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*Auto Depreciation from Deicing Salt  
By: Wayne Snyder  
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THE ROCHESTER COMMITTEE FOR SCIENTIFIC INFORMATION  
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Summary

Salt still adds considerably to the corrosion of automobiles, though the actual amount is widely debated.

Various studies have arrived at widely divergent annual costs from corrosion. Some of these studies were completed under preconceived prejudices for or against salting. Others present varying results because different variables are included, various approaches taken, or unequal economic models used.

Estimates on the costs of corrosion range from 0 to \$200 per year for each car. In 1976 there were 334,114 cars registered in Monroe County, so that a middle estimate indicates that the local cost is as high as \$33,000,000.

Any estimates of cost should include the costs of prevention such as undercoating and extra car washing.

Total costs should include the costs of research and reporting (\$1 million for the National Committee for Highway Research, alone).

Arguments over the actual cost will continue, but it may be concluded that the cost of using deicing salts on a national scale is high. Furthermore, this cost is borne, in large part, directly by the individual, and it is often not considered in the economic calculation of highway departments.

Background

RCSI Bulletin #218 provides information on the nature of automobile corrosion and the conditions which increase it. A series of previous RCSI Bulletins deal with the amount of salt used in the Rochester area, its cost, relationship to weather and other factors, and the environmental consequences, particularly to water quality and lake dynamics.

Costs of Corrosion

Estimates of the cost of corrosion to automobiles range from 0 to \$200 per year. The most common figure is around \$100 annually. Those claiming that corrosion does not add any significant cost include the Salt Institute, private citizens' pro-salting groups, and the Utah Department of Transportation. The \$200 figure is quoted by an anti-salting group in Winchester, Massachusetts. More impartial groups place the value in between.

\* This Bulletin is based on a Thesis which will be submitted for the degree of M.S. in Environmental Science at the University College of the University of Rochester in April 1978. A copy of the full text, (Wayne E. Snyder: "Deicing Salt and the auto: Corrosion costs and driving benefits") will be available for reference at the Rush-Rhees Library, University of Rochester, New York 14627.

A study by the Idaho Department of Highways calculated the annual cost of salt corrosion to be \$5 per automobile (1). They assumed the total amount of damage to an auto to be \$35 and the effective life to be 7 years. The \$35 comes from a 1969 estimate by the Ziebart Co. of the cost of undercoating each car in the state. The Dept. of Highways assumed that the cost of damage cannot exceed the cost of prevention. There is, however, no known location in the U.S. where an auto owner can get his car undercoated for \$35. The present rate is \$120 to \$150. Even using the \$5/year estimate, the total cost for just those cars registered in Idaho in 1971 comes out to be \$3,150,000. And using the figure of 76.4 million automobiles nationally exposed to deicing salts (estimate of the Ziebart Co.), the yearly cost totals \$380 million.

Two projects used depreciation rates to estimate the costs of corrosion. They arrived at comparable figures. Anderson and Auster estimated the cost of automobile damage from deicing salts for 1972 to be \$1.1 billion (2). Murray and Ernst arrived at a total figure of \$1.4 billion for 1973 (3). Averaged out to values per auto, the annual cost is only slightly higher than that of the Idaho study, in the \$15 to \$25 range.

Both of these studies used resale value of used cars in various parts of the country to calculate depreciation. According to Mr. D. Stahl, Executive Director of the Automobile Dealers' Association of Rochester, NY, about 20,000 local cars have been shipped south for resale in each of the last few years. This means that the 2 studies that used depreciation as a basis for estimating salt damage inadvertently may have compared northern cars exposed to salt with southern cars that were also exposed to salt in their first 2 years of operation.

The Environmental Protection Agency (EPA) report of Murray and Ernst also included an estimated cost of muffler deterioration from corrosion. The estimate nationally was \$500 million, and this puts the total cost of automobile damage from corrosion at about \$2 billion annually (3).

