

February 21, 1946

Mr. Fred Paget
Program Chairman
Western Snow Conference
401 Public Works Building
Sacramento 5, California

Dear Mr. Paget:

Here is a little preview of the - what shall we call it - "Sno-bug" that Bill Sutter and I have built in the hope of easier travel while making snow surveys. We haven't decided what to call it altho I think that "Sno-bug" pretty well describes it. It isn't much bigger than a good sized bug, and its motive power - well, I'll tell you what we did, we took all the bugs out of our previous attempts at making a sno-mobile and put them into this one to make it go.

Yours very truly,
(signed) O. W. Monsen
O. W. Monsen
Irrigation Engineer

OWM/alr

The Montana "Sno-Bug"

Designed and built at Montana Agricultural Experiment Station by
O. W. Monsen and W. J. Sutter.

This machine is the result-up to date-of an attempt to devise something that will furnish transportation for making snow surveys under Montana winter conditions. These conditions are quite different from snow conditions encountered where temperatures are less extreme.

Temperatures here usually stay down around the zero mark - or maybe 40° below - during January and February. The result is, snow of low density - 20% or less. Such a snow cover does not afford much support for any kind of a vehicle. Travel even with snow shoes or skis is difficult. When the snow is deep, a man on snow shoes or skis will sink in 7 or 8 inches. Where the depth is not over 24 to 30 inches, one doesn't sink in so much.

Many of our snow courses are located beyond the reach of roads. To get to them one must travel 5 to 7 miles over steep narrow forest trails. Our "Sno-bug" has been designed to meet these conditions in so far as possible. Our present machine is an experimental model and is still very much in the experimental stage, altho we have travelled over 75 miles with it and it performs quite well.

The machine consists of two parts, a driving unit and a steering unit. The driving unit is made in the form of a toboggan 84 inches long by 28 inches wide

which gives it a bearing surface of about 2350 square inches. It weighs 620 pounds and gives a weight distribution of about 35 pounds per square inch.

The pilot or steering unit is 30 inches wide and 48 inches long and weighs 90 pounds. Thru a spring arrangement, part of the load on the driving unit can be transferred to the steering unit.

The driving unit is powered by a 6 H. P. Briggs and Stratton air cooled gas engine. Power is applied to a sort of conveyor made from two No. 62 binder sprocket chains running parallel on both sides of the sled and connected by a hardwood crosspiece $1\frac{1}{2}$ x $1\frac{3}{4}$ " attached 18 inches apart, between the two drive chains. These chains travel over two sprockets, one front, one rear.

As the cross cleats pass over the front sprocket, they are depressed into the snow, making contact which causes the toboggan to slide forward over them, after which they return over two guides placed below the deck where driver and passenger ride.

The Sno-bug is not a high speed machine. The top speed being between 9 and 10 miles per hour in high gear - in intermediate gear it will do between 4 and 5 miles per hour and in low, 2 to 3 miles per hour. We were limited by the size of power unit available, but since the distances to be travelled are not great we feel that speed is secondary in importance to the ability to staying on top of the snow.

Due to its light weight, the Sno-bug rides the surface even over powder snow and fresh snow conditions. During our last trial, the maximum depth to which it sank into the snow was about 6 inches in snow of 20% density. It will climb fairly steep, 15 to 20% hills in 2nd gear and we have climbed 50% slopes without difficulty. The light weight pilot makes it ride high and leaves a partly packed trail which helps keep the heavier driving unit on top.

The gas consumption runs between 8 and 10 miles per gallon, which is not considered excessive.

It will carry two men and pull two others on skis. Generally speaking, it is a two man outfit. One man can load and unload it. We haul it on a $\frac{1}{2}$ ton Ford pickup truck.

As was previously explained, our machine is still ⁱⁿ the experimental stage and there are a few things about it that should be corrected. The main difficulty we have had with it is the tendency to overturn in loose snow. This was rather troublesome on our recent "competitive" trip with Work and Marr and their "Tucker Snow-Cat".

The Sno-cat left deep trenches, 14 to 20 inches in the trail which gave us a lot of trouble in crossing. The principal points in its favor are: (1) light weight (2) easy to load & unload (3) low cost (4) ability to climb hills (5) ability to travel over loose snow.

(Signed) O. W. Monsen
O. W. Monsen
Irrigation Engineer