

Zero Velocity Salt Spreader

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Evaluation of Zero Velocity Salt Spreader

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In Cooperation With

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- ⇒ Mr. Don Johnson (FHWA, Indiana Division)

Spread Pattern of Salt on Pavement

- ⇒ Spreading over a wide path, covering parts of two lanes by means of a spinning disk or a roller extending the width of the truck tailgate
- ⇒ Windrowing in a narrow path of 1 to 3 feet through a tube or off a dead spinner

Optimal Salt Application Rate

- ⇒ Level of service required
- ⇒ Weather conditions and their change with time
- ⇒ State and characteristic of salt used
- ⇒ Time of application
- ⇒ Traffic density at time
- ⇒ Topography and type of road surface

Issues Concerning Salt Usage

- ⇒ Proper application rate of salt is a matter of judgment
- ⇒ Public awareness on the effect to soils, vegetation, water supplies, and structural materials
- ⇒ Safe pavement surface and minimum cost to the public and to the environment

Approaches to Minimize Salt Use

- ⇒ Prewetting salt with liquid chemicals
- ⇒ Direct application of liquid chemicals
- ⇒ Spreader attributes
- ⇒ Better management control
- ⇒ Training
- ⇒ Adequate weather forecast
- ⇒ Use of abrasives and snowplowing

Typical Characteristics of Conventional Salt Spreaders

- ⇒ Loss of material. Blown off the road by traffic especially high speed vehicles
- ⇒ Particles bouncing off the pavement
- ⇒ Cast up to 40% of deicing material into an area outside the traffic lanes
- ⇒ Speed differential between truck-traffic
- ⇒ Real performance during the winter is hardly tested

Typical Characteristics of Zero Velocity Salt Spreaders

- ⇒ Electronically operated
- ⇒ Ground oriented granular material spreader
- ⇒ Operator with management programming
- ⇒ Desire spread rate with automatic adjustment
- ⇒ Maintain consistent pound per mile application rate
- ⇒ Reduce truck-traffic speed differential

Relation of Salt Use to Travelling Public

- ⇒ Increased hazard to safe travel
 - Death, injury, and property damage
- ⇒ Additional economic penalty
 - Delay of traffic and increased cost of operation

Evaluation Settings

- ⇒ Spreader types
 - Industrial Hydraulic System
 - Muncie System
 - Pengwyn Zero Velocity
 - Swenson Zero Velocity
 - Tyler Zero Velocity

Evaluation Settings...

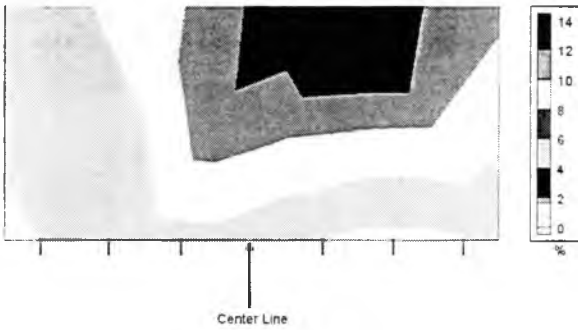
- ⇒ Ground Speed
 - 20 Miles per hour
 - 40 Miles per hour
- ⇒ Size Distribution of Salt
 - Total materials
 - Retained on ASTM #4 Sieve, larger than 4 mm, pea gravel size

