CALIBRATING SANDERS 9/16/2009

TOWN OF SOUTH WINDSOR STREET SERVICES DIVISION

SO WHY SHOULD WE CALIBRATE SANDERS?????

Here are of some of the reasons why:

1. The environment such as plants and trees.
2. Drinking water contamination.
3. Silting in of streams and ponds.
4. Less catch basin maintenance.
5. To check actual usage against the calibrations.
6. To assist a substitute driver on a sanding route.
7. Aids driver in severe weather conditions with poor visibility.
8. Less wasting of sand and salt.
9. A problem with the truck or sander can be detected by a change in material usage.
10. **Consistent results from route to route.**
11. Allows sanding different speed limit areas where you will know the correct auger setting for the speed the truck is traveling.
12. Allows you to switch to straight salt or different sand and salt ratios quickly, eliminating the guesswork.
13. Trucks wear equipment ages and things change.
14. The introduction of new products such as ice ban and calcium chloride may dictate more controlled usage.
15. Best management practices
16. Sand may be a thing of the past. This year we are hearing that there isn't much sand around here. We may all be using straight salt in the next few years.

NECESSARY EQUIPMENT FOR CALIBRATING SANDERS

1. Scale (bathroom type will do) to weigh the sand and salt mix you will collect.
2. Piece of plywood or a sign blank to use as a platform or a 5-gallon pale.
3. A 5 by 5 foot tarp to collect the sand you will weigh.
4. A stopwatch used for timing.
5. A paint pen to mark the shaft you will count the revolutions of.
6. A calculator for the simple math required.
7. A steel tire rim for a base under the weighing platform.

You need three people to do the work.

One pay-loader operator to load trucks and assists in the operation.
One truck driver to operate the truck.
One record keeper

THE PROCESS AND HOW TO DO:

We are now going to discuss certain constants that must be adhered to, in order to successfully accomplish this task.

1. The truck you are using must be completely warmed up, both the engine and the hydraulic system. Fifteen minutes is required. Why? Because hydraulic fluid flows different when it gets hot. It thins out and requires less engine speed to the pump for it to flow.
2. You must drive each truck with at least a half load in its sander, in the proper gear selection at 20-mpm to find the engine r.p.m. Speed needed to simulate the 20-mph speed at which we all sand. If you do not lock out the other gears, cycling of the transmission will occur, resulting in a change of engine speed.
3. You must have a half load in the sander while calibrating because it creates drag and weight on the hydraulic system requiring more engine speed to run the pump, which pressurizes the system.
4. You need dry sand. Sand can absorb water resulting in a significant amount of added weight. Weight and speed are determining factors in the process.
5. You must have an open mind to do the work. It can work for you.

We are now going to go to the next the page and review the sample calibration sheet. I will take you step by step through this. Some of the

information you are receiving was obtained from Snow Fighters Handbook prepared by the Salt Institute published in 1999 and the Snow and Ice Guidelines 2001-2002 CT. D.O.T. along with the Town of So. Windsor's practical experience and findings over the last 20 years.

Sample Calibration Sheet

Agency: Town of CT. D.P.W.

Location: Town Garage

Truck No.: 62 Spreader No.: 62 - 6

Date: 1-1-98 By: J.D.

Gate Opening: *A (4)

Control Setting	1 Shaft RPM's (Loaded)	2 Discharge Revolution (Pounds)	3 Discharge Rate (Lbs/Min)	4 10 mph X 6.00	5 20 mph x 3.00	6 25 mph X 2.40	7 30 mph X 2.00	8 35 mph X 1.71	9 40 mph X 1.50
1	*C 2.75	20 *B	*D 55		*E 165				
2	4		80		240				
3	6		120		360				
4	8		160		480				
5	11		220		660				
6	15		300		900				
7	18		360		1080				
8	20		400		1200				
9	23		460		1380				
10	24		500		1500				
11	26		520		1560				

