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SNOW DENSITY CUTTERS

DIRECTIONS FOR USING - 1000 CC MODEL (RIP1)

1. Dig snow pit wall or surface to be sampled. Shave the wall or surface with a flat-bladed shovel to give a good sampling plane. Surface must not be rough or sampling error will result. Position cutter perpendicular to surface in both vertical and horizontal directions. (Fig 1)

2. Insert cutter at desired location. Be sure to insert cutter perpendicular to the surface so that the entire back of the cutter is flush with the snow surface when the cutter is all the way in. Do not attempt to straighten cutter after it is partially inserted or sampling error will result. It is better to move cutter and resample correctly. Do not push cutter in farther than snow surface or over sampling will occur.

3. Place lid above cutter at an angle close to the angle of the upper cutter surface. (Fig. 2)

4. Hold cutter in place with one hand while inserting cutter lid in with the other. Do not allow cutter to slide back as lid is pressed in as undersampling will occur.

5. Remove the cutter and lid at the same time being careful not to lose any of the sampled snow. In consolidated or wet snow, once the lid is pressed in and the sample has been isolated, the cutter and sample may be removed and weighed while the lid is left in. In new, unconsolidated, weak, or kinetic (depth hoar) snow, the lid should be removed from the pit wall with the cutter to insure no sample loss. In general, it is best to remove the lid with the sample to insure no losses.

6. Transfer the snow sampler to the digital scale with the sample still in the sampler, now turned in an upright position as a full dustpan would be held (Fig. 3). Read the scale directly in grams which is also the density in kg m^{-3} since the volume of the cutter is 1/1000 of a m^3 and a gram is 1/1000 of a kilogram. If your digital scale does not have a tare function, just record the gross weight while working in the field and subtract the weight of the density cutter after returning. After weighing, simply dump the sample and repeat. Alternatively, density can be measured with the 1000 cc cutter using and appropriate hanging spring scale and a plastic baggie. The disadvantage is a small loss in accuracy and a larger loss of time in transferring the sample to the baggie, then emptying the bag after weighing.

Best results are obtained by inserting the flat bottom of the cutter vertically into the snowpack because this insures that heterogeneous layers are sampled evenly by the wedge shaped cutter. Hold the cutter handle in your left hand as you would a ski pole and the lid in your right hand. Since the lid perturbs the snow above and below the cutter, a continuous density should be sampled by staggering alternate samples to one side or the other.

In extremely dense snow, refrozen melt-freeze or thick ice lenses it may be necessary to use a rubber mallet to insert both the cutter and the lid. Both parts are strong enough to use in this manner if done with care. Do not hit cutter handle with mallet. Hit lower corners of the cutter. Do not use anything except a rubber mallet. In conditions where sticking or icing make sample removal difficult, a putty knife may be helpful. Use it to scrape the cutter clean after the sample has been weighed, if weighing in the cutter, or use it to scrape entire sample into weighing baggie if a spring scale is used.