Spread Patterns

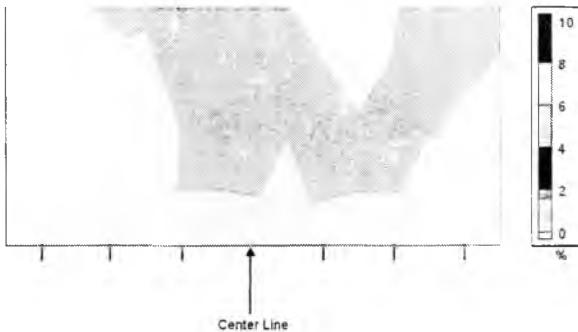
Industrial Hydraulic System



Industrial Hydraulic at 20 MPH, Total Salt



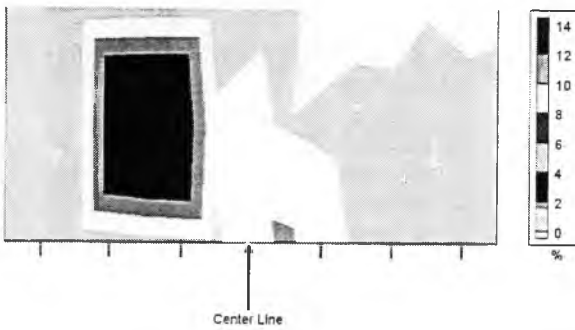
Industrial Hydraulic at 20 MPH, Salt Retained on #4 Sieve



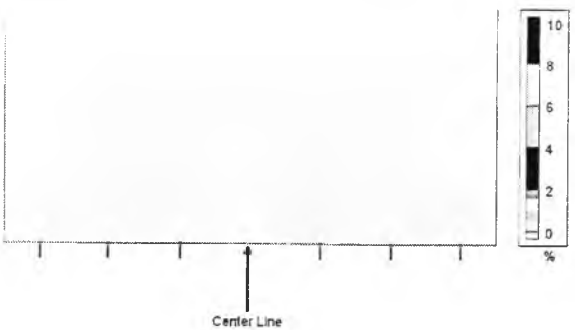
Industrial Hydraulic at 40 MPH

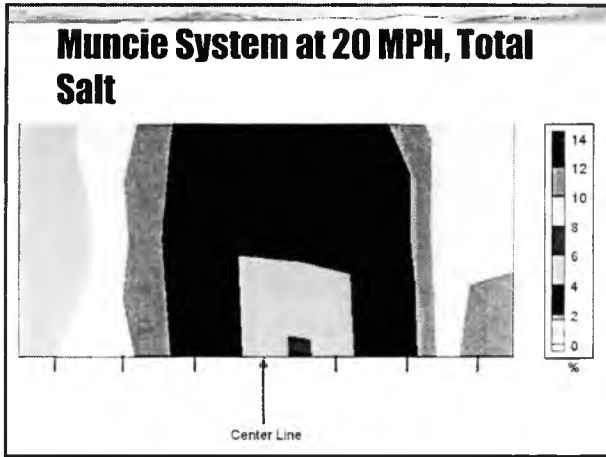


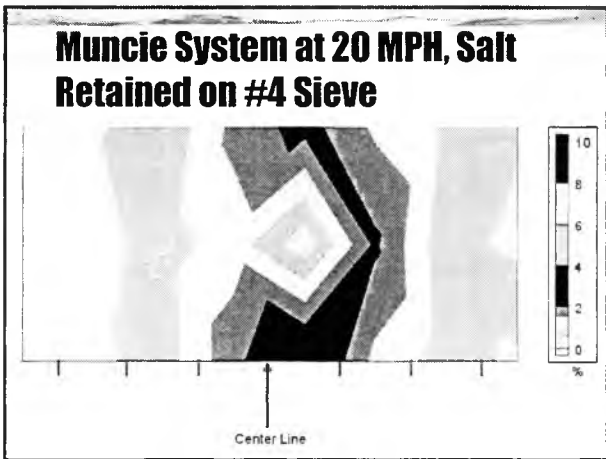
Industrial Hydraulic at 40 MPH, Total Salt