1. Have truck warmed up and at least half full.
2. Find RPM setting on engine which equals 20 mph.

A. 3. Close or open gate three or four inches from auger chain to the bottom of the gate. Circle the gate setting above.

B. 4. Take one shaft revolution of sand and salt mix and weigh it. Record the amount above.

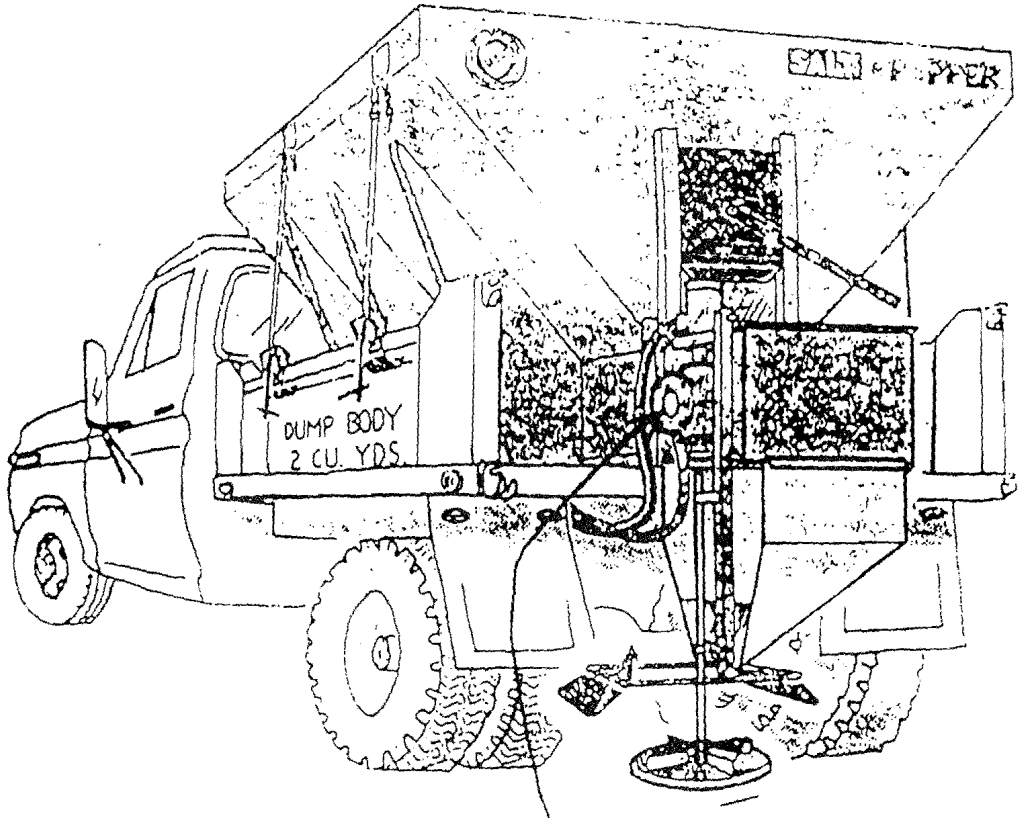
5. Set your engine RPM's to simulate 20 mph sanding operation.

C. 6. Count each shaft revulution for one minute while the truck RPM's are set to repreent 20 mph sanding at each auger setting and record revolutions above. (Note: Must be at least a half full sander.)

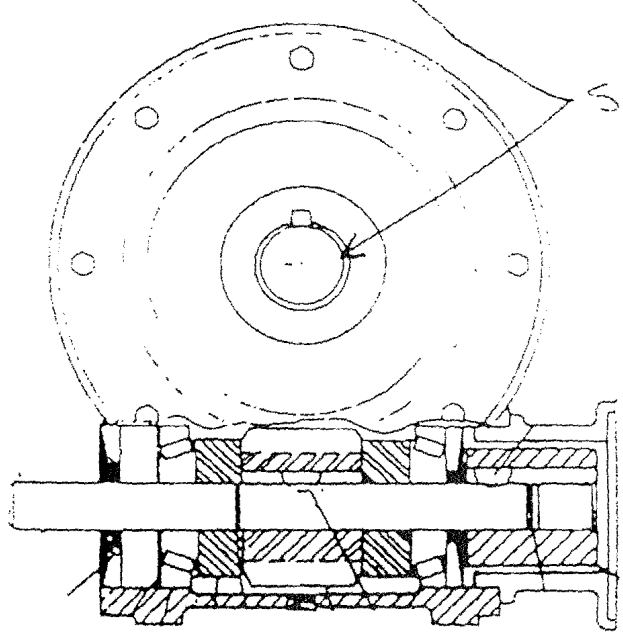
E.

D. 7. Multiply each control setting by the 20 pound factor and record above. Next, multiply by 3 which represents 20 mph. That will give you how many pounds per lane mile of sand and salt mix at each auger setting.

