WHITE PAPER

PATRON SAFETY AT CALIFORNIA SNOW SPORT FACILITIES

An Analysis of the Current State of and Potential Opportunities for Safety Improvement Based on Observation, Stakeholder Perspective and Limited Available Data
PATRON SAFETY AT CALIFORNIA SNOW SPORT FACILITIES

An Analysis of the Current State of and Potential Opportunities for Safety Improvement Based on Observation, Stakeholder Perspective and Limited Available Data

INTRODUCTION

Alpine skiing has transformed in the past few decades from a rustic and romanticized form of wilderness adventure to a popularized recreational pastime. Most resorts have become increasingly like amusement parks with the creation of specialized venues within the resort built to encourage bigger jumping, citizen racing, discovery parks for children and the like. Loud music often blares from large speakers mounted on buildings and in the trees. The marketing and promotion of high-risk race and “big-air” jump competitions (such as the Winter X Games), along with the dramatic growth of snowboarding, has launched winter snow sports into the limelight of youth culture. This is particularly true in California where the surf and skateboard cultures meld with that of snowboarding. The expansion and consolidation of winter sports resorts has created large corporate entities, which control numerous resorts and have large marketing budgets to promote their resorts and products and compete with other forms of wintertime recreation. Resort marketing heavily targets families by advertising a wide range of supposedly safe and exciting activities for every age, experience and skill level of patron.

As ski and snowboard products and activities evolve with innovations, so too do the resort facilities. Man-made snow now covers the slopes of most resorts. Fleets of snow-grooming machines costing hundreds of thousands of dollars each plow and till the slopes to create a consistent, ideal riding surface. Uphill transportation in the form of multi-million dollar, high-tech, high-speed chairlifts, gondolas and tramways moves more people faster and in greater numbers and comfort than ever before.

Unfortunately, concern for patron safety on these slopes has not kept pace with marketing and technology. The finely groomed snow surfaces and ever more advanced and refined skiing and snowboarding equipment have dramatically increased the speeds at which patrons can “fly” down the hill. And this equipment has decreased the level of skill and experience needed to do so. This is particularly true in California where resort safety efforts focus primarily on “educating” patrons as to proper conduct by posting catchy slogans and then labeling those who are injured as “risk takers.” Ski patrols, whose stated purpose is to warn patrons of unexpected dangers on the slopes and care for the injured, all too often focus the vast majority of their efforts on only the latter. Injuries and death are frequently the result of the failure of resorts to warn of unexpected and unseen dangers that they are well aware of, but which the public often is not able to anticipate. Resort operators’ primary response to injuries is to blame the patrons for not watching where they are going and deny responsibility, accountability and liability if such dangers are encountered and injury results.

The following are factual examples of the lack of safety precautions at California ski resorts:

1) The use and placement of warning signs and devices vary from resort to resort and often within the resort itself. There are no written industry standards that give guidance on when and where to use warning signs and devices. The result is inconsistency between and within the
resorts. The patron, who may be age 6 or 60, is on his or her own when trying to interpret the meaning of signs and warnings…if they exit at all.

2) Ski and snowboard equipment manufacturers are continuing to design for ever higher speeds, more aggressive turning and higher, more “extreme” jumps and tricks. Little is done at most resorts to control aggressive behavior, especially among the youth. In fact, the goal is to attract as many as possible by offering ever new and changing features to the resort.

3) Higher skier and snowboarder speeds, along with better and faster lifts, create more congestion on the slopes resulting in a higher incidence of collisions. Proactive traffic management and patrolling often is overlooked.

California’s only regulations with regard to resort safety practices relate to ski lift construction, maintenance and operation and are the responsibility of the Department of Industrial Relations. Lift inspections occur twice each year (Labor Code, Sections 7340-7357). With respect to safety practices, resorts claim they develop individual safety plans and promote “safety as a priority”; however, resort guidelines for safety typically are touted as the “skier’s code of responsibility.” Actual safety and accident prevention plans are not posted and are very difficult for the public to obtain.

The picture is further complicated by the relationship between the ski resorts and the U.S. Forest Service. Approximately 135 out of 481 ski resorts have “partnerships” with the U.S. Forest Service. These “partnerships” actually take the form of use permits by which the U.S. Forest Service is essentially a landlord and requires the resorts to completely indemnify the government for all liability. In most instances, the U.S. Forest Service takes a “hands-off,” non-supervising position leaving safety practices in the hands of the resorts. The U.S. Forest Service has no published safety or accident prevention regulations for its ski resort tenants. As a result, the foundation for the resorts’ safety philosophy and practice rests on two significant tenets.

