

Senior Capstone Project: Slacklining

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21 May 2012

Introduction

Slacklining, a blossoming sport across the United States and world, is illegal in Jackson, Wyoming for two main reasons: first, damage done to trees and second, liability and safety concerns. The municipal code applied to slacklining had been established long before the birth of the sport itself and had remained applicable once the conflict between slackliners and county officials arose. Never before had any formalized research been done regarding the sport of slacklining and its damage to trees in particular. I, Taylor Meadows, a member of the senior class at the Jackson Hole High School, decided to take a closer look at the sport, the issues and potential solutions to the problems.

Background

Slacklining, a sport of only 40 years, originated in the camping areas of Yosemite National Park. The objective of the sport at its starting point was to walk between a certain span near the ground. What started as a sport to pass the time at camp when the climbers were not climbing soon grew to a sport in itself that people began to devote time to. Once many of these climbers had conquered the lines around three feet off of the ground, they began setting slacklines on and across many of the high walls of the national park. Not long after its birth in Yosemite, slacklining spread from within the walls of the park to other areas in the country and world. Although the sport is still just beginning to blossom, its popularity has greatly increased since its origin and is projected to continue to grow.

In Jackson, Wyoming, the sport of slacklining is illegal. Municipal code 9.52.050 prohibits the sport of slacklining and states that no person shall attach any rope, wire or other contrivance to any tree or plant. Local officials also have concerns about the damage being done to trees as well as potential liability and safety issues. Local ordinance simply states that no rope, cord or string of any sort may be tethered to trees in local parks.

I am a slackliner and have been immersed in the sport for nearly four years. During the summer of 2010, I learned that the sport was strictly illegal and that the municipal code would be and had been enforced. As I became continually more involved with the sport and as the issue grew to a bigger problem, I realized the need for solutions. I had the opportunity to devote one of my high school classes to a senior thesis project and the slackline issue in Jackson soon became my focus. No formalized research had ever been done regarding tree damage or liabilities and it was time, for the good of the sport as a whole, for the research to be done.

Method

Tree Damage

I started my project looking at the tree damage issue. After searching out solutions across the country, I connected with a professor at the University of Michigan who teamed up with me to formulate an experiment.

Our experiment was based around the use of simple generalized tree protection and its effectiveness to prevent damage. For my experiment, I tested the Gibbon Treewear, which has a thickness of 1/8" and is made of synthetic felt. The Treewear is relatable to other common forms of protection such as carpet, cardboard and towels.

The experiment had a general set up that was followed for each data collection. Every slackline set up had a span between thirty and forty feet and was forty-two inches off of the ground. Using the slackline, I also took a measurement of the amount of sag, or slack, in the line.

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With all of these measurements, I derived the tension present within each individual slackline setup using the formula

$$2T\cos(\theta) = mg$$

with T being the tension, theta being the angle of sag, m being my mass, or the mass on the slackline, and g being the influence of the gravitational field.

Before and after each experiment, standardized photographs were taken of each tree used in the data collection. The photographs were presented to an arborist for close analysis.

I also met with a local certified tree specialist, Todd Graus, who analyzed my data and looked at any damage being done during a slackline session. After working with Todd Graus, I concluded my work with tree damage.

Slackline Experimentation



A: Tree span

B: Height of Slackline attached to the tree from the ground

C: Sag or distance from bottom of the slackline with a person on it to the ground.

D: Total distance in the tensioning system

E: Distance between the slackline attachment to the tree to the tree itself

Liability and Safety

The threat of injury and potential lawsuits is another major concern regarding the sport of slacklining and its legalization. I chose to base all of my research on three main points: first, the current statutes and municipal codes in place that applied to the sport, second, established precedent regarding slacklining from other locations across the United States, and third, the interpretation of these codes and precedents by law professionals.

Statutes and Municipal Code

Through government websites, I looked up all of the municipal codes and statutes that applied to the sport of slacklining in public, government-controlled areas. In Wyoming, the Recreational Safety Act applies most closely to slacklining. Looking into local ordinances, municipal code 9.52.050 is the standing ordinance that applies to and effects slacklining.