GOAL: The correct amount of pounds of sand and salt mix should be 1,564 pounds per two lane mile of road.



MODEL SP-HY1-B



Close up of the shaft that you Count Revolut... of.

APPLICATION RATES VS STORM CONDITIONS

2004/2005

CONDITION	TEMPERATURE	SALT LBS GUIDE LINE	50/50 RATE	2/1 MIX	7/2 MIX
FREEZING RAIN	NEAR 30	200 LBS	500 LBS	700 LBS	1100 LBS
SLEET	NEAR 30	500 LBS	1100 LBS	1700 LBS	N/A
SNOW	NEAR 30	200 LBS	500 LBS	700 LBS	1100 LBS
PLOW AS NECESSARY, REPEAT 200LB AS NEEDED UNLESS DIRECTED OTHERWISE.					

SNOW	29 FALLING	500 LBS	1100 LBS	1700 LBS	N/A
FREEZING RAIN	29 FALLING	200-400 LBS	600-900 LBS	1300 LBS	1500 LBS
PLOW AS NECESSARY, REPEAT 200 LB AS NEEDED UNLESS OTHERWISE DIRECTED					

APPLICATION RATE LIQUID CALCIUM OR MAGNESIUM CHLORIDE 8 gal. Per Ton.

SNOW	BELOW 20	500 LBS	1100 LBS	700 LBS	1500 LBS
DRY SNOW. DRY PAVEMENT PLOW THEN APPLY 7:2 MIX WHEN NO MELTING IS TAKING PLACE. APPLY 2 : MIX TO WET OR HARD PACK AREAS AT 600-800 LBS SALT PER 2 LANE MILE RATE					

SNOW, SLEET, FRZ. R	BELOW 20	600-800 LBS	1500-1800 LBS	1700 LBS	N/A
PAVEMENT WET AND STICKY. SPREAD THE 2:1 MIX. WAIT 30 MINUTES THEN PLOW. REAPPLY AS NECESSARY OR DIRECTED.					

SNOW OR FREEZING	BELOW 10	500 LBS	1100LBS	1700 LBS	2550LBS
ACCUMULATION OF PACKED SNOW OR ICE. SAND FIRST WITH 7:2 MIX CONTAINING SALT AT THE 500 LBS PER 2 LANE MILE.THEN AS DIRECTED.					

SAMPLE TABLE OF RATES

50/50 Mix 45.38% WT. 1:1 Mix 2380lb/cuyd	SALT PER 2-LANE MILE POUNDS	2:1 Mix 29.35% Wt. 2:1 Mix 2453 lb/cuyd	SALT PER 2-LANE MILE POUNDS	7:2 Mix 19.18% WT 7:2 Mix 2502lb/cuyd	SALT PER 2-LANE MILE POUNDS
2380	1080	2453	720	2502	480
1500	681	1500	440	1500	288
1300	590	1300	382	1300	249
1100	499	1100	323	1100	153
800	363	800	235	800	153
600	272	600	176	600	600
500	500	500	147	500	96

0.4538 0.2935 0 1918

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3.

