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The Use of Deicing Salt in Monroe County

By: Lindsay Holmes
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THE ROCHESTER COMMITTEE FOR SCIENTIFIC INFORMATION
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Summary

The amount of salt spread per lane mile on state highways by Monroe County towns in 1972-73 ranged from less than 14 to over 140 tons. State crews used about 35 tons per lane mile on routes through urban areas. In spite of a mild winter, approximately 163,000 tons of deicing salt were used in the County.

Road salting practices in Monroe County were studied through questions directed to highway officials of villages, towns, the City of Rochester, New York State Department of Transportation and New York State Thruway Authority.

This report compares the diverse guidelines for spreading salt used by different crews, and the varieties and usage of plowing and salting equipment. Only one town, Chili, was found to have modern, salt-saving equipment.

The present procedures are inconsistent, wasteful, and result in unnecessary damage to property and the landscape. Eleven changes to improve salt use patterns in the County are discussed as a model for a uniform policy for rational management of snow on the roads.

Background

In the summer of 1973 a questionnaire was circulated to all town, village, State Department of Transportation(DOT), NY State Thruway Authority, and City highway officials. The questionnaire, part of which is appended to this Bulletin, was detailed and authorities were co-operative. The first series of questions dealt with salt stock-piling and the results were reported in Bulletin #167. This Bulletin summarizes the information on how many tons of salt were spread per lane mile of State, County and Town roads in each municipality in the winter of 1972-73, on types of snow removal and salt metering equipment available in the County and on policies for salt use.

Who Salts the Roads

Town and village roads are serviced by the town or village crews. Monroe County subcontracts the clearing of county roads to the towns. The DOT, using State equipment, clears and treats the following State roads in Monroe County:

- NY Rte. 47 west of the City from Ridge Rd. west to Scottsville Rd.
- Ridge Rd. west from Mt. Read Blvd. to Lake Ave.
- US I490 from the thruway east to the inner loop and from the loop west to the thruway
- The inner loop, City of Rochester

All other State roads in the County are cleared by the Towns under State contracts. The Ontario State Parkway is cleared by the Genesee State Park Commission, and the thruway by the NYS Thruway Authority. This report does not consider salt spread by the State Park Commission, schools, industry, hospitals, airports etc.

Table 1. Salting Policies

Municipality (Towns:)	Typical Mode of Treatment			Additives (Chemical and/or abrasives)	Guidelines followed
	State Rds.	County Rds.	Town Rds.		
Brighton	100% salt, plow when needed	100% salt, plow when needed	-most are not salted, only plowed -some, including school bus routes are salted 100% or "skip salted" -bad curves, hills & intersections are salted	below 0° use $CaCl_2$ in small amounts on curves, hills, intersections	State, own
Chili	depends entirely on conditions; make no distinction between treatment of state, county, town roads			small amount sand-salt mixture is used	State, County
Clarkson	Those with heavy traffic (13 miles) are 100% salted; others are spot salted unless icy, and are salted at hills, curves & intersections	Spot salting and plowing; salt 100% only if very icy	100% salted(trying to cut down in 73-74)	sand-salt mix used sometimes	State, County
Gates	bare pavement policy (100% salting)	County guidelines	Most are plowed only; salt curves, hills, intersections	"State prohibits mixture"	State, County, own
Greece	Salt with early snowfall; plow if depth exceeds 2". Follow NYS guidelines, but use judgement as to whether 100% salting needed.	Same as for State	Plow all town rds; use abrasives on some	below 5°F use sand-salt mixture	State
Hamlin	Salt when snow first starts; plow then salt deeper snow; 100% salting to remove ice	Salt intersections RR crossings, hills curves, bridges	Plow, then lightly salt, mostly at intersections	no	own
Henrietta	100% salting	100% salting	100% salting	no	Salt Institute