Established Precedent

I next turned my attention to researching established precedent and code from across the country. The first example I came across was an ordinance issued by the National Park Service in regards to slacklining at its birthplace, Yosemite National Park. Following finding data on Yosemite Slacklining, I found an example of a debate and change of ordinance in Seattle, Washington. Another example that I found was a policy formulated at the University of Colorado Boulder. All of the examples are locations where change in ordinance had occurred.

Interpretation

My final stage regarding liability was interpretation of my research. After researching code and policy, I went to local Jackson lawyers Bret King and Audrey Cohen-Davis for assistance in interpreting the laws and policies so that I could better understand what I had found. These meetings concluded my work with researching the liability and safety aspect of the project.

Results

Tree Damage

Experimentation produced several results as well as brought up a number of factors that come into play with slacklining. I started my project planning on only examining the outer bark layer, but soon expanded the scope of the analysis.

Outer Bark Damage

Just inside the outer layer of bark, many layers, such as the cambium, phloem, and xylem layers, are vital to a tree's survival and longevity. If the outer layer of bark becomes damaged past a certain point, the tree can be at risk for a number of major concerns. The two issues in regards to the outer layer that slacklining can affect are first, damage to the inner layers of the tree used for nutrient transport and second, exposing the tree to disease spread from spores in the air.

The primary focus of my study regarding tree damage was in the field of analyzing if inner layers were being damaged from slacklining, which can lead to the entire tree dying. The outer layer protects the xylem, phloem and cambium layers and if damage is done, the health of following three layers that are vital to a tree's longevity can be compromised. After six experiments using the standard tree protection (see figure 1), no visible damage was seen even in the form of indentations to the



Figure 1

outer layer. Each experiment involved anywhere from 500 to 1000 pounds of tension. After setting up and using a slackline during an experiment with Jackson Certified Arborist Todd Graus present, conclusions were made that no damage was being done to the outer bark layer as a result of slacklining with an approved tree protection system in place.

Another key point that came into play when I was analyzing the outer layer was the chance of spore distribution within the tree from open cavities on the trees. Slacklining anchors have a tendency to slip and slide around laterally while any given slackliner is attempting a variety of moves or even simply walking the line. Rubbing on the tree became a concern that could also lead to the death of a tree by means of disease. After two hours of experiments, Mr. Graus was able to confirm that the tree protection was fully effective in preventing any rubbing or visible bark damage to our test subject trees.

After demonstrating the use of a slackline to Mr. Graus, he concluded that tree protection is effective in preventing damage to the visible outer bark, alleviating the possibility of damage to the invisible cambium layer located just under the bark, which is responsible for the transportation of water and nutrients throughout all trees.

Wind-worthiness, Deflection and Tension Roots

As is known with common knowledge, some trees are stronger than others. The biggest factor on a tree's strength is its root system and the system's ability to withstand wind.

The strength of a tree can partially be determined based on its exposure to natural elements, specifically wind, as it matures. On any given tree, as it grows, it will be exposed to various bouts of wind. The sapling will need to develop strong root systems in order to survive and continue to grow. After meeting with Mr. Graus, I learned that trees strengthen their tension roots as a result of exposure to lateral forces like wind. Mr. Graus stated, "Movement of the tree from slacklining merely mimics lateral forces that are produced by wind everyday".

During any period of a lateral force being exerted on a tree, the angle of contact between the tree and the ground can change and deflect because of the forces. Wind is a very prevalent example of a force that can cause deflection on a tree. The amount of deflection depends on a number of elements with the tree, but the root system and the basal width of the tree were the only elements that applied directly to slacklining.

Focusing on the root system, tests produced results that no deflection was visibly present present on our two test subjects (Two (2)-12.5" DBH Cottonwood trees) during slacklining, however no professional measuring devices were used for precise testing.

