SUMMARY OF SNOW STORAGE – 2018

The empty snow pit was surveyed in the fall of 2017 at 10 cross sections, using a theodolite and level and a pit volume was calculated. In the winter of 2018 snow was made and stored in the snow pit. The dome was not so high as the previous year but the pile was longer, extending more out the west end. The pit contained an ice layer on its base at the time of filling. At the end of snowmaking in the spring of 2018, snow storage volume was again measured using the same cross sections and a volume calculated for the snow dome just before sawdust was layered on the snow. A total storage volume was calculated by adding the pit volume to the snow dome volume. The results are below.

Pit Volume: 6,170 cu m. (Fall of 2017)

Snow dome: 6,293 cu m. (Spring of 2018)

Total snow volume: 12,463 cu m.

In the fall of 2018 when the sawdust was removed, the snow dome was once again measured and a volume calculated. Unfortunately, not all 10 cross sections could be measured as heavy equipment was on the pile; sawdust was being removed and snow was being pushed forward with the Pinroth. However, as the pile was quite symmetrical the fewer sections measured still allowed for a reasonable estimate of volume loss due to melt, settling and loss during sawdust removal. The results are below.

Snowdome volume after loss: 6293 – 902 = 5,391 cu m. (a 15% loss)

Total volume after dome loss: 12,463 – 902 = 11,561 cu m. (an 8% loss)

Snow loss occurs mainly in the western end of the pile which is more open to the elements and may have had a thinner layer of insulating sawdust. The eastern end was quite low this year and not so exposed as the snow pack rests mostly beneath ground level.

The issue of the ice in the floor of the snow pit was investigated and two short trenches excavated to ground level beneath the ice, one at the eastern end and one in the mid point along the pit. At the eastern end, the ice was 76 inches (1.93 m.) deep whereas at the mid one it was 66 inches (1.68 m.) deep. The ice at the toe of the pit at the western extremity was 12 inches (30 cm) thick. Thus the ice formed a wedge-like profile from the eastern end to western end. Observations and measurements taken in the trenches revealed that the ice layers build at a rate of 10 to 12 inches (25-30 cm.) per year, this last year (2018) generating 12 inches. The eastern trench ice was dry but the mid trench ice was wet indicating “warmer” conditions toward the western end…a fact in keeping with a more extensive snow loss at that end.

Using the cross-sectional data from the 2017 pit profiles and current ice depths estimated at each cross section as determined from a proportional triangle representing the wedge-like configuration of the ice in the pit, total ice volume was calculated as below:

Total ice volume (current): 1,288 cu m.

This ice represents a loss of snow storage volume and potentially an additional 500 m of Frozen Thunder track (assuming a track width of 4 m. and depth of .75 m.). A protocol for annual or biannual ice removal might be considered in order to maximize storage volume.

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