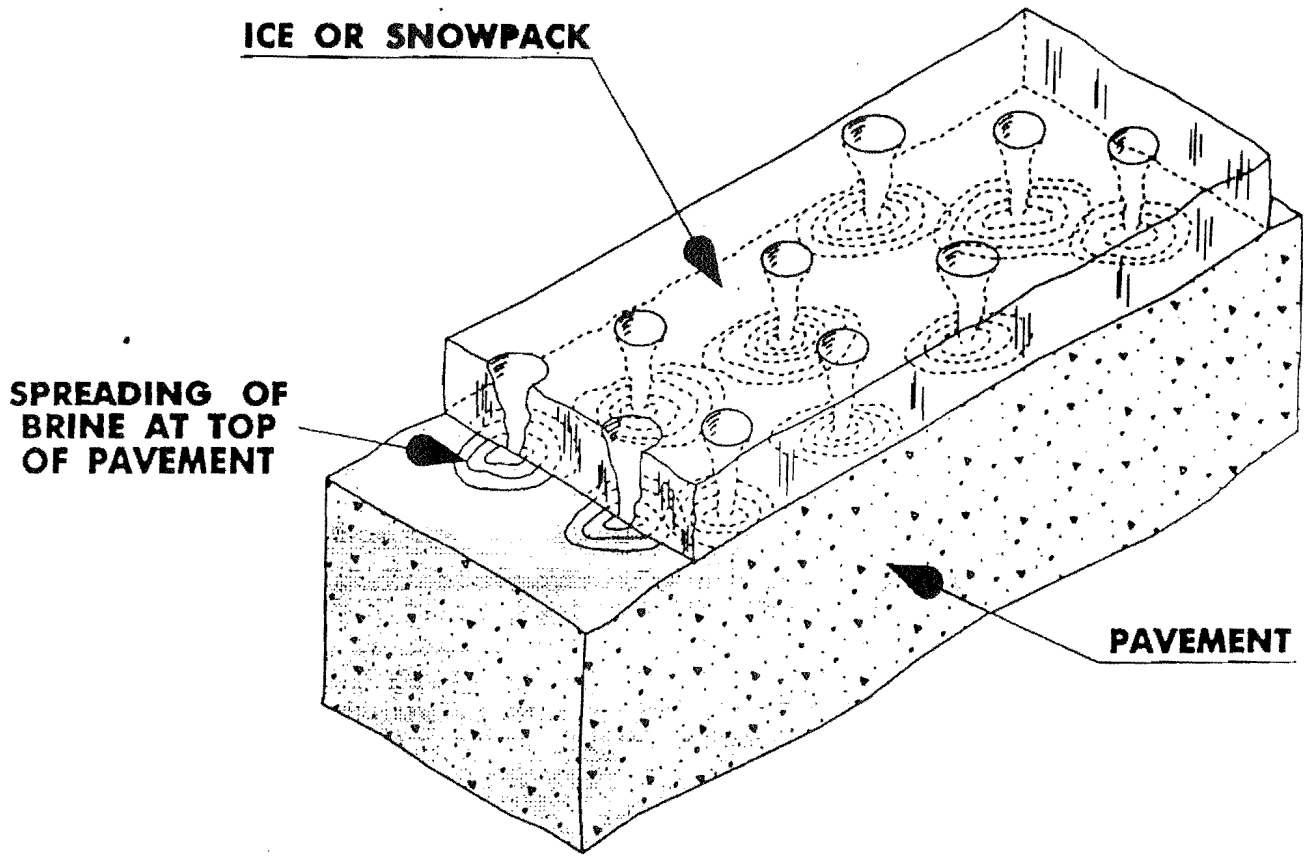

ILLUSTRATION OF AUGERING ACTION OF SALT PARTICLES

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Different materials will spread at differ- t rates at the same setting, so spread- s must be calibrated with the material at will be used.

preader Calibration Procedure

Calibration of spreaders is simply cal- lating the pounds per mile discharged various spreader control settings and ck speeds by first counting the number auger or conveyor shaft revolutions per nute, measuring the salt discharged in e revolution, then multiplying the two d finally multiplying the discharge rate the minutes it takes to travel one mile. With hopper-type spreaders, specific te openings must be calibrated. Mea- re from floor of conveyor to bottom ge of gate

Each spreader must be calibrated indi- lually; even the same models can vary dely at the same setting.

Equipment needed:

1. Scale for weighing.
2. Canvas or bucket/collection device.
3. Chalk, crayon or other marker.
4. Watch with second hand.

Calibration steps:

1. Warm truck's hydraulic oil to normal operating temperature with spreader system running.
2. Put partial load of salt on truck.
3. Mark shaft end of auger or conveyor.
4. Dump salt on auger or conveyor.
5. Rev truck engine to operating RPM (at least 2000 RPM).
6. Count number of shaft revolutions per minute at each spreader control setting, and record.
7. Collect salt for one revolution & weigh, deducting weight of container. (For greater accuracy, collect salt for several revolutions and divide by this number of turns to get the weight for one revolution.) This can be accomplished at idle or very low engine RPM.
8. Multiply shaft RPM (Column A) by discharge per revolution (Column B) to get discharge rate in pounds per minute (Column C), then multiply discharge rate by minutes to travel one mile at various truck speeds to get pounds discharged per mile.*

**For example, at 20 MPH with 30 Shaft RPM and 7 lbs. discharge— 30 x 7 = 210 x 3.00 = 630 lbs. per mile.*

Calibrating Automatic Controls

Automatic controls come with factory calibration cards that indicate the proper rate of spread for each setting. However, when there is a need to calibrate, use the following steps:

1. Remove or turn off spinner.
2. Set auger on given number, such as No. 2.
3. Tie sack or heavy canvas under discharge chute.
4. Mark specific distance, such as 100 or 1,000 feet.
5. Drive that distance with spreader operating.
6. Weigh salt collected in sack or canvas.
7. Multiply weight of salt by 5.2 (in case of 1,000 feet) or 52.8 (in case of 100 feet)

This will be the amount of salt discharged per mile, which remains constant regardless of speed, but calibration must be done for each control setting.