Table 1, continued

Irondequoit	Up to 3" snow, salt 100%; over 3" snow, plow then salt 100%	Same as state	Spot salted	No	Own
Mendon	100% salting	Spot sanding; spot salting (curves, RR crossings, intersections) 100% salt only in ice storms	Same as county	Sand used on dirt rds since salt causes bad potholes	State, own(for dirt rds)
Ogden	100% salting	-About 13 lane miles are salted 100%; -about 36 lane miles are spot salted; -about 91 lane miles are not salted, just plowed. (In ice storms all are salted 100%)		No	Own: Traffic flow of -1000/day gets 100% -500-1000/day gets 50% salting -less than 500/day gets no salt
Parma	100% salting	Some 100%, some spot salted	Most are spot salted	Mix a little sand if it is very cold ($< 10^{o}F$)	-------
Penfield	State wants 100% salting but judgement is used; they salt 100% at rush hour times, at most curves, hills,& intersections and under icy conditions; otherwise they spot salt	Hills, curves & intersections are salted; if icy salt 100% but otherwise spot salt	Several town rds. having heavy traffic, dangerous conditions are salted 100%. Others are spot salted.	Salt-sand mixture	State, County
	-Use dual salt-plow capacity-				
Perinton	100% salting	Salt hills, curves & intersections	Some(16 lane mi.) are 100% salted due to steep hills. Others are spot salted at intersections, and according to conditions.	Sand-salt mixture on some town roads	State, County
	All roads: -Under 3" snow, simply salt; -over 3" snow, plow first, then salt		Some residential areas choose to get salt (depends on conditions); others choose no salt but plowing.		
Pittsford -Town and Village	Plow and 100% salting	Plow and spot salt; certain roads get 100% salt	Salted but <u>not</u> 100%	In very cold weather mix sand-salt	State, County

Table 1, continued

Municipality (Towns:)	Typical Mode of Treatment: State Rds.	County Rds.	Town Rds.	Additives (Chemical and/or abrasives)	Guidelines followed
Riga and Churchville	100% salted	Spot salt: hills, curves & intersections, RR crossings, unless icy - then 100% salted	Same as County rds.	No	?
Rush	Rtes. 251, 15A, 15 and E. River Rd. are salted 100%; all others- State, County and Town - are treated the same - salted but not 100%			No	Own
Sweden	13 of 69 lane miles are salted 100%; 56 of 69 lane miles are salted but less than 100%; salt spread as soon as necessary; over 2" snow, plow first then salt.			No	State, County
Webster	100% salted	Not 100%; salt depending on traffic & conditions	Treat hills, curves and intersections with sand:salt mixture for 1/3 of season	Sand:salt 1:3 mix used on Town rds. part of season	State, County
	- Plow when over 1 inch accumulation -				
Wheatland	100% salted	Salt hills, curves & intersections	50:50 sand:salt mix on curves, hills & intersections	50:50 mixture sand:salt on Town rds.	County
City of Rochester	Arterials, commercial routes: 100% salted, plowed if >3" accumulation. Bus routes in residential areas, steep hills are salted after arterials are done. City is moving away from 100% salting to spot salting here. Residential areas are normally plowed, not salted except for dangerous hills and in severe freezing rain conditions (spot salting).			No	Own
(Villages:)					
Brockport	--	--	2:1 sand-salt mixture and plowing on all streets	2:1 sand-salt mixture used always	Own
East Rochester	--	--	Usually salt 15 lane mi. 100%, rest depends on conditions, hills and curves	No	Own

Table 1, continued

Honeoye Falls	--	--	Usually plow first, then salt all village streets 100%(bare pavement)	No	Own
Fairport	100% salting when they are done by Fairport (usually salted by Perinton)	--	Plow, no salt unless there is glare ice	Sand mixture	Salt Institute
Hilton	--	--	Plow if over 1½" snow;use sand:salt mix or later in season use pure sand. Do all streets.	1:1 mixture sand-salt or pure sand	Own
Scottsville	--	--	Sand:salt mixture on all streets, over 1" snow plow first	Sand:salt 1:1 mixture on all village sts.	Own
Spencerport	--	--	All 100% salted; plowed	No	Own
Webster	--	--	Plow and salt; only a few are salted 100%		Own
State DOT	State DOT specifications; see section on salting guidelines	--	--	Yes. If very low temp. State use $CaCl_2$:$NaCl_2$ mix;spot-use of abrasives under unusually slippery circumstances	
NYS Thruway Authority	Salt Institute recommendations	--	--	Use 1:1 or 2:1 sand: salt mix always if under 20°F. Spot treat icy areas with $CaCl_2$	Salt Institute

