

Skiing on Air

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Ski jumping has an image problem in the United States, due in part to a hapless Yugoslavian who careened down a ramp twelve years ago, lost his balance, and crashed in a one-man avalanche of skis and snow. Each week, millions of viewers still watch Vienko Bogatej's spectacular fall as part of the introduction to ABC's "Wide World of Sports."

"People think of jumpers as daredevils," says Jim Page, Nordic director of the U.S. Ski Team. "Or that we must be on drugs or demented to even try it. But really it's no more dangerous than any other sport."

A typical flight on a ninety-meter ski jump lasts about four seconds, says Page, "so in a sense whole careers can be measured in minutes." U.S. Olympic coach Greg Windsperger wanted his top jumpers to take seven hundred training jumps before the start of the 1984 Olympics in Sarajevo, Yugoslavia, giving them about an hour of air time.

Many U.S. jumpers come out of the small rural communities near the twenty ski jumps longer than seventy meters—places like Ishpeming, Michigan, Brattleboro, Vermont, and Lake Placid, New York. Still, the best U.S. jumpers spend most of their time out of town. Until this year, the U.S. Ski Team had to practice overseas during the summer. The Europeans have used plastic mats for off-season training since the 1960s, but only

in July 1983 did the Olympic Training Center in Lake Placid install the shiny, looped mats on seventy-, forty-, and fifteen-meter hills there. The mats, which resemble spaghetti, are bound together and spread on the takeoff and landing areas. The hills, looking like oversized thatched roofs, are then sprayed with water to keep them slick.

The skiers reach roughly the same distances on plastic as they do on the real thing. The plastic may also be slightly safer than snow, says Steve Gaskill, a former national coach who currently works with young jumpers. "The skiers don't dig in when they fall like they do in snow. I hear it can burn a little, though."

Even with their own mats, American jumpers continue to train with Europeans. "It's good for them to gauge themselves against the best," says Gaskill. "Then they can see what speeds and styles are winning competitions."

In the 1860s, Norwegian cross-country skiers often amused themselves by hopping off small hills. But the sport of ski jumping didn't really take off until Sondre Norheim of Telemark, Norway, created the now-classic down-on-one-knee landing. Moving the right knee forward keeps the jumper's balance centered and transfers the shock of landing to the hips and thighs. With the telemark landing, distances increased from the 30.9 meters of Norheim's first officially measured jump to the current record of 180 meters.

The Finns and Germans were the first to change their upright jumping profiles to a forward lean and promptly started taking titles from the Norwegians. Early film studies of the flying Finns by Swiss engineer Reinhard Straumann and Norwegian coach Thorleif Schjelderup revealed that the most successful jumpers were making their bodies into airfoils. Leaning forward from their ankles at about a thirty-degree angle to their skis, jumpers created lift as the air flowed faster over the curve of their bodies.

But before a skier can fly, he has to take off. In a crouch, the skier must keep his weight centered over his skis as he picks up speed down the ramp. At the takeoff, the critical part of the jump, he thrusts himself out over his skis and straightens his legs to bring his ski tips up. A jumper pushes his hips forward at takeoff, actually generating from three to five miles per hour of extra speed from this motion.

Once aloft, a jumper must keep his upper body at a constant angle to his skis. "It's very difficult to prevent further extension," says Gaskill. "In basketball and many other sports you can extend your body fully, but in ski jumping you have to maintain a certain angle and stay flat so you don't lose speed. It's close to diving and gymnastics in this respect."

Because the longest jump is almost by definition the most aerodynamically sound, it usually wins the competition. Jumpers can lose points, however, by wobbling in the air, for instance, or letting a hand touch the snow on landing.

According to five-time Olympian Art Devlin, early jumpers had a lot more to worry about than form. "It's much safer now," says Devlin. "Before the 1950s each community with a ski hill built it differently. One of the biggest problems we had was knowing how fast we were going and where we were going to land." Devlin speaks from experience, having once out jumped a hill in Leavenworth, Washington, by forty feet, tearing the cartilage in his right knee, and missing his chance to compete in the 1958 Olympics.

Now all ski hills conform to the same engineering specs and have movable starting gates. At ski jumping competitions, young noncompetitors called forejumpers test snow conditions and inrun speeds-usually about fifty-five miles per hour on a seventy-meter hill-before the starting gate is set. Wind and snow conditions can change during an event, though, so the judges watch for unusual jumps that might indicate that the inrun has iced up, or the wind has gusted out of the safe thirty-five-miles-per-hour range.

Judging made a big difference in the outcome of the seventy-meter event at the 1980 Lake Placid Olympics. Jeff Davis, an American whose best jump ever had been seventy-nine and a half meters, made a leap

of ninety-one meters, well past the sixteen meter-long landing area. His was the ninth jump of the event. After a delay, the competition jury ruled the jumpers were going too fast on the ramp, and moved the starting gate down, forcing everyone to jump again.

Davis made two creditable leaps of eighty and eighty-four meters to finish seventeenth, and the competition was won by Austrian Anton Innauer with jumps of eighty-eight and ninety meters. Davis handled his disappointment with grace, but others felt that if someone with an international reputation had jumped ninety-one meters it would have stood. The judges were concerned that if Davis flew so far, the top jumpers would surely sail into hazardous territory beyond the hill's landing area.

The athletes themselves just want to out jump the competition, landing zone or no landing zone. Some try out unusual styles to get greater distance, risking the disapprobation of style judges. In the old days, everything from flapping the arms to bowing from the waist was seen. More recently, a style called the delta-wing came into vogue. Most jumpers keep their skis parallel about six inches apart, but others have been able to successfully complete jumps with their skis in a snowplow or triangular formation. Canada's leading jumper, Steve Collins, used this technique for some time but has since abandoned it.

"Collins did the delta-wing naturally," says Jim Page. "He's a great wind skier. His size

(roughly 105 pounds) may have something to do with it. He floats on the wind-doesn't drill through it like other skiers."

According to Page, floaters get the most out of every flight, riding the wind and maintaining lift as long as possible. Power jumpers accelerate more at takeoff but often do not have the best aerodynamic posture getting down the hill. Floaters tend to adjust better to ideal days with uphill breezes when they can take advantage of the lift.

Once aloft, a jumper must keep the tips of his skis angled into the wind and his back curved-forming an airfoil not unlike that of an airplane wing

