Physics of Bungee Jumping

While modern bungee jumping has become known and practiced worldwide, what is less understood is the physics behind bungee jumping. Interestingly enough, the extreme sport originated from spiritual rituals of South Pacific natives, who had no idea of the science behind the sport. Modern bungee jumping enthusiasts find much comfort in the idea that someone has worked through the math required to perform a safe jump. So who developed the physics of bungee jumping and how sure are the modern practitioners of the sport that it is relatively safe? Let's start by taking a look at the origins of the science behind the sport.

Years before the discovery of the land diving natives on Pentecost Island, a British mathematician named Robert Hooke was discovering the physics of bungee jumping. He began working as an assistant to the famous scientist Robert Boyle in 1653. However, it wasn't until 1660 that he formulated and wrote down Hooke's Law of Elasticity. In laymen's terms, Hooke's law basically tells us how much tension a spring can endure, and the maximum length it will reach. Hooke's law can be used on any material that is considered linear-elastic, or stretching lengthwise. Oddly enough, rubber is usually considered non-linear, because variations of stress and temperature can have a significant impact on the elasticity of the rubber.

Today, modern practitioners of the physics of bungee jumping don't have to be as well-versed as Hooke. Depending on the bungee cords used and their ratings, the science has been simplified quite a bit. The commercial proprietor who is offering 'bungee jumping' as an extreme sport still has to be on their toes. Cords that are manufactured to meet a well established United States military specification (mil spec) are perhaps the best to use. This is simply because of the rigorous testing that must go in to making sure they meet the mil spec. Most of these cords have a specific weight limit and elongation potential. Using these numbers, along with the length of the jump and the weight of the jumper, the calculations can be made. The length of rope needed, how many strands are needed for the weight, and how much beyond the normal length of the cord the jumper can expect to go.

The physics of bungee jumping has changed some with advances in the material used in bungee cords. Some cords are also 'pre-streched' so there is less elasticity and bounce, and a more forceful shock and return from the bottom of the jump position. The problems with some jumpers using cords that were too long are the result of not understanding the physics of bungee jumping. Even though modern bungee cords are weight and elongation rated, some people still fail to take this into account when performing amateur jumps. This is why it is highly recommended that anyone who wants to learn bungee jumping should consult

with a professional. This is not a sport that you can learn and practice at home. The physics of bungee jumping have been simplified by 20th century manufacturing standards, resulting in a much safer sport for everyone participating.