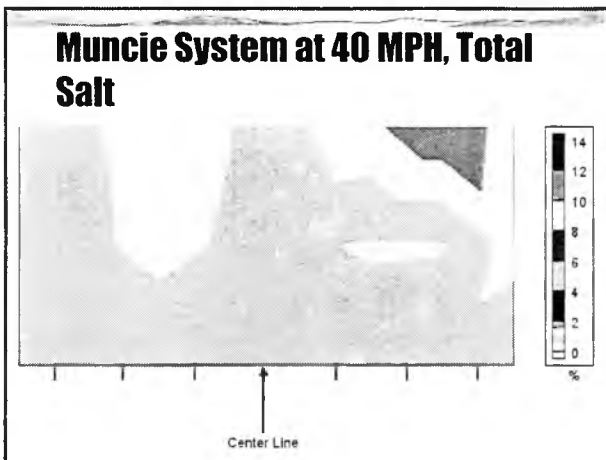


Industrial Hydraulic at 40 MPH, Salt Retained on #4 Sieve

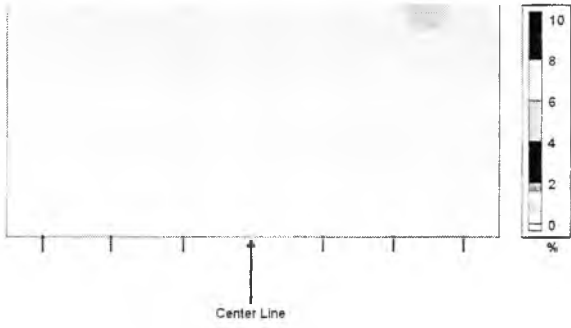








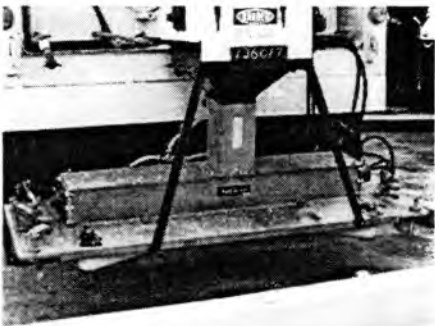
Muncie System at 40 MPH, Salt Retained on #4 Sieve



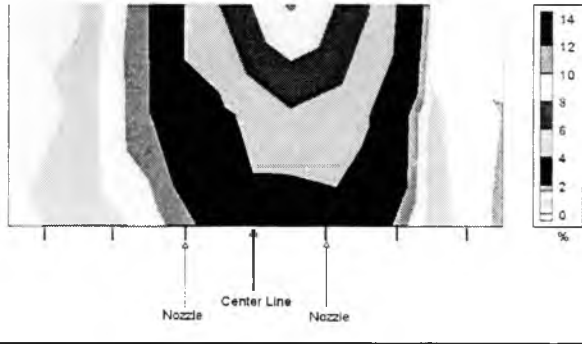
Pengwyn Zero Velocity Spreader



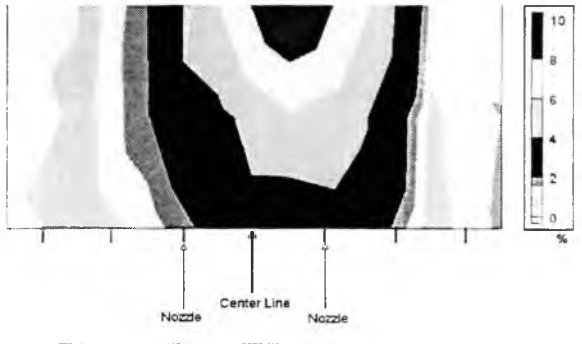
Pengwyn Zero Velocity Spreader



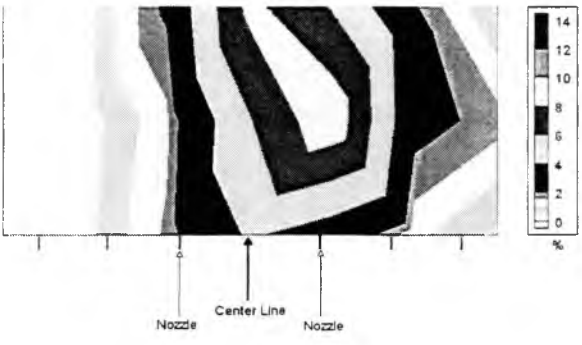
Pengwyn System at 20 MPH, Total Salt



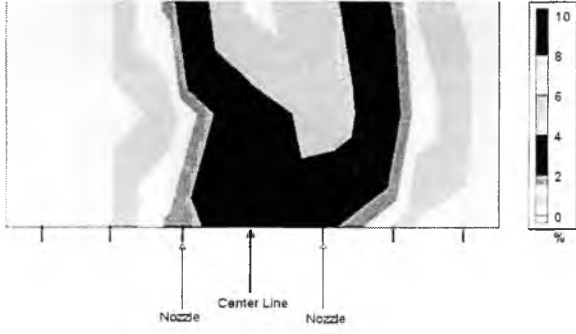
Pengwyn System at 20 MPH, Salt Retained on #4 Sieve



