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Exploding the Mayor

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Abstract

One of Buffy's most challenging foes was the mayor, also known as Richard Wilkins, who was a sorcerer whose main ambition was becoming a pure demon. Once in demon form, as a Olvikan, he would almost be unstoppable. Previously the demon had been killed by a volcanic explosion and, on the Day of Ascension, Buffy used dynamite to kill him. This paper explores how much dynamite would be needed recreate an explosion the size of the volcano and the impact this would have in Sunnydale.

Keywords: *TV; Physics; Chemistry: Explosives; Volcano; Buffy the Vampire Slayer; The Mayor*

Introduction

The mayor was a sorcerer who was there at the founding of Sunnydale in 1899 up until his death in 1999. His main ambition was to become a demon called an Olvikan. He planned to achieve this through ascension at Buffy's graduation ceremonial where he would then feed on all the students. One problem Buffy faced when trying to defeat the mayor was that up until his ascension, he was invincible because of some of the rituals he participated in. Therefore, Buffy could only slay him once he had achieved demon form [1].

Olvikan

Olvikan has the appearance of a green snake with a clubbed tail. It is one of the original demons that inhabited the Earth upon its creation earning it the label the 'Old Ones'. It appears in the mythology of the Kauai village. Due to its immense size, it was incredibly strong and it could eat a human being whole, in addition to this the tail itself could be used as a club that was highly destructive. Despite this, the Olvikan is defeatable as it had previously been killed by a volcano, the remains of which were later found by Lester Worth who mistook it for dinosaur bones. On discovery of this weakness Buffy and the Scooby gang loaded the high school with TNT which exploded and killed the mayor [2]. This paper explores how much TNT would be needed to replicate the explosion of the volcano that killed the mayor and the impact zone over Sunnydale this would have.

The Volcanic Explosion

As the Olvikan appears in Kauai mythology it is reasonable to suggest that for a period of time the Olvikan inhabited that environment and that one of the volcanic explosions could have been the one that caused the mayor's death. The volcanic explosion that could have caused the death of the Olvikan could have been the 1790 eruption of Kilauea volcano which killed 400 people making it one of the deadliest explosions in US history. On the volcanic explosivity index (VEI) it scored a 4 on its explosiveness [3]. A VEI volcano can create 2.4 Megatons of thermal energy which is equivalent to 1.00416×10^{15} J [4]. To kill the mayor Buffy used TNT. For 1g of TNT 4000 J of thermal energy can be produced [5]. Therefore:

$$\frac{1.00416 \times 10^{15}}{4000} = 2.5104 \times 10^{11}g,$$

of TNT would be needed to replicate the original volcanic explosion that killed the mayor.

A normal stick of TNT consists of 190g so they would need:

$$\frac{2.5104 \times 10^{11}}{190} = 1,321,263,158 \text{ sticks of TNT}$$

If Buffy were to use all the sticks of TNT it would generate an earthquake on the Richter scale of 6; this would have an impact zone of 100 km with the

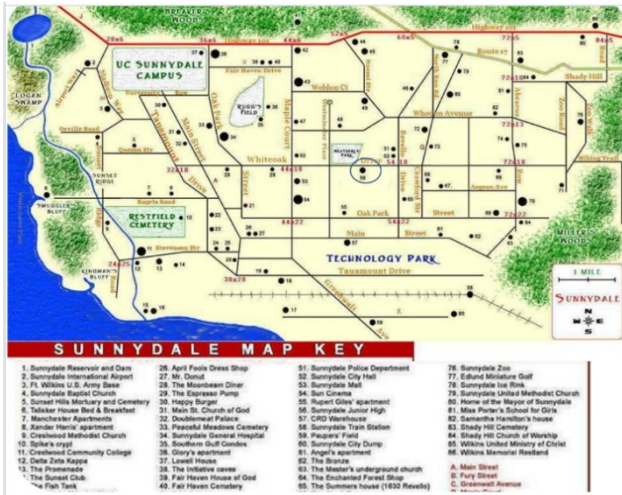


Figure 1 – A map of Sunnydale spot 54 on the map circled in blue is the epicentre of the original explosion [5].

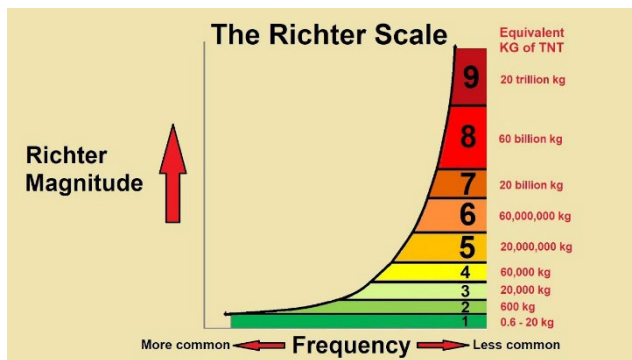


Figure 2 – The TNT equivalent and how the explosion would compare on the Richter scale (screenshot taken from [6]).

epicentre being school (figure 1 and 2). This would mean that the destruction of the school is highly realistic, it would also mean that the rest of Sunnydale would also feel the impact of the explosion. It is reasonable to suggest that the eruption of the volcano was overkill as in the episode “Graduation part 2” Buffy uses much less TNT than what would be required to explode the mayor this would mean there is less impact on the surrounding city.



Figure 3 – A picture of the library filled with the products used to explode the Mayor (screenshot taken from [7]).

What Buffy did

Luckily for Sunnydale, Buffy didn’t go for the overkill by using tonnes of dynamite and TNT. Instead she used 10 sticks of TNT attached to 6 barrels of oil all of which was surrounded by 26 bags of sulphate of ammonia (figure 3). Although on its own sulphate of ammonia can be quite harmless once its heated intensely it can be highly explosive. The larger the quantity the bigger the detonation. It was believed that this chemical was responsible for the Beirut warehouse explosion that killed over 100 people when 2750 tonnes of ammonia nitrate was stored incorrectly. The blast could be heard and felt miles away even as far as Cyprus [8]. Now Buffy did not use as much ammonia as what was in the warehouse but the combination of TNT, oil and ammonia would have been enough to kill and destroy the Olvikan.

Conclusion

Overall although the volcanic eruption that originally killed the Olvikan was most probably overkill and to create an explosion with TNT that size would require $2.5104 \times 10^{11}g$ which would be equivalent to 1,321,263,158 sticks of TNT. Luckily, to kill the Olvikan, Buffy didn’t need that much fire power and she only had to use a few sticks of TNT and a couple of bags of ammonia to create an explosion powerful enough. This is promising for us as we can easily access the necessary materials to defeat the mayor if he was ever to return.

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