Salting Guidelines

The State, the County, and the Salt Institute issue guides on when to salt and how much salt to use (1,2). The State specifies that its roads should be salted for their full length (100%), rather than spot-salted at critical portions. The amount of salt recommended depends on the type of road and weather conditions. For example, expressways are to be plowed within one hour after a storm stops, and salted immediately so that their full width is clear 12 hours after the storm. Class B highways (heavily traveled arteries such as U.S. Rte. 15) are to be cleared to their full width within 24 hours after the storm, and class C highways (under 200 vehicles per hour) within 48 hours after a storm. This goal of clear pavement within a certain number of hours following a storm has become familiar as a "bare pavement policy". The policy does not aim at bare pavement during storms. The State advises that plowing should begin when the accumulation of snow reaches ½ inch (for class A roads) and 1 inch for class B and C roads, and that no more than 2-3 inches of snow should ever be present on the roadway.

Over half (12) of Monroe County towns base their salting procedures, at least for State roads, on the state guidelines. In practice some town crews spread over four times as much salt as State crews and both claim to achieve bare pavement.

County salting guidelines authorize a "bare pavement policy" on roads traveled by more than 2500 cars per day, using the state guidelines. Spot-salting is recommended for roads with less traffic. Nine towns follow county guidelines for salting, at least on county roads.

Both county and state officials (1) emphasize that these standards set for salting are simply guidelines -- the decision as to how to implement them is left to the town which contracts to clear the roads.

The Salt Institute (2) recommends that salt be spread at the rate of 500 to 600 pounds per 2-lane mile of road. The frequency of application depends on the temperature and other weather conditions, but should average about four applications per storm. Henrietta, Fairport and the Thruway Authority follow their recommendations.

The City of Rochester and four towns follow their own rules, established by the supervising highway official. Several other towns emphasized that salting policies for town roads are based on their own experience and judgement. All of the villages in Monroe County except Fairport, which follows Salt Institute recommendations, rely on experience and judgement rather than state, county or other official guidelines.

Table 1 summarizes the treatment accorded various classes of roads in each municipality in the County.

Almost all state roads are salted to achieve a bare pavement. Some towns use four times as much salt as others to get the same effect.

Brighton, Greece, Gates and Irondequoit salt the entire length of all county roads. In the other towns the few county roads with heavy traffic flow are salted 100%, but most county roads are only spot salted on curves, hills, railroad crossings, school bus routes and intersections. The methods of treating local roads show the greatest variation of all. Clarkson, Spencerport and Honeoye Falls salt all town or village roads 100%. Most of the other municipalities spot salt at the danger spots and plow the rest of the streets without using any salt.

Alternatives to Simple Salting in Use in the County

The NYS Thruway is treated 75% of the time with a 1:1 or 2:1 mixture of sand and salt. Rock salt (almost pure sodium chloride) is used only when the temperature is above 20°F.(3).

Nine towns, and four villages use sand or sand and salt mixtures on local roads either routinely or in special weather conditions such as extreme cold.

The State spot treats with abrasives when the roads are icy. Calcium chloride is used alone for spot deicing in Brighton and on the Thruway, and in mixture with sodium chloride by the State when temperature is very low.

Plowing Policies

According to Salt Institute publications(2), salting should usually precede plowing. A thin layer of salt at the start of a storm prevents bonding of ice and snow to the pavement, thus increasing the effectiveness of plowing, if sufficient time for melting is allowed. Plowing should begin only after the salt has had time to do its work - if slush is thrown to the side by wheels, the salt is still working; if it is thrown straight back, it is time to plow. The Salt Institute advocates spreading a new layer of salt after plowing; the process to be repeated until the storm is over and the roads are cleared. According to some officials (3) this procedure simply wastes salt if snow is accumulating quickly, because it will be plowed to the side before it has done its job.

Saltfall in Monroe County

Although snowfall in the winter of 1972-73 was comparatively light, a total of about 162,727 tons of deicing salt was spread on Monroe County roads by State, Thruway, town, city and village crews. Use of salt in the county is summarized in Table 2. Figures are approximate, since in many cases salt left over from the year before was used at the start of the season and some salt remained in the pile at the end of the season.

