Physics and rock climbing essay example

Science, Physics

Introduction

Physics as one of the primary disciplines of science finds many applications in the modern world. Some of the most common processes and activities that people take part in involve concepts of physics. In fact, physics is not only involved in some activities but it actually makes these activities possible to participate or take part in. One activity that does not receive much attention but which incorporates an enormous application of physics is rock climbing. Physics essentially makes rock climbing possible.

As an activity, rock climbing is usually the reserve of a few people who are obsessed with challenges, mainly adrenaline junkies and thrill seekers. The activity is believed to have started in the 18th Century and over time, it has gained a lot of popularity. In addition, the activity has witnessed a lot of advancements with many of them attempting to make the activity not only easier but also safer (Luebben 11). It has also become a full-time career or profession for some people who climb rocks for a living, and their endeavors are recorded for TV or film.

The first element of physics that is utilized in rock climbing relates to energy. The two most commons forms of energy that are discussed in physics are potential energy and kinetic energy. These two forms of energy are deeply applied in rock climbing. At the bottom of the rock wall, the rock climber possesses no potential energy (Resnick et al., 101). The climber then uses potential energy to propel himself or herself up the rock. As the climber gets higher up the rock, his potential energy increases. At the top of the rock, the kinetic energy of the climber is zero while his potential energy is maximum (Resnick et al. 105).

The kinetic energy of a climber in the course of climbing is used to overcome gravity. Gravity is the greatest force that any rock climber encounters. The climber uses his kinetic energy to over this energy, also referred to as gravitational potential energy. Gravity as an element of physics is what makes the rock climbing activity a fun activity. If there were no gravity, a rock climber would be simply floating up rock's the wall without using any energy.

Another type of force that is very crucial when it comes to rock climbing is force of friction. Friction plays a huge role in enabling the ascension of the climber. Friction prevents the climber from constantly slipping and falling down. Most rocks have a very rough surface, and this is what creates the required friction that prevents the climber from constantly slipping and falling (Luebben 45). In addition, there are a variety of secondary tools that a climber uses to increase friction. One of these is specially made climbing shoes. Climbing shoes are specifically designed and are contoured at the bottom to increase the climber's foothold of the rock's surface or wall. Many are also made of rubber soles (Reali and Stefanini, 348). All these elements are meant to increase the friction that prevents the climber from continuously slipping down.

One of the elements of physics that all climbers take into consideration in climbing is the fall factor. When a climber is planning a rock climbing endeavor, determining the amount of weight that the climbing rope can sufficiently support before it breaks down is of crucial importance (Westland, n. p). Statistically speaking, a dynamic rope has the ability to withstand around 7000 Newtons while static rope has the ability to hold about 22, 000

Newtons. However, the fall factor is of crucial importance in determining which type of rope to use. The fall factor is simply a measure of the size of climbing fall. It is essentially the ratio of the distance between the climber and the ground and the length of the climber's rope that can absorb the fall (Westland n. p). This factor is what determines the force that is placed on the rope as well as the accompanying gear. Many climbers prefer using dynamic ropes. These ropes can stretch which means that they can support a significantly larger amount of force of weight if a climber for example falls. They have the ability to absorb the energy of the fall slowly (Luebben 11).

Apart from ropes, rock climbing also utilizes other tools including anchors. Anchors simply refer to permanently attached tools on the rocks that ultimately prevent a climber from tumbling down (Reali and Stefanini, 348). The factor of forces come into play once again in the anchors. The forces created in the climber's ropes result from the energy of the climber moving towards the earth as well as the anchor attached on the rock attempting to prevent the climber from moving downwards (Reali and Stefanini, 348). Climbing scenarios normally incorporate two or more anchors and forces acting on these anchors essentially form an isosceles triangle. By doing this, anchors fundamentally distribute the weight of the climber between two points on a rock rather than one. Anchors are usually at a close distance from each other to reduce the amount of the intensity or size of their tear and wear.

A hex is another tool that is used in rock climbing, and that utilizes a lot of physics aspects in it functioning. A hex is a stopping device that the climber places periodically in suitable holes, crevices or crack on the rock surface

(Luebben, 48). A hex placed on a certain level of a rock prevents the climber from falling a distance lower than the level where it has been placed. The proper functioning of a hex is significantly dependent on various physic aspects. It must, for instance, be positioned in such a way that when a climber falls, the hex will basically rotate and not pull directly out (Luebben, 48). The correct placing of a hex ensures that it rotates when the climber falls, and thus sticks on the rock's surface and does not fall out of place (Luebben, 49). This hex's rotation resembles a quantification in physics known as torque. In physics, torque is defined as a force whose action produces rotation (Luebben, 50).

Conclusion

Climbing is a fun activity that is particularly appealing to adrenaline junkies as well as thrill seekers. Many however do not understand the physics involved in the process, and as shown in the above discussion, physics is a crucial component of rock climbing. A rock climber with sufficient knowledge of physics knows at all times the forces that acting on him and consequently, he can use this knowledge to his advantage to plan for the climb even better, for instance by using more adequate material's and tools. In addition, physics enables the climber not only to be able to climb but also to plan adequately for any unforeseeable events such as falling accidents. This proves that physics does not simply involve theoretical aspects and equations that are learnt in class, but is involved in real activities such as rock climbing.

Works Cited

Luebben, Craig. Rock climbing: mastering basic skills. The Mountaineers Books, 2004.

Reali, Giancarlo, and Ledo Stefanini. " An important question about rock climbing." European Journal of Physics 17. 6 (1996): 348.

Resnick, Robert, David Halliday, and J. Walker. Fundamentals of physics. John Wiley, 1988.

Westland, Leo. " The physics of climbing - and falling." The Guardian. N. p., n. d. Web. 20 Oct. 2014. .