Liability and Safety

After researching laws and precedent regarding liability, I turned my focus to interpretation by law professionals of the items I had found. As stated above, two local lawyers helped me to understand what I had found so that I could apply it to my situation and find solutions.

To start, I discovered what legalities were involved with an accident in a public space. In any accident-based situation where a suit has come forth, a jury will weigh out the percent of negligence with the parties involved. As the case is looked into more in-depth, the court will decide who is more at-fault regarding the accident. Many cases have come forth based out of accidents that have taken place in town parks.

A number of items keep the governmental agency in charge of any public space immune from being sued. Such items included in Wyoming Code of Civil Care are Duty of Care, the Recreational Safety Act, and within the Recreational Safety Act, Assumption of Risk. Duty of Care is the general responsibilities that an agency has to make sure grounds are maintained. The

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Recreational Safety Act, however, has the biggest impact on slacklining. Included in the Recreational Safety Act (W.S. 1-1-121 through 1-1-123) are three subtopics that apply closely to slacklining: inherent risk, provider and sport or recreational opportunity. Inherent risk, as defined by the state of Wyoming, is the dangers or conditions which are characteristic of, intrinsic to, or an integral part of any sport or recreational opportunity. The state defines the provider as any person or governmental entity which for profit or otherwise, offers or conducts a sport or recreational opportunity. Finally, sport or recreational opportunity is commonly understood sporting activities including baseball...Nordic or alpine skiing and other alpine sports, snowboarding, mountain climbing, outdoor education programs...and similar recreational opportunities.

Assumption of Risk (W.S. 1-1-123) applies to the Recreational Safety Act and holds the answers to liability concerns. Under Assumption of risk, subsection (a) states: Any person who takes part in any sport or recreational opportunity assumes the inherent risks in that sport or recreational opportunity, whether those risks are known or unknown, and is legally responsible for any and all damage, injury or death to himself or other persons or property that results from the inherent risks in that sport or recreational opportunity. Following that, subsection (b) says: A provider of any sport or recreational opportunity is not required to eliminate, alter or control the inherent risks within the particular sport or recreational opportunity. Subsection (c) states: Actions based upon negligence of the provider wherein the damage, injury or death is not the result of an inherent risk of the sport or recreational opportunity shall be preserved pursuant to W.S. 1-1-109 or Comparative fault. Finally, subsection (d) says: The assumption of risk provisions in subsections (a) through (c) of this section apply irrespective of the age of the person assuming the risk.

I also learned that in our law system, anyone can sue for anything. Americans are free to sue and can always utilize that right. On top of that, Americans are also deemed with their knowledge of the law, whether it is posted clearly or found online. In other words, the American people are responsible for knowing laws and are subject to prosecution if they break those laws. Our law system is designed to be free and fair.

Established Precedent

Across the country, policies have been formulated to allow safe slacklining. Examples are listed below.

Yosemite National Park formulated a policy for slackliners to follow for safety of the users, others and the trees. The first item of importance in the policy states that the lines must be set up so as to protect the trees from any damage. The park service suggests tree protection such as carpet, sleeping bags, haul bags and clothing, however, they do require that protection is used. The other key point in the policy says that all lines may be left up in Camp 4 due to the expectancy of seeing slacklines there, but all lines elsewhere in the park must be removed when not in use.

Another strong example of policy creation comes from Seattle, Washington where a slackline debate took place. Slackliners worked with town officials to create a best practices document for slackliners. The best practices states that slackliners must be nice to the trees, use safe equipment and if they choose to go to the bathroom, they must place objects on the slackline so that other park users can see that it is there. After the slackliners worked with a local arborist, conclusions were made that no damage would be done to the trees as long as they were padded and were of adequate diameter.

The final example of policy with slacklining is at the University of Colorado Boulder. The school worked with college students to create a policy to allow slacklining, yet keep it safe. The document generally states that participants and others in the area assume risk, slacklines must be set up only on a temporary basis, slackline gear should be safe and maintained, trees with a diameter of one foot or greater must be used and the trees must be protected.