Saltfall on state roads ranged from a low of 10 tons per lane mile in Wheatland to a high of 149.6 tons per lane mile in Irondequoit. This extreme disparity is even found when similar stretches of state road run through several towns (Table 3). Traffic on Ridge Road West is approximately comparable in the City and Greece, yet the segment in Greece receives 3.7 times more salt. Ridge Road in the City is salted by N.Y. State crews. N.Y. Route 47, salted by Irondequoit, receives over 4½ times as much salt as the same route on the west of the City (Outer Loop) which is salted by the State. Saltfall density on Monroe Avenue triples between Pittsford and Perinton although traffic density probably decreases. Differences in local weather patterns and terrain may account for some of this variation, but the magnitude of the difference suggests that many state roads are receiving more salt than they need. Certainly most towns are applying more salt to state roads than the state crews are using to achieve bare pavement.

Clarkson spread only 13.3 tons of salt per lane mile on county roads while Irondequoit spread 140.5 tons. Again, at least eight towns applied more salt to county roads than the state used to achieve its "bare pavement" on state expressways in the county, even though several of them profess to be spot salting county roads.

Local streets (city, town, village) received relatively little salt. Total saltfall for the 1972-73 season varied from a minimum of 3.7 tons per lane mile in Wheatland to 22.0 tons in Penfield. There is no clear relationship between snow and ice control policy for local roads and density of saltfall. Towns and villages which

Table 2. Saltfall

Municipality (Towns:)	Tons NaCl used, 1972-73 season	Was it a higher, lower or average level of salt use than usual?	Approximate # Tons NaCl spread per LANE mile* PER YEAR on: State Rds.	County Rds.	Town Rds.
Brighton	10,211	average	59.4	57.9	8.6
Chili	4,547	lower	--	--	--
Clarkson	2,555	lower	48.8	13.3	5.4
Gates	5,873	average	69	61.8	--
Greece	9,299	lower	125	43.8	5.3
Hamlin	2,200	average	overall average, 14		
Henrietta	9,000	average	overall average, 28.1		
Irondequoit	18,494	low to average	149.6	140.5	21.5
Mendon	3,747	lower	50	18.7	15.5
Ogden	3,130	?	23.7 for State & County		5.2
Parma	1,760.5	average	overall average, 10.4		
Penfield	7,941	?	139.2	63.6	22.0
Perinton	8,499	?	146.9	82.8	8.0
Pittsford Town & Village	9,199	lower	48.4	48.8	11.4
Riga & Churchville	2,278	average	overall	- -	27.5
Rush	1,569	lower	overall	- -	26.2
Sweden	about 2,500	average	92.3	27.3	17.4
Webster	6,820.5	slightly lower	45.5	37.1	6.5
Wheatland	1,239	lower	10	10	3.7
City of Rochester	34,600	?			
(Villages:)					
Brockport	235 T.salt 470 T.sand	?	--	--	7.8
East Rochester	563	low to average	--	--	12.5
Honeoye Falls	145	?	--	--	7.3

* Where 100% coverage of the road by salt is not in effect, the figure "tons/lane mi./yr" is misleading since most salt in such areas goes onto intersections, hills, curves, railroad crossings.

Table 2, continued

Municipality (Villages:)	Tons NaCl used, 1972-73 season	Was it a higher, lower or average level of salt use than usual?	Approximate # Tons NaCl spread per LANE mile* PER YEAR on: State Rds.	County Rds.	Town Rds.
Fairport	1,008	lower	Average for 15 lane miles State Rds. occasionally treated plus village rds. (64 lane mile total), 15.8		
Hilton	82	lower	--	--	4.1
Scottsville	41	lower	--	--	4.1
Spencerport	195	much lower	--	--	8.5
Webster	495	average	--	--	21.1
State DOT	11,500	?	33.6	--	--
NYS Thruway Authority	3,022 T.salt 4-5,000 T.sand (1973-74 data)	?	32.9	--	--

Table 3. Density of saltfall on State roads in Monroe County, 1972-73, salted by different municipalities. This Table makes no effort to evaluate driving hazards of any of these roads.