1) With the purchase of a ticket or season pass, the California skier or snowboarder, in most cases, unknowingly agrees to an “assumption of risk” doctrine supported by case law precedent. This precedent results in the classification of virtually all accidents as included in the “inherent risks” of the sport and usually provides for a complete waiver of resort liability, even in instances of gross negligence. With this protectionist doctrine as a foundation, ski resorts have little motivation to proactively develop and invest in safety practices, which would lessen the number and severity of preventable accidents.

2) The ski resort industry rigorously guards its accident and injury data. And what data it collects from its member resorts often is vague and formatted in such a way as to preclude meaningful analysis. Little comprehensive or usable safety and accident prevention data is available on ski injuries and fatalities in California or nationally, thereby discouraging efforts to study or improve existing safety methods and procedures or identify additional opportunities for improvements in safety practices. Pinpointing safety oversights or improvement opportunities is difficult without consistent, reliable, accurate, independent and accessible data. The National Ski Areas Association (NSAA) reports annual death and serious injury statistics but does not release raw data for independent analysis or disclose the details of the collection process or the criteria used for categorization. For instance, former insurance industry personnel report that deaths occurring outside the boundaries of resorts, e.g. patrons who accidentally or deliberately leave the ski resort boundaries or who die in hospitals after being evacuated from the resort, are not counted as a resort fatality. In industries such as health, transportation and construction, California public policy recognizes the risks in these industries and attempts to guide improved and adaptive practices as the industries change. However, as the snow sport industry and associated risks have changed over the years, California public policy has not kept pace. Consequently, California snow sport facilities have significant latitude as to when, how and whether safety and accident prevention procedures and methods are employed. Changes in skier demographics, as well as equipment and snow-grooming technology combined with the snow sport industry’s reluctance to adopt an up-to-date and conscientious focus on prevention and safety, have created an unnecessarily dangerous
winter recreation environment in California. This paper presents the case for the need to improve safety practices at ski resorts, in particular, the systematic collection of and access to injury and fatality data and the consistent, standardized application of safety and accident prevention practices at ski resorts.

BACKGROUND

Ski industry experts recently have reported steady gains in snow sport participation over the last few decades coupled with a rapid movement toward a faster, more exciting experience reflected both in marketing presentations of skiing and in actual practice. Simultaneously, ski resorts have experienced consolidation of snow sport resorts contributing to significant congestion on the slopes. Data from the NSAA, the primary trade association representing ski-area owners and operators, indicate a drastic change in snow sport age demographics and a steady increase in skier participation. Minors of any age can purchase a ski lift ticket and access the slopes without parental consent. However, these minors are subject to an implicit agreement of "inherent risk" when the ticket is purchased, as are their parents. This situation is somewhat unique to the snow sport industry and spotlights the need for solid safety measures.

While overall participation has increased by several million visits in the last 20 years, the heightened popularity of snow sports has shaped consumer practices on the slopes, including increased average speeds and participation in terrain park venues. Before the advent of high-tech equipment and well-groomed commercial trails, early downhill skiing involved traversing gentle, snow-covered roads and naturally occurring slopes generally at low speeds. With the introduction of consistent snow making and grooming, together with dramatic changes in ski and snowboarding technology, recreational skiers and snowboarders are able to make more radical turns at higher speeds mirroring the increasingly faster professional racers and competitive jumpers. According to a 2005 study, the average skier traveled 27.6 mph (44.5 km/h), while average snowboarders' speed was slightly slower at 24.1 mph (38.9 km/h). However, according to NSAA...
President Michael Berry, in a news release dated January 8, 2008, “Most [male skiers] are traveling at 25 to 40 mph which isn't considered excessive.” Top speeds often reach 50 to 60 miles per hour on well-groomed runs creating a greater need to implement traffic management and proactive safety measures. In a 2005 collision at Jackson Hole Mountain Resort in Wyoming, 18-year-old snowboarder Greg Doda, killed 29-year-old skier Heather Donahue, who was stopped in the middle of a run waiting for her husband. Video footage of the incident later showed Doda was traveling at speeds of at least 47 miles an hour and was unable to slow down in time to avoid the fatal collision. According to a local newspaper, after sentencing, Doda spent a year in jail for criminally negligent homicide. Teton County Circuit Judge Timothy Day, “Criticized the mountain resort and ski resorts nationwide for doing little to deter dangerous behavior and even less to investigate accidents.”

