the road using attached panels by the methods of Fromm in Canada[2] and Nixon[3] in the U.K. There are several advantages in the selected method. There was no time delay while corrosion measurements were carried out, and results applied retrospectively over a period of several years. The results are realistic in that they relate to actual vehicles, and it is possible to place an economic interpretation on the results obtained which would not be possible if corrosion rates on test panels had been measured.

2. METHOD

A list of the counties of England and Wales in order of annual usage of de-icing salt showed that over recent years the highest usage was in Derbyshire at a rate of 7.3 tons per mile per year[4]. Only two areas used virtually no salt: Pembrokeshire and the Isle of Wight. Pembrokeshire and the Isle of Wight are both coastal areas where the natural background of salt concentration is higher than in Derbyshire. In addition the Isle of Wight is obviously a more special case.

The two counties of Derbyshire and Pembrokeshire, however, gave a very great contrast in salt usage and it was decided to use them for this survey.

TABLE I

Salt usage in Pembrokeshire and Derbyshire

County	Total road length miles	Amount of salt used				Average rate of use tons/mile
		62/3	63/4	64/5	65/6	
Derbyshire	3,141	25,013	16,178	23,262	27,587	7.33
Pembrokeshire	1,445	271	41	373	322	0.17

Details of normal atmospheric corrosion rates in the two counties Pembrokeshire and Derbyshire are not available but the following factors may be considered. The natural atmospheric chloride concentration along the urban areas of coastal Pembrokeshire will be high and it can be assumed that the normal corrosion rate of steel will be high. Similarly the industrialised areas of Derbyshire bordering on such cities as Sheffield and elsewhere in east Derbyshire will also have a high corrosion rate but in both counties large areas have uncontaminated rural atmospheres. The average annual rainfall in Pembrokeshire is 47.8 in and that of Derbyshire is 34.9 in and the humidity is consistently higher in Pembrokeshire than in Derbyshire. It seems reasonable to assume that the overall atmospheric corrosion rate for Derbyshire is no higher than that of Pembrokeshire and very probably is less.

There is the likelihood that vehicles from each county will travel a fair proportion of mileage in other counties. In the case of Pembrokeshire these vehicles are bound to travel to areas where salt usage is greater than in the home county and in the case of Derbyshire to areas where salt usage is less. Such external travel will therefore in no way affect the findings of this report except slightly to underate the differences in corrosion damage to vehicles due to salt.