Road Name	Tons/lane mile in:
Ridge Rd.	City, by State - 33.6; Greece - 125; Irondequoit - 149.6
East Avenue	Brighton - 59.4; Pittsford - 48.4
Clover Street	Mendon - 50; Pittsford - 48.4; Brighton - 59.4
47 West of City	State - 33.6
47 east of City	Brighton - 59.4; Irondequoit - 149.6
Monroe Avenue (& Pittsford-Palmyra Rd.)	Brighton - 59.4; Pittsford - 48.4; Perinton - 146.9
Penfield Rd.	Brighton - 59.4; Penfield - 139.2
Lake Rd.	Sweden - 92.3; Clarkson - 48.8
Mosley Rd. - Fairport	Perinton - 146.9; Penfield - 139.2; Webster - 45.5
9 Mi. Pt. Rd. - Webster Rd.	

routinely use a sand:salt combination on local streets all had saltfall densities below 8.0 tons per lane mile. However some municipalities which claimed 100% salting to local roads (Clarkson, Honeoye Falls) applied less than 8 tons/mile, while many municipalities which spot-salted local streets applied more.

Equipment for Snow and Ice Control

Table 4 summarizes data on salting and plowing equipment owned by each municipality.

1. Equipment for simultaneous salting and plowing

Although all municipalities in the county except for the City, Irondequoit and Brockport have the equipment needed to salt and plow simultaneously, few use it in dual capacity. Plowing and salting are done as two separate operations. Interestingly, Sweden (and other towns) avoid such dual operations because salting "slows down the plowing operation", while Perinton often employs the dual capacity believing that one-truck treatment provides, overall, a faster operation! There does not seem to be a clear relationship between a policy of using dual plow-salt capacities and density of saltfall. For example, Perinton often salts as it plows while Irondequoit uses separate vehicles for the two operations, yet these towns have the highest saltfall for state and county roads of all the municipalities in the county.

The City of Rochester has large salting trucks which could be fitted with plows, but City officials claim that they are too cumbersome. All plowing of local streets is done by private contractors, and City refuse trucks plow arterials. Therefore plowing stops or delays refuse collection. This disruption encourages the effort to salt off all the snow and ice and avoid plowing - a policy which is very wasteful of salt.

2. Salt spreaders

Salt spreaders, often called sanders, are trucks with salt metering devices which control the amount and distance of spread. In all Monroe County municipalities except Chili, the salt metering devices are relatively simple mechanical spreaders. The aperture of the spreader is generally set in the garage to a level which will provide salt coverage of 300-600 lb/2 lane mile (or whatever standard is chosen). As the truck accelerates the salt is spread more thinly; as it decelerates, saltfall becomes denser; when the salter stops, the driver must turn off the spreader or else salt will flow onto the street at its set flow rate. The coverage is uneven since there is no feedback between truck speed and salt flow other than the "on-off" control. The density of saltfall thus depends in large part on the ability and motivation of the driver to maintain a steady speed while carefully turning on and off the spreader. A second major criticism of the mechanical spreaders is that they are very inaccurate, and reflect the set rate only roughly.

3. Epoke spreader

The State uses two "Epoke" spreaders to salt expressway ramps in the county. They were first put into operation last winter (1973-74), and although no systematic evaluation has been made, they seem to have both bad and good characteristics. The Epoke spreader is a mechanical device which is said to give much more accurate metering of salt than conventional spreaders. It can be controlled (on-off) from within the cab. It spreads salt over one lane only, and is driven down the middle of a road so that the salt can work its way to the edges.

4. Electronically controlled saltflow

Chili is the only town in Monroe County which uses a modern spreader with an electronically controlled mechanism that automatically adjusts saltflow to the speed of the truck. Electronically controlled spreaders are advantageous because the driver does not need to give them attention. The driver can still cut off the spreader and run without it when salting is not needed. This type of spreader prevents waste, since salt is spread at a uniform density regardless of truck speed, and cuts off automatically. Electronic spreaders can be attached to existing trucks at a cost of $400-700 per unit (4).

The County is encouraging towns to use electronically metered salt spreaders, by adjusting their reimbursement for clearing state and county roads to the type of equipment used. The higher rate for work done with spreaders with better controls has been offered to offset the cost for installing the modern spreading system.