Terrain parks, which were developed at major resorts in the last decade to keep pace with the youth snowboarding culture, also pose a significant additional risk on the slopes. This change in practice is perhaps most marked among young people who are vulnerable to recklessness and injury and have begun practicing techniques that largely were unheard of 20 years ago. While terrain parks certainly add to the variety of experience available at resorts, observations suggest they are breeding grounds for injuries. For example, the terrain park at Squaw Valley in Lake Tahoe was dubbed by onlookers as the “vegetable garden” after a series of injuries. Few, if any, of the jumps created in terrain parks, which launch skiers and snowboarders 20 to 30 feet in the air, are formally engineered to anticipate the speed and trajectory of the jumps to minimize injuries. Essentially, these “big-air” jumps are man-made piles of snow put in place by resort personnel using only the most rudimentary “eyeball” methods. A recent CDC study sampling emergency room data identified snowboarding as the number one cause of outdoor sporting injuries seen in emergency rooms.

Furthermore, despite the fact that ski resorts are striving to become more family-friendly destinations, alcohol consumption is encouraged in ski area bars and restaurants. The combination of speed and alcohol on the already crowded slopes has the obvious potential to increase the risk of accidents and deaths. Since there is no complete and accurate data about skiing accidents, there is no way to determine the role that alcohol may play in these accidents. However, most ski accidents occur in the afternoon as muscles begin to fatigue and the effects of muscle fatigue are increased by the consumption of alcohol.

**CHANGES IN RESORT PRACTICES**

The steady increase in new and younger skiers and snowboarders and the move to higher speeds and more and “bigger air” have challenged the industry's resistance to: 1) Develop and use consistent signage, padding and barrier fencing as well as other warning/prevention systems; and, 2) Insure adequate safety precautions for snow sport participants impacted by increased patron density on the slopes. The rapid growth of the industry has accentuated the wide variability in signage and marketing practices resulting in increasing participant confusion as they and the people around them travel at higher speeds. The fast-paced nature of modern skiing and snowboarding requires quick identification of hazards and the opportunity to make an informed decision on a safe, alternate course. Typical hazards that require warnings include changes in terrain difficulty, single small obstacles that often are slightly snow covered, creeks, man-made drainages and cliffs. Warning materials commonly consist of a combination of bamboo poles, ropes and flagging near obstacles, but the form they take can be completely different from ski resort to ski resort and within a single ski resort create confusing and mixed messages as to their meanings. Hazards that warrant barriers include terrain changes that are considered un-skiable (such as bare ground and rock outcroppings), slopes with exceedingly icy conditions and areas with avalanche conditions. These obstacles and conditions generally are marked by rope or fabric fencing or netting supported by poles that may or may not withstand expected impact forces. Patrons have
no way of knowing if the fences are intended as “catch” fences or simply as warning markers.

Markings and signs differ in size, shape, wording and symbols from resort to resort resulting in patron confusion and pointing to a need for consistent design and standardization.

There are numerous incidents cited in which the failure to provide adequate hazardous and boundary warnings caused injury or death. In February 2008, for example, experienced skiers Patrick Frost, 35, and Christopher Gerwig, 32, were skiing at Alpine Meadows during whiteout conditions and unintentionally crossed the resort boundary and became lost in the Granite Chief Wilderness Area. They huddled together in a snow cave for several days in dangerously cold conditions until a county rescue party found them and a helicopter finally reached them. “We never thought we had left the ski [area] boundary,” Gerwig told the San Francisco Chronicle. “We never saw a sign or a rope line which is what you usually see if you're [heading] out of bounds, but it was such a whiteout we could have passed it and not seen it.”

Safety and accident prevention practices have not evolved to keep up with the changes in skiing and snowboarding. Equipment modifications have occurred that have accentuated speed and rapid direction changes. One of the most notable equipment modifications with regard to safety risks has been the evolution of parabolic-shaped skis, which allow for improved turning control but which also allow for more radical and extreme turns at higher speeds. The result is a sense of better skier control, which decreases as speed increases. Shaped skis encourage the less experienced to travel at much higher speeds where, eventually, they exceed their ability to control speed and direction.

A significant problem on crowded slopes occurs when snowboarders are present. Snowboard users stand sideways to the direction the board is traveling (much like a surf or skateboard rider). This renders the rider virtually blind to his or her heel side. In surfing and skateboarding, however, the rider is usually alone or has only a few others around him. On a ski slope, there may be hundreds of others. Skiers are facing in the direction of travel and can see what is ahead and to the sides. Mixing snowboarders and skiers is a relatively new phenomenon at ski areas, yet nothing has been done by the industry to address this fundamental incompatibility.

