

TOM HOFFMANN

# Cross Country Skiing – Aviation Style!

## *The Twists and Turns of Flying with Skis*

“Pizza wedge” and “French fries.” Anyone with even the slightest bit of experience with snow skiing is probably familiar with these “tastefully” descriptive terms for positioning your skis to either slow down (wedge) or speed up (parallel). Unfortunately for pilots flying ski-equipped aircraft, there are no such colorful commands that provide a similarly simple reminder of control techniques for maneuvering on snow or ice. Instead, skiplane pilots must rely on a combination of skill, technique, and careful planning to safely navigate the “slopes.”



No rating is required to operate a skiplane, but be aware that the learning curve is probably a bit steeper than your average bunny slope. If you are already knee-deep in winter weather this year, or perhaps inspired by the freedom and exploration opportunities that only skiplane flying can offer, then read on — this article will help you get on your way to safely enjoying this exciting niche of frosty flying.

## Pick Up Your Skis Here

When you choose your own skis, several factors can influence what type you pick (style of skiing, environment, cost, etc.). The same is true for selecting skis for an airplane. However, despite the many variations in materials and design, there are only two basic categories of skis: plain and combination. Both can be used on ice and snow, but combination skis allow pilots the added benefit of using tires for a runway landing.

Plain skis come in three flavors. Wheel replacement skis are just that — skis in place of wheels. Clamp-on skis attach to the tires and, as a result, provide a little extra cushion on landing. Finally, roll-on or full-board skis are similar to clamp-ons, except that the tires are bypassed and do not carry any side or torque loads.

Combination skis have two main variations: retractable and penetration. Retractable skis have either a hydraulic pump or crank that allows pilots to extend or retract skis as needed. Penetration skis have a more permanent arrangement whereby the tires extend partially below the ski through a cut-out. Penetration skis might be a more economical option for some, but they generally provide poor ground clearance on non-snow surfaces and can add drag on snow.

There's also the possibility of adding a tailwheel ski, which, depending on your conditions, can either hamper or enhance operation. For takeoff or taxiing on deep snow, tailwheel skis can make turning easier and can help prevent the tail from sinking into the snow. On the flip side, the additional drag of a traditional tailwheel (without a ski) can aid in a shorter distance stop and keep the airplane going straight on a snow landing. Bottom line: Whether you're a seasoned aviator or a novice-in-training, buying or renting, it's important to know exactly what type of ski equipment your airplane has, and how the handling characteristics of that equipment could impact your flight planning.

## Before You Go

All of this extra gear on your aircraft also means you'll need to adjust your preflight inspection to

ensure everything is up to snuff. Start by checking the condition of the skis, especially the sheathing on the bottom which can take an awful beating from rocks and ice. Any significant damage to the surface may require a mechanic to have a look.

Be sure to also inspect any and all shock cord bungees, steel springs, and any hardware attachment points. Check the condition of any limiting cables and their fastenings and, if applicable, check tire pressure and the condition of any external hydraulic lines.

Another thing to be mindful of during preflight is stuck skis. "If a shove doesn't move the aircraft easily, the skis may be frozen to the surface," says Anchorage-based FAA aviation safety inspector and skiplane owner Mike Yorke. "Try gently rocking the airplane at the struts to free up the skis, but make sure your skis are free *before* you swing the tail to avoid any damage." To avoid this sticky situation, some pilots prefer to taxi on to a couple two-by-fours or plastic garbage bags. Still others swear by using a little non-stick cooking spray. Who says Pam<sup>®</sup> is just for frying eggs!

For a complete list of preflight inspection items associated with skis, refer to the appropriate supplement in your aircraft's pilot operating handbook.

## Know Your Snow

Equally important as your preflight inspection is your preflight planning before hitting the slopes. That includes reviewing the proposed route and any available alternates, fuel requirements, available facilities at your destination, weight and balance, and of course, weather. It's also a good idea to consider all of the necessary gear you'll need for an unexpected survival situation. That includes warm clothing and boots (for you and your passengers), water, food, first aid kit, and a means of signaling for help.

Knowledge of the terrain you can expect to find at your destination (and along the way) is another critical part of good preflight. Snow and ice conditions can vary widely and so it's best to find out what kind of conditions you can expect ahead of time. Unless you're headed to a heavily trafficked area, you'll often only have meteorological clues to consider like temperature, dew point, and accumulation reports. When ambient temperatures are low in drier conditions, expect powdery snow. Wet or slushy snow is more prevalent with higher moisture content and warmer temperatures near the freezing point.

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*The Experimental Aircraft Association hosts an annual Skiplane Fly-In every winter at Wisconsin's Pioneer Airport that showcases dozens of skiplanes like the one pictured here.*

Photo copyright Brad Lane/EAA

Both these snow types can lengthen your takeoff run or require you to pack down the snow beforehand with a few passes. It might also cause you to reconsider how much “stuff” you pack in your plane.