Financing Salting Operations

Towns that plow State roads are reimbursed by the State through the County Department of Transportation on a time and materials basis with a special allowance for equipment maintenance and use. There is no minimum or maximum budget.

The County reimburses towns for treating County roads. Each town is guaranteed a minimum of $17,780 per year to enable it to maintain equipment and manpower in readiness. In a heavy winter, the town can receive higher reimbursement with the maximum total payment for manpower and equipment totalling $1,000 per two lane mile of county road in the town. In addition, the full cost (State bid price) of the salt is refunded by the county. This reimbursement schedule was introduced in the fall of 1973. Previously, there was no guaranteed minimum and in low snow years some towns had to use local funds to maintain crews in readiness (7).

Financing of local snow removal operations is part of the local highway department budget, and is financed by taxes.

Discussion of Changes to Improve Salt Use Patterns in the County

A. Countywide policy guides for salt usage

1. Deicing salts cause environmental damages to public and private property at great cost to the individual and the taxpayer. It is widely recognized that salting should be kept to a minimum, but Monroe County uses excess salt because of inconsistent and technically deficient practices. Uniform county policies would save salt and reduce environmental effects (5,6).

2. At the present time the actual practice of salting is determined by each highway department. The most powerful influences on the salting policies of each municipality are (a) the highway personnel's commitment to maintaining a normal flow of traffic, and (b) feedback from a public that is worried about traffic accidents and not trained in winter driving techniques. The public tends to equate heavy salting with easy driving while there is no proof that salting increases safetv. If public outcry, whether based on reason or emotion, fact or fiction, becomes loud enough, the highway officials are pressured to respond with more salt. There is, unfortunately, no compensating response to complaints of damage to cars, concrete structures and vegetation, because these damages are only seen long after salting. If Countywide regulations for salt use and snow and ice control were adopted, the legal and psychological burden of justifying policies would be shifted from local highway departments to the County as a whole.

Table 4. Snow and Ice Control Equipment in Monroe County

Municipality (Towns:)	# Salt trucks with plow	# Salt trucks without plow	# Plows (including those on salt trucks)	Av. lifetime (yrs) or age span of truck or plow	Special salt-metering devices	Frequency of use of dual salter-plow equipment capacity	Other snow handling equipment
Brighton	5	3	17	8-10 av.	?	Used together only after a storm is over	none
Chili	6	-	13	0-10 yrs	Material spread rate controller. Electronic control adjusts to speed of truck	Depends on weather conditions. (Plow first, then salt if needed.)	Grader with V plow & wing bulldozer with 13ft. blade; 2 front-end loaders; 1 tractor with snowbucket
Clarkson	1	1	4	2-16 yrs	no	Dual truck used mainly as a salter	Grader; loader
Gates	8	-	15	6-7 av	no	?	Austin Weston grader with snow removal equipment 2 loaders which dig out snowpiles
Greece	5	2	36	1-16 yrs	no	Salt & plow together only in emergency	yes
Hamlin	1	1	7	1-20 yrs	no	Use dual capability infrequently	loader; grader
Henrietta	9	3	9	?	no	Yes. Use together often.	?
Irondequoit	-	10	20	trucks-10 av. plows-rebuilt until worn out	no	They plow & salt at same time but use separate trucks for each function.	Large snow blower that attaches to front of 2½ yd. loader
Mendon	-	3	5	6, av	no	No	Grader with wing; Trojan loader; 2 V-plows
Ogden	3	1	8	2-14 yr. av. depends on type equipment	no	?	Front end loader