Pengwyn System at 40 MPH, Total Salt



Pengwyn System at 40 MPH, Salt Retained on #4 Sieve



Pengwyn System at 40 MPH



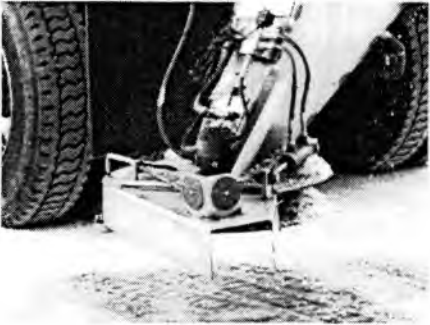
Pengwyn System at 40 MPH



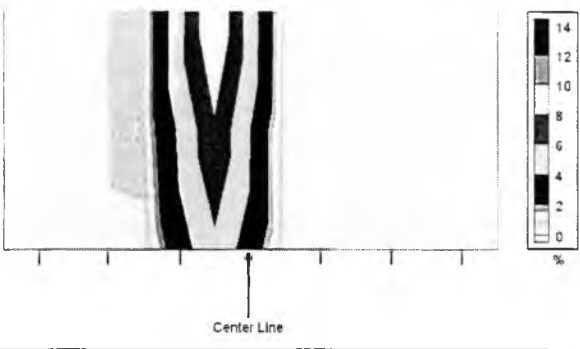
Swenson Zero Velocity Spreader



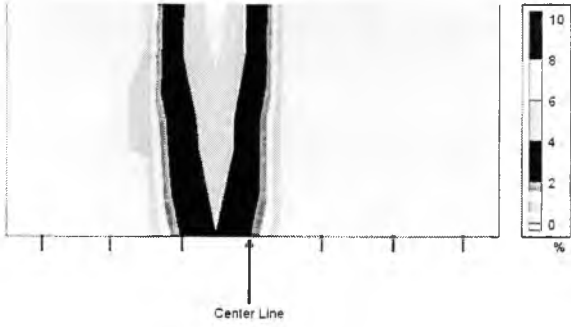
Swenson Zero Velocity Spreader



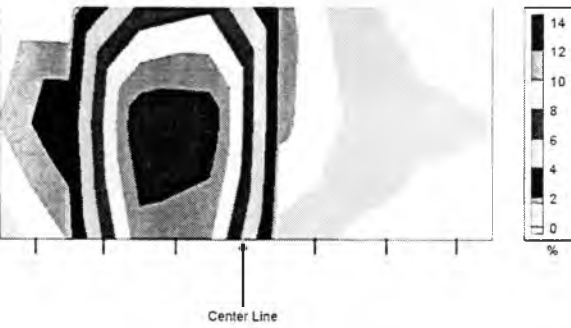
**Swenson System at 20 MPH,
Total Salt**



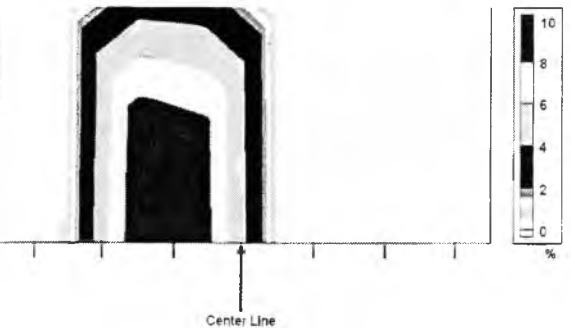
Swenson System at 20 MPH, Salt Retained on #4 Sieve