Discussion

After six months of researching and discovering new truths that applied to my project, I turned my work to finding solutions and making my own analysis on what I had found.

Tree Damage

Through all of my experimentation, I learned that slacklining can be very damaging if not fatal to trees. I had always heard these statements, but I had never gone to discover the truths behind the sport for myself. I also learned that slacklining can be made completely safe and non-damaging if simple and standard practices are followed.

I have tested the effectiveness of simple, generalized tree protection and certified tree specialist Todd Graus has confirmed that if tree protection is used, no damage is done to the tree.

Liability and Safety

I entered my research and experimentation curious about how the legalities applied to the sport. After meeting with several law professionals, I learned the truths about liabilities involving slacklining.

I first learned that the Governmental agencies involved with public areas are immune from any lawsuits that could take place as long as they maintain the grounds.

Second, I discovered that park users accept risk upon entering. Other users will be utilizing the public spaces for a variety of activities and every person in the park has accepted the risks and hazards that could go along with the presence of others in the park.

Third, as defined by the sport or recreational opportunity clause of the Recreational Safety Act, mountain climbing, which slacklining can be categorized under, is a commonly understood sport that can take place in a park. Although slacklining isn't a widely known sport yet, it is still growing and will become one in the near future.

Fourth, anybody can sue anyone for anything at any time. Regardless of what is going on in a park, lawsuits could happen. If a man gets hit in the head with a Frisbee and receives a concussion, he can sue the thrower of the disk, even if he was not paying attention. This given case would then be looked at by a jury who would weigh the percentage of negligence between the two parties involved. No matter what is happening, lawsuits can always be filed.

Fifth, Americans are responsible to know the laws that apply to them. An example that applies to parks is tree climbing. If a woman were to climb a tree, not knowing that it was illegal, and get caught, she would still be fined because she is responsible for knowing that tree climbing is not allowed.

Although all of the discoveries seem to be scattered, they all come together to apply to slacklining. To more fully understand the application at hand, I have created a hypothetical situation that applies.

Suppose a slackliner has set up a line in Miller Park (it is legal to slackline) and a man playing Frisbee is not looking and runs into the line, resulting in a broken wrist. The slackliner was walking the line at the time of the incident, resulting on him falling off, however no injuries were acquired. First off, since the grounds that the man was playing on were well kept, the parks and recreation department is instantly immune from any lawsuit. Next, let's say that the Frisbee

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player decided to sue the slackliner for his injuries. In the court case, the jury would then look at what happened and what factors played a part in the end result. In this case, both park users accepted risks that could be present in the park upon arrival. Also, the slackline qualifies as a part of the Recreational Safety Act since all of the gear being used is climbing gear and the climbing community dominates the sport. Although the slackline was legal, the slackliner had not followed an ordinance to protect the trees, which also comes into play. At this point, the jury would weigh out the percentage of negligence between the two parties. First off, the Frisbee player was not paying attention to his surroundings, thus leaving him liable for whatever happened to him. The Frisbee player would not win the suit. However, since the slackliner was not protecting the trees, he would receive a fine since he is deemed with his knowledge of the law.

Solution

Through the implementation of a Best Use Policy, all unanswered what-ifs can be avoided and the liabilities that come with slacklining can be placed on the users like they should. The slackliner can be responsible for their own actions and if they should disobey, they are subject to prosecution. A suggested Best Use Policy could go as follows:

Tree Damage

- Trees used must have a diameter of 12 inches or greater for use.
- All trees must be protected at any points where contact between the slackline gear and tree exists. (Suggested items: carpet, cardboard, felt strips, towels, etc.)
- All gear attached to the tree must be completely on the tree protection and must be capable of staying on the protection during use.
- No use of any cables for anchors on the trees.

Safety

- Slacklines may not block any paths or trails.
- All gear used must be maintained and safe for use.
- Slacklines may only be erected on a temporary basis.
- All slacklines must have bright objects hung from them when not in use.
- All slackliners must stay within the park boundaries while the slackline is erected.
- No slacklines may be left unattended overnight