Another type of snow — granular — is wet snow that is exposed to a temperature drop, causing the snow to crust over. Similar to what you might encounter during a typical downhill ski run, it's possible a mix of these snow types can exist together and force you to adjust maneuvering techniques on the fly. As a good practice, use all performance data provided by the manufacturer to aid in planning.

### **Look Ma, No Brakes!**

In the air, the only difference you'll likely notice with a skiplane is a reduction in range and cruising speed caused by drag. On the ground is quite a different story. Let's start with taxiing, which becomes somewhat of a balancing act with little or no braking capability. In hard packed snow, directional control is achieved mainly via airflow over the rudder. Turning can be enhanced by adding power and forward elevator. Gusty winds can complicate this process, as skiplanes have a tendency to become giant weathervanes. To compensate, allow the aircraft to weathervane partly during a crosswind taxi. Give yourself plenty of room to maneuver as you'll probably wind

up drifting during a turn. Preplanning your taxi track should help you anticipate any tricky spots.

“Keep your taxi speed slow on ice or crusty snow, but on powder, be sure to keep enough power in to keep your skis from sinking,” says Yorke. “If you do get stuck, working the elevator and rudder along with a short burst of power should help.”

### **How to Prevent a Yard Sale in the Snow**

For those unfamiliar with the term, a “yard sale” is when a skier wipes out on a slope and gear jettisons every which way across the mountain. I've had my share of these, and they can be painful both physically and mentally. Airplanes, however, are not as resilient as humans when face planting in the snow. Hard-to-see snow banks, ice patches, and other inconspicuous wintry hazards can quickly turn a powder smooth takeoff or landing into a yard sale closer to the size of a flea market. Here are a few tips to keep you safe.

As we mentioned earlier, the type and condition of snow or ice you depart from will determine your takeoff run. A good rule of thumb is to add 10 percent, but wet or powder snow may require two to three times the normal distance. Due to the unpredictable nature of field conditions, you'll also want to plan for a soft-field takeoff. In addition, try walking

or taxiing the length of your takeoff path to assess conditions. This practice will serve as an additional means to pack down the snow.

Landings require an equal amount of advanced planning. Off-airport landing sites like glaciers, lakes, and tundra all have unique characteristics you'll want to consider beforehand to ensure that a safe landing (and takeoff) is possible. A good first step is to make a pass over the landing area to get a read on the winds, and check that the landing area is long enough and has sufficient obstacle clearance on both ends. To get an up-close look for hazards and get a better feel for the surface conditions, execute a trial landing, or more colloquially known as "dragging the lake." The *FAA Seaplane, Skiplane, and Float/Ski Equipped Helicopter Operations Handbook* recommends that pilots perform a gentle soft-field touchdown, controlled with power, while remaining near takeoff speed for approximately 600 to 800 feet, and then initiate a go-around. The tracks you leave on your trial landing will also help provide some contrast on your ensuing landing. But, if the ski paths you left in the snow turn black, it means overflow water is present and a landing should not be attempted.

Common landing areas for skiplanes include frozen lakes and rivers, so knowing your ice is important too. Glaze ice is essentially frozen snow packed down solid. Be on the lookout for frozen ridges and ripples caused by blowing snow in these areas. Aiming your approach parallel to ridge rows that are visible or in a lee area can help make for a smoother landing. Glare and clear ice, while pretty to look at, can be extremely slick and provide little or no directional control when on the ground. Add a stiff crosswind and you might wind up as a new contestant on *Airplane Ice Dancers*.

Another hazard encountered by skiplane pilots is a phenomenon known as "flat lighting." This is where overcast skies and snowy hills visually con-

verge and can wreak havoc on a pilot's depth perception at low altitudes. Flight operations should be discontinued if these conditions exist. In fact, you'll find flat light conditions surface in several NTSB accident reports, including one from 2012 where the pilot of Cessna 180 inadvertently struck the ground with his left ski during a landing site pass on a glacier. The gear collapsed and the left wing hit the snow-covered ice causing substantial damage.

To enhance depth perception on landing, try using a shoreline or tall grass as a reference point. A good pair of sunglasses will help, too.

### Sign Me Up for Ski Lessons

Do you now have visions of a remote ice-fishing or snow-shoeing expeditions floating around in your head? If so, and you live in or near a ZIP code that's no stranger to the white stuff, why not seek out a flight school that specializes in skiplane training? "While there are no specific training requirements, I recommend a minimum of two to three hours with a qualified instructor to learn the ins and outs of flying with skis," says Yorke.

In addition to expanding your knowledge of winter weather operations, flying with skis can open up a new world of flying opportunities with an almost endless amount exploration options. Consider it a lift ticket to the skies. ✈️

*Tom Hoffmann is the managing editor of FAA Safety Briefing. He is a commercial pilot and holds an A&P certificate.*

### Learn More

#### FAA Seaplane, Skiplane, and Float/Ski Equipped Helicopter Operations Handbook

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