Swenson System at 40 MPH, Total Salt



Swenson System at 40 MPH, Salt Retained on #4 Sieve



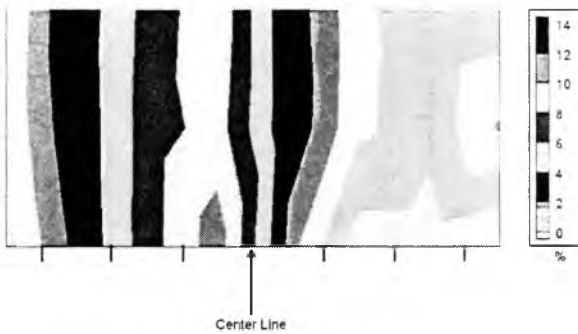
Swenson System at 40 MPH

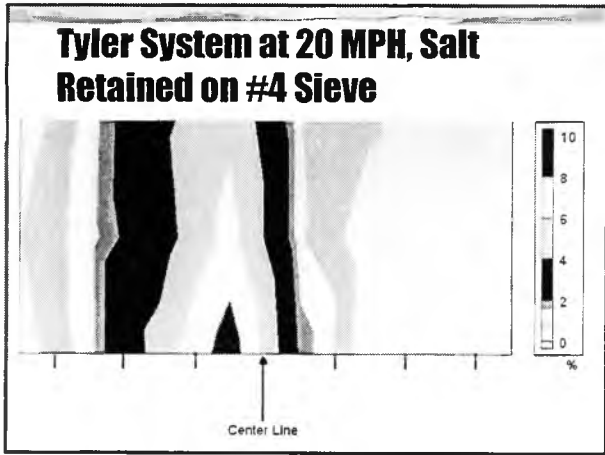


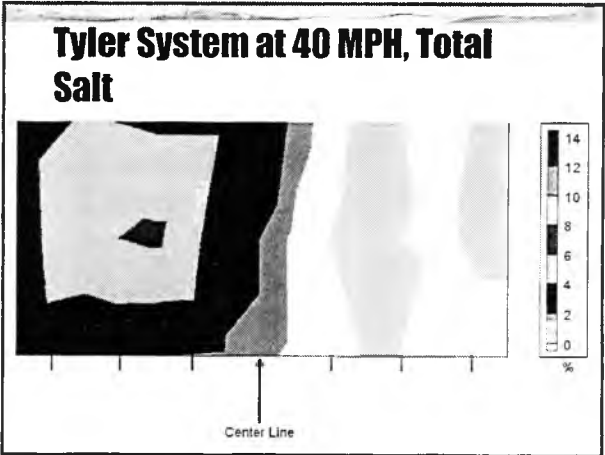
Tyler Zero Velocity Spreader

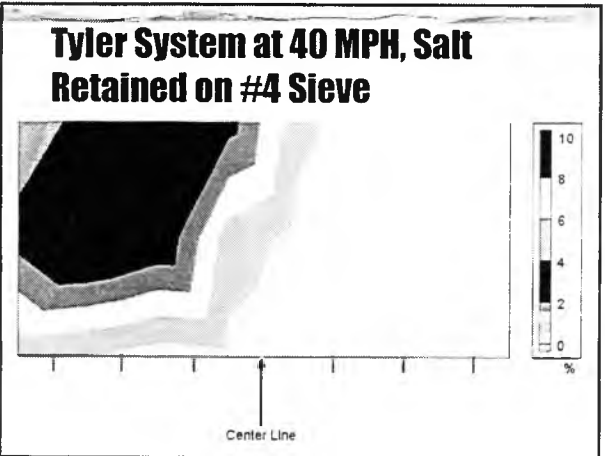


Tyler System at 20 MPH, Total Salt

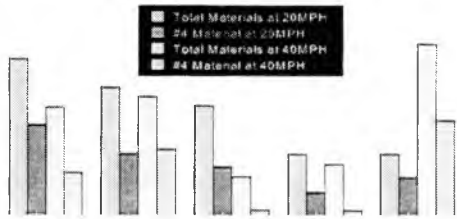








Percent Recovery Rate



Conclusions

- ⇒ Zero Velocity Salt Spreader in general give a better spread pattern and recovery rate compared to the conventional spreaders at 20 MPH
- ⇒ Zero Velocity Salt Spreader give a much better spread pattern and recovery rate compared to the conventional spreaders at 40 MPH

Conclusions

- ⇒ Performance of the Zero Velocity Salt Spreaders depends primarily to the ability of the spreaders to continuously spread the specified amount of salt
- ⇒ "Down time" of the spreaders should be taken into account when selecting a Zero Velocity Spreader