Table 4, continued

Parma	3	0, though plows not normally attached to the salters	10	up to 15 yrs or so	No-considering purchase of electronic spreader	Only if all other plows are out do they attach plows to salters	loader; grader
Penfield	14	-	16	?	?	?	Snow blower; loaders; sidewalk plow
Perinton	9	-	16	1-10 yrs	no	Often; much faster operation to have one truck do both	Grader; loader; dozer
Pittsford	6	-	14	trucks 8-10 av. plows as needed	no	Salt trucks have regular snowplow routes	1 grader; 2 rubber-tired loaders; 1 Case tractor; 1 sidewalk snowplow
Riga	3	-	4	2-10 yrs	no	Do not like that procedure so rarely use plow & salt together	Grader; dozer; loader
Rush	2	-	9	2-29 yrs	no	When needed	Loader
Sweden	3	-	5	1-11 yrs	no	Seldom - salting slows the plowing operation; if plowing is needed salt is wasted	No
Webster	9	-	13	8-9 av.	no	Used this way all winter	Grader with wing
Wheatland	2	1	6	7 av.	no	Often; better utilization of equipment	Trojan payloader
(Villages:)							
Brockport	-	1("sander" spreads sand:salt 2:1)	4(3 plows & 1 grader	1-20 yrs	no	none	2 loaders; 4-wheel drive truck
East Rochester	-	1	5	trucks 1-6 yrs plows as needed	no	none	Sidewalk tractor; sidewalk bombadier loader with snow bucket

Table 4, continued

Municipality (Towns:)	# Salt trucks with plow	# Salt trucks without plow	# Plows (including those on salt trucks)	Av. lifetime (yrs) or age span of truck or plow	Special salt-metering devices	Frequency of use of dual salter-plow equipment capacity	Other snow handling equipment
Fairport	2	-	5	trucks 1-7 yr	no	often	2 front-end loaders; 2 sidewalk plows; 1 snow blower attachment
Honeoye Falls	1	-	1	8 yrs (Single vehicle)		Most of the time if under 2" or icy just use salt.	Sidewalk plows; tractor; front-end loader (loads truck)
Hilton	1	-	3	10 yr. av. (now 1-5 yr. old)	no	Plow if over 1½" snow, otherwise just sand: salt	2 sidewalk plows 2 front-end loaders
Scottsville	1	-	1	10	no	Always	Trojan loader; sidewalk plow
Spencerport	1	-	2	6-8 av.	no	?	Sidewalk plows front-end loader
Webster	1	-	2	?	no	often	no
City of Rochester	-	18 (can fit with plow but don't as it is cumbersome. Will have 24 in 74-75)	60 which fit on contract trucks (private) for residential plowing; 90 which fit on City refuse trucks for plowing arterials	?	no	never	6 sidewalk plows (most sidewalks done by private contractors)
N.Y. State	11	2	16	?	no, except 2 Epoke spreaders	depends on conditions	2 rotary plows for loading snow on trucks; 2 grader plows with wing attachment; 2 Epoke spreaders; 10 small dump trucks with plows for doing ramps
Thruway Authority	?	?	?	?	no	Whenever snow is deep enough and not accumulating too fast	--

B. Technical improvements

The following technical suggestions should be considered in devising regulations. They include some use of sand. A major objection to sand voiced in this area is that it clogs sewer systems. This argument should be reevaluated - salt is also bad for sewers. The cost/benefits of salting with its attendant damage should be compared to the cost/benefits of using light sanding or salt-sand mixtures with their attendant problems. All costs as well as all benefits should be included (5, 6). The suggestions also call for accepting a snow-covered road surface wherever safe, instead of bare pavement. It is understood, that this will require both public education and some changes in traffic laws. These suggestions are intended as a starting point for public discussion of a better system of winter road manggement in Monroe County.

3. Roads limited to plowing only: Residential streets should not be salted unless unusually icy conditions prevail, except at dangerous curves, hills and intersections. In all other instances residential streets should simply be plowed well enough to let garbage collection and fire trucks through.

Minor arterial roads, such as some county roads should be treated as residential streets. All straight and level runs away from intersections should be plowed without salting.

4. Use of sand: Sand or a mixture of salt and sand should be used in critical locations of residential streets and minor arterial roads, that is at curves, hills, intersections and icy surfaces. This can be spread by snow plowing trucks, under manual control by the driver. Salt trucks would not have to be used in these areas.

5. Greater use of plowing: Plowing should begin when accumulation of snow or slush reaches a depth of at most 1-2 inches. Since it takes a certain amount of time to carry out a plowing run, this guide would help to assure that snow depth does not exceed 3 inches at any time.