The last decade has seen widespread helmet use by skiers and snowboarders. Some experts believe helmets to be questionably effective at higher speeds. A recent study showed ski helmets to be designed only to be effective at about 15 mph, a relatively slow speed in the modern resort environment. The potential for helmets to simply shift injuries from the head to the neck and spine, instead, also is a question that should be more carefully researched. However, helmet use was determined by a U.S. Government Consumer Product Safety Commission study in January 1999 to be relatively helpful in mitigating head and neck trauma directly related to snow sports. The same study concluded that the severity of 44 percent of head injuries to adults and 53 percent to children younger than 15 could be prevented or reduced. Still, head and neck protection gear has not been redesigned for higher speed impacts and helmet use is not required at ski resorts.

Grooming practices and the introduction of high-capacity lifts also have transformed the resort landscape. The goal for most large ski resorts is to attract as many customers as possible and move them up the mountain as quickly as possible. To this end, resorts have introduced high-speed lifts that carry up to six people per chair and move at 1,000 feet per minute contributing to the inevitable crowding on the slopes. Unfortunately, numerous accidents continue to occur throughout the United States every year at ski resorts where individuals, including minors, fall out of these lift chairs. At most ski resorts, safety bars are not required, and the chairs are designed for adult frames not for minors. In Colorado, for example, 50 percent of those falling out of chairs were minors. Currently, there is no requirement in California for deployed safety bars on chair lifts; however, there is precedent in Vermont and New York for the requirement of the use of such bars. When faced with the option of high ticket sales versus limiting
the number of patrons on the slopes, high ticket sales will be the chosen option.

ASSUMPTION OF RISK AND LACK OF OVERSIGHT

Recent changes in the ski and snowboard industry have spurred the use of shaped skis and snowboards, wide-spread grooming and more crowded slopes. But to what extent do these changes cause injury and who is responsible? Can these injuries and accidents be prevented or, at least, mitigated? If, as the resorts promote, ski and snowboard safety is the sole responsibility of the skier and snowboarder, how can any individual, family or the public at large learn about safety issues and how to take proper precautions? How can individuals learn which resorts are implementing what types of safety and accident prevention measures? In most cases, the “inherent risk” doctrine and lack of oversight and reporting make it difficult to answer these questions. When skiers and snowboarders buy a lift ticket in California, they unwittingly agree to waive liability for injuries under the assumption that snow sports carry “inherent risks.” The wording on the ticket lists every conceivable hazard as “inherent,” and the resort industry holds that even resort negligence is an inherent risk of skiing. Under this thick, protective, legal umbrella of “assumed risk,” the resorts have no incentive to reduce risk, standardize safety procedures or take common sense preventative measures to reduce injury potential. An extensive review of ski injury litigation in California over the past 30 years reveals nearly certain liability immunity for the industry. With this long-standing, legal protection, the ski resort industry has little, if any, reason to collect and provide data that may shed light on the number and causes of deaths and serious injuries on the slopes. On the other hand, the state has imposed enhanced responsibilities on ski area operators for ski lifts reasoning lifts should be treated as common carriers similar to machinery in the heavily regulated amusement park industry.16

California has failed to pass any legislation providing for even the simplest and easiest measures on ski slopes to reduce preventable, needless injury. With the passage of a basic safety act, parameters could be enumerated for patrons to act responsibly and operators to consistently mark hazards and obstacles not readily visible to the average patron. Lack of oversight and reporting of deaths and injuries in California makes consistent safety improvements difficult since there is limited reliable data to ascertain what exactly needs to be fixed and how best to fix it. The NSAA currently is the primary source of accident and injury data, but the data collected often is extremely limited, unreliable and absent the detail necessary for safety improvements and accident prevention.

