

PROBLEMS OF SNOW REMOVAL IN MOUNTAIN PASSES FOR 1955-1956

by  
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There are eight major mountain passes on the 6,795 miles of Washington highways but those which give us the greatest concern, headaches and problems, are on the primary highway routes located east-west through the Cascade Mountain range and are:

1. Snoqualmie Pass, U. S. Route #10, Primary State Highway #2, Elevation 3004 feet.
2. Stevens Pass on U. S. Route #2, Primary State Highway #15, Elevation 4061 feet.
3. White Pass on a branch of Primary State Highway #5, Elevation 4500 feet.

In the order of traffic volume, Snoqualmie Pass has the preponderance of cross state east-west travel of both truck and passenger vehicles, with an average daily traffic of 4500. Stevens pass. is next with an average daily traffic of 1450, with White Pass having an average daily traffic of 520 according to the latest count. The latter pass has been open only since 1952 and is gaining in traffic volume each year. Snoqualmie Pass is four-lane width at present from Hyak on the east side to the upper crossing on Denny Creek on the west. By the end of this year, the Snoqualmie Pass Highway should be completed so that travel will be easier all the way from Hyak to Seattle on four lanes of pavement.

All the other passes have but two lanes of pavement. All of the above three passes have easy curvature, both vertical and horizontal, with good sight distance.

The other five passes are:

4. Blewett Pass, U. S. Route #97, Primary State Highway #2, Elevation 4071 feet.
5. Satus Pass, U.S. Route #97, Primary State Highway #8, Elevation 3149 feet.
6. Chinook Pass, U.S. Route #410, Primary State Highway #5, Elevation 5440 feet.
7. Austin Pass, Branch Primary State Highway #1 to Mt. Baker Lodge, recreation area, Elevation 4630 feet.
8. Sherman Pass, Secondary State Highway #3-P, Elevation 5575 feet.

These five passes do not give us too much trouble during the snow season, primarily due to the lower traffic volume. Chinook Pass, which is just north of Mt. Rainier, in very scenic country, is not kept open to through traffic during the winter. It remains closed from the first heavy snowfall, generally the latter part of November, until the latter part of May or June, due to its location in a heavy rain or snow belt and the danger of slides in numerous sections, especially the east side of the pass. In addition, because part of this highway is located in Mt. Rainier National Park, vehicles with gross weight of more than 5,000 pounds are restricted from using Chinook Pass Highway at any time without special permits. This highway is kept open as far as Cayuse Pass on the west side for skiers, although this winter the highway has been closed approximately two months because of slides or danger of slides.

Satus and Blewett Passes traverse the mountains in a generally north-south direction and the prevailing winds tend to clear the roadways rather than drift them full and the snow removal operations and ice control are more or less routine matters, requiring smaller numbers of men and equipment than on the first three passes noted.

Austin Pass Branch is a highway connecting Mt. Baker Lodge, a ski resort in winter and a summer vacation spot, and, in reality, is not a mountain pass but a mountain highway. It lies in a heavy snow belt and on March 8th of this year, a record-breaking 454 inches (almost 38 feet) of snow was measured at Mt. Baker Lodge. This highway from Shuksan to Mt. Baker Lodge is maintained for recreation purposes only.

Sherman Pass crosses the Kettle River range at the highest elevation of any of our passes, but lies in a light snow belt, crosses no avalanche courses and has been no problem to maintain since 1953 when the Highway Department took over this highway between Republic and Kettle Falls. It was located and constructed by the Bureau of Public Roads and maintained the first years by Ferry County.

Due to the remote locations of both Snoqualmie and Stevens Passes, the Highway Department constructed snow camps at the summits with dormitory and dining facilities for a maximum of 40 men, repair shops and equipment storage, sand storage, etc. White Pass has only an equipment storage building, with fuel tank at the Summit. Living facilities are available on both sides of the pass at Packwood and Indian Creek where the men are fed and sleep. Snow camps are maintained at the approaches of both Chinook Pass and the Mt. Baker Lodge Highway because of their remote mountain locations.

The overall problems on all passes are similar but, due to geographical differences, each pass has difficult conditions that are peculiar to itself. They each, with the exception of Satus and Sherman Passes, have areas that are subject to snow-slides. Snowfall and temperatures, with the exception of Satus and Sherman Passes, are

similar. The cost of snow and ice control for each pass will obviously vary considerably but it is of interest to note that the total cost for any one pass in a year of moderate snowfall will not fluctuate greatly from a year of heavy precipitation. The reason for this is that, regardless of the snowfall, the men and equipment needed for each pass will be about the same each year. About the only difference in cost is in the length of the season and duration of storms which necessitate 24-hour patrol and require payment of overtime to our men. However, the cost of snow and ice control for all passes this year will exceed that of previous years because our snow season has been from November 1st and has been nearly a continuous operation until after April 1st, with few breathing spells between storms. The standards of winter maintenance have been higher the last three years because of the demand of increased traffic volume, which increases the cost.

