D47 Forensic Engineering Critical Site Photogrammetry and the Use of GPS in a Ski Collision Case

A.K. Aleksander, PhD, Aleksander & Associates, PA, PO Box 140558, Boise, ID 83714*

After attending this presentation, attendees will understand some of the complexities of the reconstruction of ski terrain collisions, photographic techniques, expert errors, and the use of novel technologies.

This presentation will impact the forensic science community by presenting a collision between two skiers at a western ski area which resulted in severe head and bilateral wrist injuries to the smaller, female skier.

A collision between two skiers at a western ski area resulted in severe head and bilateral wrist injuries to the smaller of the two, a female. Ensuing litigation excluded the ski area, but nonetheless, ski patrol reports on the incident proved to be critical to the accurate identification of the collision site and the trajectories and speeds of the two skiers.

This presentation outlines the need for systematic orthographic photos to locate otherwise unremarkable features in the ski terrain environment. Furthermore, it is imperative that opposing experts be sufficiently skilled in interpreting this information to reach reasoned conclusions, especially on terrain with which they have minimal familiarity.

Both of these factors will be developed in detail with site photos and case evidence.

In general, placing a known object in the scene allows a series of photos to be taken that will locate the spot at a future date. By judiciously selecting trees, poles, towers, buildings, landscape features, and features on ridgelines, a person can take a set of photos that will preserve the alignment of the known object and background features along three or more intersecting lines of sight.

As it happened, this litigation was initiated several years after the event. The collision reconstruction relied on the accurate positioning of the collision scene, which was made possible by the site documentation at the time of the collision.

These reports included witness statements, first responder ski patrol documents, and follow-on investigative interviews. The basic potential energy calculations indicated a minimum speed at the collision point of approximately 24mph. Actual site measurements indicated speeds of approximately 38mph were easily attainable in the moments before the collision. These factors will be presented.

A number of interesting techniques were developed during the course of this investigation and will be presented. Site measurements during summer months are compared to winter views. Opposing expert topographic models are presented, along with a discussion of the importance of deposition testimony and perceptions of position and speed on a hill.

Actual test runs along the trajectories of the participants were documented through use of the GPS capability of an iPhone®, an app called Ski Tracks®, and recorded video on a GoPro® camera with surprising results that were then plotted on Google® Earth®. These novel products allow investigators a degree of flexibility not available only a few years ago.

The general case outcome will be discussed as will the importance of the orthographic photo techniques that set the stage for this case resolution.

Ski Collision, Orthographic Views, Ski Patrol