The Society of Automobile Engineers estimated in 1968 that the depreciation rate caused by corrosion was approximately \$100 per year (2). This value was corroborated in a master's thesis by Madden who interviewed three large-volume used car dealers in Rochester, NY and received estimates of \$85, \$100, and \$135 as the annual depreciation amounts used (4). Between 1968 and 1977, the cost of a new automobile has increased approximately 70% (based on data from Car and Truck Appraisals, 1968 and 1977 editions). Applying this percent increase to the SAE estimate of \$100, the present figure would be \$170 per year.

Private automobiles are not the only vehicles on the road. Government vehicles, public transportation, and commercial trucks and sedans are also exposed to a corrosive environment on the roads. Often the amount of exposure is greater than that of the average private vehicle, and also these vehicles are often stored in heated garages.

Vehicles made specifically for commercial use are better made than the average automobile. Most company cars, however, are ordinary vehicles. Overall, it may be expected that the average rate of deterioration will approach that of private autos, and without a doubt the costs are passed on to the consumer and taxpayer.

#### Costs of Prevention and Diagnosis

In the economic study of road deicing and automobile corrosion, preventive costs would include costs of research and construction changes. Changes in painting techniques, galvanized steel, zinc-rich parts, cadmium plating, elimination of dirt catching joints, are just a few of the many efforts manufacturers have devised to battle salt corrosion. These advances entailed research, testing, and changes in construction techniques. Such costs are not absorbed by the company, but are passed on to the consumer. Some of these changes would have occurred without the salt problems, some were accelerated, and some are the direct result.

One partly documented case of preventive costs is undercoating. A 1976 study by the EPA estimated that approximately 1.5 million automobiles have been Ziebarted (a soft wax is applied to steel surfaces beneath the auto). If the cost of the process is assumed to be \$150, the cost for those automobiles to be undercoated has been \$225 million (3).

One point stressed by all sides, from the strongest advocate of salting to the staunchest foe, is the importance of regular washing to combat corrosion. Without a doubt such washing is a preventive cost. The Massachusetts Department of Public Works estimated such a cost (5). They estimated the cost of a car wash (either a commercial fee or the cost of time and materials for self-washing) to be two dollars. If each car owner washes his car one extra time per month to lessen salt corrosion, for four months a year, then the annual cost to residents of Massachusetts alone is \$25,360,000. Using the estimate of 76 million autos, the national bill would total over \$600 million yearly. Added to this is the cost of washing trucks and commercial vehicles.

The second category of costs are diagnostic costs including the cost of studies on the cost of rusting. Some projects have been nothing more than totally biased attempts at supporting one side or the other. For example, a Washington consulting firm did a study "objectively examining the benefits and costs of using deicing salts." The words in quotes followed a sentence which began "Road salting, the most effective, most economical, and safest deicing method known..." (6). Such an opening does not promise a very objective study. However there have been numerous scientific studies done by private individuals, companies, and public agencies, and each received financial support. Some people argue that research is not a cost, but if there were no corrosion of automobiles, such research would not be necessary. Consequently it is a cost for the problem.

One example of the cost of research is shown by the National Committee for Highway Research Programs which has completed 9 major studies relating to ice and snow removal. The total cost of these studies has been just over \$1 million (5).

The automobile related costs of salting are considerable. Costs of prevention, maintenance, and depreciation must all be included. Even with continuing automobile improvements and initial salt reduction in some areas, the cost of corrosion still is high.

#### References

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- (3) Murray, D.M. and Ernst, U.F.W., "*An Economic Analysis of the Environmental Impact of Highway Deicing*," Environmental Protection Agency, May 1976.
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- (5) Massachusetts Department of Public Works, "*Draft Environmental Report for the Snow and Ice Control Program*," 1976.
- (6) "*Benefits and Costs in the Use of Salt to Deice Highways*," The Institute for Safety Analysis, Washington, D.C., 1976.