6. Restrictions on salt use: Only high speed expressways and major arterials should receive "bare pavement" salting; and consideration should even be given to using sand or sand-salt mixtures on such roads in place of salt alone. This is now done on the Thruway when temperatures fall below 20°F, and is therefore, obviously a successful alternative. Towns should not spread more salt per lane mile than the State uses on the same highways in the City. This could be controlled by reimbursement practices. A strong action would be a County requirement that no municipality spread more salt than the State if it wants to be reimbursed.

C. Better equipment and handling

7. The County should continue to encourage all towns and villages to replace existing mechanical metering devices with electronically controlled devices which automatically keep saltfall density constant, as soon as the existing equipment wears out and must be replaced. A stronger action would be to require electronically controlled devices for reimbursement.

Each town should, in addition, investigate funding possibilities, such as revenue sharing money, to enable a more rapid transition.

8. The County Department of Public Works should establish a yearly training session for drivers of snow plows and salt trucks, to train them in new methods of spot sanding and salting.

D. Winter traffic rules

9. The County Legislature should consider legislation making it a traffic violation for a car to block a lane of traffic by stalling on a snow emergency route where there is snow, sleet or ice, if the car is not equipped with effective tire chains or snow tires, or if it runs out of fuel. Penalties should include mandatory towing at the driver's expense.

10. A public education campaign is needed. Techniques for driving on snow and ice should be stressed more than they are in the driver education session mandated by the State. A "campaign" by all public service agencies such as the Agricultural Extension Service, the Department of Environmental Conservation and private groups should be started to educate the public on the reasons for decreasing the amount of salt used.

E. Continuing improvement

11. An engineering task force should be appointed by the County Manager to review every year the advances in road-clearing technology. This group should be charged with reducing the use of salt on roads as soon as possible, and its report should be featured every winter in the local papers.

References and Notes

(1) Robert Fitch (County) and Donald Damon(State): personal communication

(2) "Sensible Salting", available from The Salt Institute, 206 N. Washington St., Alexandria, Virginia 22314

(3) Vaughan Goodwin, foreman for Thruway maintenance in Monroe County: personal communication

(4) Names of three companies that manufacture electronically controlled spreaders are:
Fox Equipment Co. Koehring, Farm Div; Appleton, Wisconsin 54911
Automated Servo Controls Inc.; Lindewood, Illinois 61049
Pratt Equipment Co.; 199 Church St., Weston, Mass. 02193
Information from Robert Henderson, Salt Institute

(5) Holmes, Lindsay, "Environmental Effects of Deicing Salts: Introductory Bulletin", RCSI Bulletin #166, December 1973

(6) Holmes, Lindsay, "Salt Storage in Monroe County", RCSI Bulletin #167, Dec. 1973

(7) John Laird, Commissioner of Public Works, Brighton; personal communication

Appendix A

Questionnaire Answered by Highway Officials (used in compiling this Bulletin)
August, 1973

1. According to information provided by Mr. Sutherland of the Monroe County Department of Health, your town used _____tons of deicing salt last winter. This figure is based on the data on the attached sheet. If there is a blank for any month for your town on that sheet, would you please indicate how much salt, if any, was used. Was last winter's salt usage lower, higher or the same as usual?
2. Describe the methods of snow removal you use for state roads, county roads, town roads in your town.

3. Do you ever use calcium chloride, other chemicals, abrasives or a combination of these with sodium chloride?

4. How many LANE miles of a) state roads and b) county roads are there in your town? Do you salt all of these; does the state do some (how many)?

5. How many tons of salt did you spread last winter on the state roads? County roads? Town roads? -of your town?

6. Approximately how many LANE miles of road are salted, but not 100% (not under a bare-pavement policy) in your town?

7. Are any roads left with no treatment at all (salt, plow or abrasives)?

8. Do you follow a particular set of state, county or other guidelines for salting, i.e.: where and how heavily to salt? Whose guidelines are they?

9. Are there any special conditions of temperature, wind etc. that must be present before you salt?

10. How many salt trucks? plows? - does your town have? How old is this equipment? How often do you replace trucks, plows?

11. Can any of your vehicles both salt and plow? How many? Do you use them this way often? Why or why not?

12. Do you have any other types of snow removal equipment?

13. Have you ever tested any type of special salt-metering devices? Which? How well did they work?

14. What funding sources does your town have for purchase of salt, maintenance of stockpiles and snow removal equipment?