The type of equipment used on all passes is similar and consists of push and V plows, many with wing attachments, mounted on heavy four-wheel drive trucks, heavy duty motor patrol blades equipped with both regular or serrated bits for removing snow bottom, rotary snow plows, sand trucks equipped with mechanical sanders and push plows, bulldozers, mobile truck shovels for removing deep snowslides and front end loaders to handle sand in the sand sheds. The push plow unit is the work horse of the fleet to plow snows as it falls on all passes except Snoqualmie. On this pass, the motor patrol blade has replaced, to a great extent, the push plow for windrowing the snow on the pavement preparatory to blowing it over the side snow banks. Seven motor patrol blades are used on Snoqualmie Pass.

So much for the locations, difference in passes and equipment used to keep these highways open for the ever increasing volumes of winter traffic.

The men of the Washington State Highway Department, who are responsible for the winter maintenance of the pass highways, take great pride in keeping these highways open and safe for travel under the most trying and miserable weather conditions. Therefore, any condition or factor that would prevent the safe and free use of the highways immediately becomes a problem, first, because of the pride of keeping the highways open and, secondly, because of the economic loss to the people of the State of Washington. For example, it has been estimated by the Planning Survey Division of the Department that it costs the users of Snoqualmie Pass \$7,500.00 to \$8,000.00 PER HOUR EACH HOUR THAT Snoqualmie Pass is closed at the present traffic volume. In the opinion of the speaker, the three major items that cause problems are: (1) Snowslides or avalanches, (2) People, and (3) Equipment breakdown. I would like to speak briefly on each of these problems.

#### 1. Snowslides or Avalanches.

I believe all of us here will agree to the correctness of the statement that the winter of 1955-56 has been an unusual one of very heavy snowfall. To prove this as a fact, I want to present the records of the Highway Department or U. S. Forest Service Stations at four stations on total accumulated snowfall up to and including April 10, 1956, and maximum depth this winter. At Mt. Baker Lodge, a total of 767 inches (63' 11") of accumulated snowfall has been recorded, with a maximum depth on March 8th of 454 inches. The Stevens Pass Station reports a total of 958 inches (78' 2") accumulated snowfall, with a maximum depth of 216 inches (18') on March 8th. Snoqualmie Station indicates an accumulated snowfall of 828 inches (69') and on March 9th a maximum of 224 inches (18' 8") was measured. We learn from our White Pass foreman that a total of 285 inches (23' 9") of snow fell, with a maximum depth of 178 inches (14' 10") on March 13th. I trust you will all agree with me that this depth of snow would set the stage for snowslides, not only on the avalanche courses, since any cut slope that is more than ten feet in height is a potential hazard from snow sloughing on to the roadway due to its extreme depth. I will not go into the subject of avalanche control or triggering avalanches by explosives when conditions are right for the snow to slide, except to say the Highway Department, under the direction and leadership of Mr. Frank Foto of the U. S. Forest Service, did try this method on four avalanche courses on the west side of Stevens Pass on March 16, 1956 and again on April 4th with fairly good results. Mr. Foto operates one of four avalanche stations in the United States and has accumulated records on Stevens Pass to predict the movement of snow in avalanche areas. Whether or not this method will be used next year and on other pass areas will be determined after a study has been made of this year's experiments. The advantage of this method is that slides occur under controlled conditions with equipment stationed on each side of the area ready to quickly go to work with traffic shut off and out of danger of being covered by snow. The use of explosives to bring down snow in avalanche courses may be continued by this Department; however, due to this year's extreme depth of snow bordering the pass highways their entire length, these banks remain a menace to traffic from sloughing. It is a proven fact that four feet of snow covering can be fatal to an unprotected person, as demonstrated on Stevens Pass on April 1st when an experienced skier was killed while attempting to remove snow from a ski lodge roof. I'm sure all the pass foremen will heave a sigh of relief when this winter is over, because they have been under a tremendous strain the past two months from fear that someone would die from being covered by snow while traveling the pass highways. We have been fortunate so far this year, although a number of cars have been covered from small slides or sloughing of some banks.

