

SNOW-SURVEYING METHODS

(A Round Table Discussion)

Chairman: Bryant Hopkins,
Kennebec Water and Power Co.,
Waterville, Maine.

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On February 10, 1955 a discussion on snow-surveying methods was conducted under the Chairmanship of Mr. Bryant Hopkins at the Eastern Snow Conference. The purpose of the discussion was to assemble data on the methods currently used in conducting snow-surveys preliminary to issuing a pamphlet standardizing methods for eastern North America.

During the preliminary discussion it was mentioned that the Snow, Ice and Permafrost Establishment had already published a paper by Dr. Gerdel on snow-surveying methods.

Length of Course

It developed that the length of course used by the attending agencies varied from the 5 sample course, used by the New England Power Company, to the 50 sample course, used by The Shawinigan Water and Power Company. Many used a 10 sample course; namely, the U.S.G.S., Kennebec Water and Power Company, Gatineau Power Company, the Canadian Government and others. One, the Hydro-Electric Power Commission of Ontario, used a 30 sample course. The agencies using short courses used motor vehicle transportation and sampled many short courses. The two agencies now using the long courses used train transportation. For this reason they felt that there would be no advantage in a reduction of the number of samples in their courses because the amount of time spent travelling between courses and the usual delay in waiting for trains was much greater than the amount of time used in taking samples. Since all agencies use the results of a snow survey as an index only, it was felt the advisable thing to do was to choose a location for a course, choose a length and then keep it.

Type of Sampler

Three types of instruments were being used; the Mount Rose sampler with a diameter of 1.48 inches, the Adirondack sampler with a diameter of 2.6 inches and a special sampler of 4 inch diameter used by the Gatineau Power Company. Gatineau adopted this special size sampler because they found it gave consistently higher water contents than the patented samplers. A comparison of the Mount Rose and the Adirondack samplers made by two members of the Conference at Burlington one day before the Conference (details of results follow), showed that there was no significant difference between the results obtained from both samplers for a water equivalent of about 2-1/2 inches (for 10 and 30 samples). This bore out the experience of another observer who compared the two samplers for a water equivalent of about 6 inches. General comments on the two standard samplers were that the Mount Rose scale was not sensitive for small water equivalents and that the Adirondack tube was difficult to drive through crusts.

General

No agency seemed to have adopted a procedure regarding samples that vary widely from the average for a course. Some abandon these samples if the variation is great, but most include them in the average.

For shallow depths it was suggested that the snow be compacted within the tube before the tube is withdrawn for weighing. In the west it was common practice, if the water equivalent is less than 4 inches, to gather a number of cores and weigh them collectively.

There was little agreement on the speed of driving. One member claimed that fast driving gave a heavier sample and another claimed that there was no difference.

It was suggested that dirt should be removed from the sample before weighing, that the tube should be waxed every three years, that the location of the snow course should be representative of the terrain in the watershed and that an adjustment should be made for ice found on the ground underneath the snow.

SNOW SAMPLING EXPERIMENT

Made Feb. 9, 1955 at Burlington, Vt.
by G.S. Cavadias and G.H. Scruton
The Shawinigan Water & Power Company
Montreal, Quebec

The purpose of the experiment was to see if there was a significant difference in the water equivalents obtained with a Mount Rose Snow Sampler and with an Adirondack Sampler.

A. Description of the Experiment

1. A flat piece of ground was selected.
2. A 100-foot measuring tape was laid on the ground in an irregular way.



3. Measurements with the Mount Rose Sampler and the Adirondack Sampler were taken at the x and y points respectively, according to the following scheme; the arrangement being made by means of a table of random numbers.

x Mount Rose Sampler
y Adirondack Sampler

Sample No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Left	x	x	x	y	x	y	x	x	y	y	x	y	x	x	x
Right	y	y	y	x	y	x	y	y	x	x	y	x	y	y	y
Sample No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Left	y	x	x	x	y	x	x	y	x	y	y	x	x	y	y
Right	x	y	y	y	x	y	y	x	y	x	x	y	y	x	x

B. RESULTS

	<u>30 Station Average</u>		<u>10 Station Average</u>	
	<u>Snow Depth</u> in.	<u>Water Equivalent</u> in.	<u>Snow Depth</u> in.	<u>Water Equivalent</u> in.
Mount Rose Sampler x	11.5	2.57	11.5	2.8
Adirondack Sampler y	11.7	2.55	11.8	2.5

C. EVALUATION OF THE EXPERIMENT

The results were analyzed statistically for the two sample sizes using the procedure outlined in "Introduction to Mathematical Statistics" by Paul G. Hoel, page 145. The differences between the water equivalents obtained by the two samplers were found to be not significant in each case and it was concluded, therefore, that the differences could have occurred by chance and were not caused by the samplers.