CALIBRATION CHART

Agency: _____

Location: _____

Truck No _____ Spreader No.: _____

Date _____ By: _____

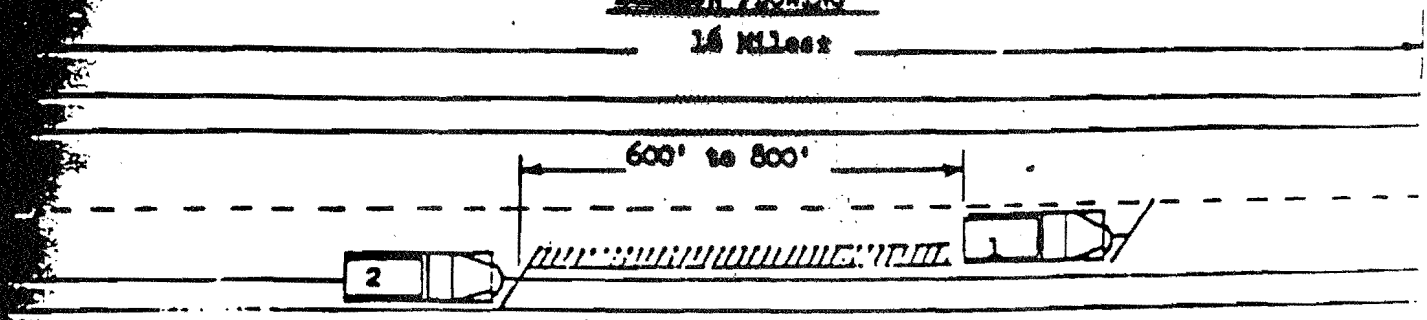
GATE OPENING (HOPPER TYPE SPREADERS				POUNDS DISCHARGED PER MILE								
	A	B	C	MINUTES TO TRAVEL ONE MILE								
ontrol etting	Shaft RPM (Loaded)	Discharge Per Revolution (Pounds)	Discharge Rate (Lbs/Min)	5 mph x 12.00	10 mph x 6.00	15 mph x 4.00	20 mph x 3.00	25 mph x 2.40	30 mph x 2.00	35 mph x 1.71	40 mph x 1.50	45 mph x 1.33
1		This weight remains constant										
2												
3												
4												
5												
6												
7												
8												
9												
10												

Exhibit 4

2 LANE HIGHWAY

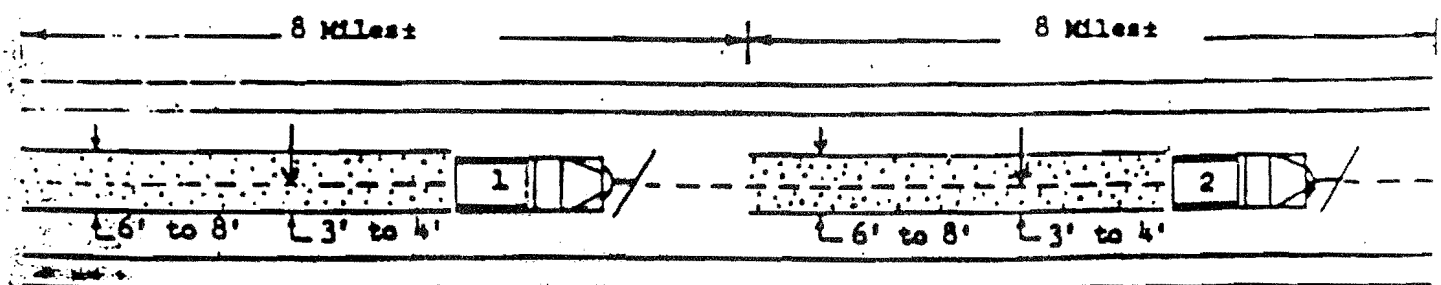
SECTION PLOWING

16 Miles±



SPREADING OPERATION

7 to 2 Mix



5cy. of 7 to 2 sand-salt/8-mile run
or 1264 lbs. sand & 300 lbs. salt/two-lane mile

Same

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