#### 2. People

The reason "People" are classed as one of the problems is that many individuals, both men and women, attempt to travel the pass highways in midwinter totally unprepared in the way of equipment and clothing. When the going is rough, they get into trouble and become a problem. While the pass highways are usually not closed for more than an hour or two due to wrecked cars or trucks and/or trailers blocking the roadway, there is the danger of

fatalities when cars and trucks go out of control on slippery surfaces. It is certain the majority of the problems stem from the fact more people are using the highways during winter months than ever before and many of them are inexperienced in driving on ice and snow. Large numbers of motorists do not realize that when they make trips in winter to Stevens Pass, for instance, they are going through a wild alpine region that can be dangerous even to the well prepared and experienced traveler. Our men have found apparently intelligent people attempting to travel the passes in midwinter without tire chains for their cars, overshoes for their feet or overcoats for their bodies. These people become real problems if they are caught in between snowslides and our personnel on the passes have to take care of them until the roadway can be opened sufficiently to get them out of the danger area. A large percentage of the accidents, in which State equipment is involved, is caused by stalled vehicles, both cars and trucks, in the sometimes narrow highway lane between snow banks and many times on slippery super-elevated horizontal curves. While our men have orders not to move or help vehicles in competition with commercial wrecker service, in many cases it is mandatory that an attempt be made to move these vehicles quickly to prevent accidents. Several of these attempts have ended this past year in fantastic tangles of traffic involving three to six cars or trucks, mainly because the vehicles came along at the wrong time, did not realize how slippery snow and ice can be, and the drivers could not stop. In most cases, they were following the vehicle ahead too closely. The occasions that really give our pass foreman and his men the jitters, chills and thrills, is to have, on a nice late winter sunny weekend afternoon, sight-seeing families stop along the beautiful innocent-looking snow banks, get out with the children, plus the family dog, to take pictures, play in the snow, make snow men and enthusiastically enjoy the mountain scenery. These families seem unwilling to realize, nor can they be easily convinced, the snow banks could cave in, causing death to part or the whole family and wrecking their car. The National Ski Patrol has been very effective in controlling the actions of not only Ski Club members, but independent skiers at the summits of Stevens, Snoqualmie and White Passes this past year, so the skiers are not such a problem as in former years. However, all snow camp buildings are still kept securely locked over weekends and holidays to prevent unauthorized use of the non-public buildings and theft of materials and personal property of our men. From this brief description you can realize people can be and are problems on our mountain passes in winter.

### 3. Equipment Breakdown

Equipment failure is always a source of trouble in snow removal work because of the rough usage it sometimes receives and the need to operate it on a round-the-clock basis to keep the passes open during blizzards and to clear snow slides as they occur. Part of this problem has been solved by trading in our trucks at shorter intervals and replacing with heavier, more powerful units that can stand the "beating" this equipment takes during the course of a winter. The rotary snow plows are a source of constant expense for repairs: The Snogo unit, used to blow out snow windrows, drifts or slides, is a delicate piece of machinery due to the design of the mechanism driving the fan and when an oversize piece of ice or hard compacted snow or a rock comes in contact with the fan blades, the fan head or driving mechanism is injured. The Department was fortunate this past winter in having enough of the rotaries operating during all periods when needed, so that the pass crews were never caught short. At one time late in February, however, Snoqualmie Pass was without any rotaries, due to breakdown for a three-day period, but fortunately only small amounts of snow fell and the crews were able to get along without them. Because of the ingenuity of the pass foremen and the flexibility in the use of equipment from one district to another, it would take a series of catastrophies to stump our supervisors.

### Costs

The cost of snow and ice control may be of interest to some of you. The average state-wide cost per mile in 1954-55 for all highways was \$246.00. On Snoqualmie Pass it was \$8,246.00 per mile; on Stevens Pass \$4,984.00 per mile, and on White Pass \$2,558.00 per mile. These figures, of course, include the operation of the snow camps, supervision, wages, equipment rental and all supplies including sand and salt.

In conclusion I want to take this opportunity to pay tribute to the men and their supervisors who clear and make possible travel on our highways during the winter months. These men, who operate the truck push plows, rotary snow plows, motor patrol blades, bulldozers, sand trucks and other pieces of equipment are out in the thick of a snowstorm or blizzard while most of us here are at home, warm and comfortable, thankful to get out of the weather and our trip completed, if we have been out in a car. Instead of being in this blinding snow for just a few hours, many times these men work their whole shift and longer on road surfaces that are slippery, with visibility next to zero. There is not only risk of sliding off the roadway but danger of collision with a motorist whose vehicle is out of control.

I would like to compare these men with the men of the pony express days whose motto was "the mail must go through." The present day slogan of our snow crews is "the highways must be kept open." The fact that the men at the mountain pass snow camps, both regular and seasonal employees, seem eager and anxious to return year after year for this type of work indicates they have little fear for their own safety, have pleasure out of battling the elements and get satisfaction in a job well done. I am proud of these men individually and as a group.