Existing federal government research is perhaps the most reliable source of aggregated, general ski injury statistics, although it also lacks detail and offers very little in the way of a California-specific view. For example, the Consumer Product Safety Commission reported in 2000 there were roughly 95,000 ski injuries, 68,000 snowboard injuries and 39,000 sledding injuries that required an emergency room visit.17 Academic research in other states documents occurrences of severe trauma caused by ski injuries. However, an accurate picture of minor or delayed injuries is difficult to attain because data is collected from hospitals not sources on the mountains. Hospital and health insurance data also is, unfortunately, of limited use because the specific causes of trauma and injury are not coded or reported. A comprehensive 2002 study of ski injuries in Oregon for the journal Wilderness and Environmental Medicine provides a clue to the types of severe injuries common at resorts and those specific to certain demographics.18

<table>
<thead>
<tr>
<th></th>
<th>Downhill skiing n (%)</th>
<th>Snowboarding n (%)</th>
<th>Sledding/tubing n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>53 (79.1)</td>
<td>27 (87.1)</td>
<td>25 (75.8)</td>
</tr>
<tr>
<td>Female</td>
<td>14 (20.9)</td>
<td>4 (12.9)</td>
<td>8 (24.2)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 or younger</td>
<td>19 (27.9)</td>
<td>9 (29.0)</td>
<td>22 (66.7)</td>
</tr>
<tr>
<td>18 to 24</td>
<td>11 (16.2)</td>
<td>12 (38.7)</td>
<td>2 (6.0)</td>
</tr>
<tr>
<td>25 to 44</td>
<td>24 (35.3)</td>
<td>8 (25.8)</td>
<td>9 (27.3)</td>
</tr>
<tr>
<td>45 or older</td>
<td>14 (20.6)</td>
<td>2 (6.5)</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>
Eighty percent of patients treated for severe injuries were male with the largest number of injuries occurring in skiers ages 17 and under and 25 to 44. Of all body parts affected, trauma to the head was the most frequent. The majority of skiers and snowboarders received injuries as a result of a fall on level or sloped ground, indicating speed and ice on heavily groomed trails were likely factors. Collisions with objects and other people accounted for a number of other incidents.

<table>
<thead>
<tr>
<th></th>
<th>Skiing ( n (%) )</th>
<th>Snowboarding ( n (%) )</th>
<th>Sledding/tubing ( n (%) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collision with person or object</td>
<td>20 (29.4)</td>
<td>5 (16.1)</td>
<td>28 (84.8)</td>
</tr>
<tr>
<td>Fall from one level to another</td>
<td>6 (8.8)</td>
<td>9 (29.0)</td>
<td>2 (6.1)</td>
</tr>
<tr>
<td>Fall on same level</td>
<td>42 (61.8)</td>
<td>17 (54.8)</td>
<td>3 (9.1)</td>
</tr>
<tr>
<td>Total</td>
<td>68 (100)</td>
<td>31 (100)</td>
<td>33 (100)</td>
</tr>
</tbody>
</table>

According to the Oregon study, 88 percent of all deaths on the slopes occurred from collisions with a tree or another person, both avoidable circumstances under the right safety conditions. It is likely much of this data would be comparable to the situation in California; however, without consistent collection of standardized data for further review and analysis, California families, skiers and snowboarders cannot be sure and have no basis on which to assess their own risk.

CONCLUSION

Transformations in snow sport demographics, technology and practices in the last few decades have altered the way the industry does business and the snow sport experience of patrons on the resort slopes. Changes and improvements in the industry’s safety culture and practices have, unfortunately, not kept pace with this rapid evolution resulting in many preventable, catastrophic injuries and death. Reform in California ski area practices must take a two-fold approach involving: 1) The adoption of standards for clear, consistent and uniform signage; hazard markings and protection; traffic management; and responsible behavior enforcement; and, 2) The development of oversight processes and collection of data for continuous improvement of safety practices and dissemination of accurate information to the public regarding their true risk and the comparative safety performance of resorts they choose.

As referenced earlier in this paper, the lack of consistent, standardized signage and hazard markings is incongruous compared to the transportation industry where the necessity and usefulness of uniform signs and caution symbols on California’s highways are critical elements in protecting those who access them. Visits to California ski resorts will only benefit from uniform and universally understood warnings and signage on the slopes. The California snow sport industry is protected by the assumption of risk doctrine and virtually free of oversight; therefore, accurate and consistent data on the frequency of deaths and severe injuries, as well as the effectiveness of safety practices at California ski resorts to mitigate injuries and deaths, is impossible to obtain. The multiple problems outlined in this paper, as well as the tragic outcomes and lack of definition and consistent application of safety and accident prevention practices on the slopes, make a clear and compelling case for access to reliable data that informs consumers and improves safety.


4 Penniman, D., “Customs and Practices at U.S. Ski Areas for Mitigating Common Hazards through Trail Configuration and Maintenance.” Skiing Trauma and


8 Ibid.


10 Ibid.


14 Masia (2005).


