to overcontrol. Then, leaning forward in his frantic search for a reference, he unconsciously lowered collective. The helicopter tail boom and one main landing gear banged down. The main rotor blade sheared the tail boom, ricocheted off the snowy surface, changed plane, and ripped into the cockpit. The pilot never knew what hit him as the blades ripped through the cockpit, killing him instantly.

Out of control, the chopper settled hard into the snow. The copilot quickly shut down the engines and ordered evacuation of the passengers. What had moments before been a rescue vehicle was now a lifeless pile of junk — a victim of its crew's "whiteout."

Given the choice of flying in conditions conducive to whiteouts, most aircrews would opt to shuffle paperwork instead. However, rescue requirements don't play favorites. Crews must sometimes respond to life and death situations in weather they normally would avoid. A whiteout may be one of the dangers inherent in such a mission.

What Can a Pilot Do?

Here are a few suggestions on how to combat a whiteout:

On takeoff, try pulling in a small amount of collective to blow away loose snow. If the snowfall is light, you can sometimes get rid of your problem before taking off. Should the snow on the ground be too heavy for this, an instrument takeoff may be the only answer. But you have to be certain that you have sufficient power available. Getting up and away from the snow is the key to maintaining proper outside vision.

On landing, if you have sufficient pad space to run on, you may want to approach slightly faster than normal. Make sure your wheels or skids are on the ground by the time the whiteout comes around the fuselage to blind you. That way you'll be able to lower collective and decrease the rotor wash. Should the pad be small or should you have to drop in over trees, your approach will become more difficult. A steep, slow approach keeps the rotor wash ahead of the helicopter, thus kicking up a cloud of snow — just waiting to swallow you up near the surface.

The main rotor blade sheared the tail boom and ripped into the cockpit

Before you decide to land out in the boonies, make plenty of recon passes over the intended landing site. It may turn out you can land on a spot where whiteout conditions are not present. Walking a few feet after landing may be better than walking home after a prang. Remember, whiteouts are dangerous. Don't give them the edge by rushing into land with a bag over your head.