Means and method for spreading of salt slurry.

The present invention relates to a method for spreading of salt slurry and a device for making such slurry. Salt and water are supplied to the tube 4 from the top by a feeding screw 11 for salt and a tube 9 for water having a spreader disc 10 at its end. Thereafter, salt and water fall down through the tube to a device comprising two rotors 1 and 2. The rotors are driven by a motor 5, suitably a hydraulic motor, and rotate at high speed which means that the salt particles hit the rotors and are broken thereby.
The present invention relates to a method for spreading of salt slurry and a device for making such slurry. Salt in various conditions is spread on the road lanes in order to dissolve ice and prevent skidding. The salt can be in the form of solid or a more or less coarse-grained powder or dissolved or slurred in water. Saturated solutions of salt are only used on special occasions and use of dry salt or salt in slurries is more common. Salt slurries are generally more efficient than dry salt as it penetrates the surface faster and not like dry salt i.e. may be blown away from the road.

Salt slurries primarily means salt substantially comprising sodium chloride and/or other substances which are included in the designation road salt and which are mixed with an amount of water which is less than what is required to make all of the salt become dissolved.

The various means and methods for spreading of salts set various requirements on the equipment used. As a rule, different equipments must be used for the different ways of spreading, which brings with it large investments. There are also difficulties, especially by preparing and using salt slurries, which appear as formation of lumps, blocking and adhesion into and onto the equipment.

The present invention relates to a new method for spreading of salt slurry. The invention also concerns a device for use by the method for producing such slurry whereby it is produced in immediate connection with the spreading.

The invention will below be described more in detail with reference to the enclosed figures.

Figure 1 shows a complete equipment for producing and spreading of salt slurry using the method and device according to the invention.

Figure 2 shows part of the device of figure 1 more in detail.

Figures 3 and 4 show the device of the invention from the side and from above.

Figures 5 and 6 show another embodiment of the invention from the side and from above.

The device shown in figure 1 comprises a container 12 for salt and a tank 13 for water or solution of salt. Water and salt is delivered to a device enclosed in a tube 4, wherein the slurry is produced. The tube 4 is essentially vertical which in practice means that it deviates not more than 25° from a vertical line as by greater deviations there are problems with the conveyance of material through the tube. Thereupon the slurry falls down onto a spreader disc 15 from which it is spread over the road. The complete device when used is intended to be placed on a suitable transportation vehicle.

In the figures 3 and 5 half of the tube 4 has been removed to show the arrangements inside the tube.

Salt and water are supplied to the tube 4 from the top by a feeding screw 11 for salt and a tube 9 for water having a spreader disc 10 at its end. Thereafter, salt and water fall down through the tube to a device comprising two rotors made as fans 1 and 2. What is here named fans is a device which has several blades or wings 1 a-d, 2 a-d mounted to a shaft 2. The blades extend from the shaft all the way outwards close to the inside of the tube. The denomination fan aims at the appearance of the device. However, the rotating fan shall not cause a flow of air in the direction of the shaft 2. The fans are driven by a motor 5, suitably a hydraulic motor, and are directed opposite each other, i.e. so arranged that the flow of air which results from the rotation is nil or very small.

In the embodiment of the invention as shown in the figure, the fans are mounted onto a common shaft 2. The blades of the fans are immovably mounted to the shaft and thus always rotate at the same speed and at the same direction. The blades of the fans comprise flat surfaces which are somewhat oblique relative to the shaft and arranged so that the upper fan 1 alone would cause a flow of air directed in opposite direction to the flow of air from the lower fan 2. The fans rotate at high speed which means that the salt particles hit the blades of the fans and are broken thereby. The speed of rotation is based upon a desire to obtain a specific maximum particle size. It has also been found that the water shall be supplied before the fans and pass through them together with the salt as problems will otherwise occur with particles of salt that adhere to and form lumps on the blades of the fans.

From the fans the so obtained slurry falls via a funnel or duct 6 onto a conventional spreader including a spreader disc 15 with several blades 7. The spreader disc is mounted onto a shaft 8 which is driven by a motor that can be controlled to the desired rotational speed.

The fan device can be made in many different ways. The device as shown in figures 3 and 4 has two sets of fan blades 1, 2 on a common shaft. The blades of the fans may also be mounted onto two different concentric shafts which rotate in opposite directions where all of the blades are angled in the same direction. Other possibilities are e.g. to have only one set of fan blades which can be flat with discs parallel to the shaft or having V-shape with the point of the V backwards in direction of rotation. It is essential that there is no or very little vertical air flow generated by the fan.

The speed of the rotors varies depending upon the other design features. However, there is a certain lowest speed at the outer ends of the blades close to the tube walls which is required and at a tube diameter of 200 mm the speed of rotation.
shall be not less than 1500 rpm, preferably about 2000 rpm.

Another embodiment of the invention is shown in figures 5 and 6, wherein the blades of the fans have been substituted for by chain links 15, 16, 17, 18. In many cases this design further reduces the formation of lumps and adhering layers on the rotors. Nor do the chain links cause a vertical flow of air.

Claims

1. Method for spreading of salt slurry, characterized in that salt particles and liquid are continuously supplied from above into an essentially vertical tube (4), wherein is arranged one or more rotors which rotate at a high speed so that the salt particles are broken by the rotors.

2. Method according to claim 1, characterized therein, that the resulting flow of air from the rotors in the longitudinal direction of the tube (4) is nil or very small.

3. Method according to any of the preceding claims, characterized therein, that the amount of salt supplied is greater than the amount which corresponds to the solubility of the salt in the liquid supplied at the same time.

4. Method according to any of the preceding claims, characterized therein, that the liquid is water.

5. Method according to any of the preceding claims, characterized therein, that the liquid is a solution of salt in water.

6. Device for producing a slurry of salt in the water, characterized in that it comprises a vertical tube, into which there are one or more rotors along a vertical shaft, each rotor having several blades (1 a-d, 2 a-d), which upon rotation generate nil or very small flow of air in the longitudinal direction of the tube and arrangements to separately supply from above salt particles and water.

7. Device according to claim 6, characterized therein, that the rotors are fan blades.

8. Device according to claim 7, characterized therein, that it comprises at least two oppositely directed fans.

9. Device according to claim 8, characterized therein, that the fan blades (1 a-d, 2 a-d) are permanently mounted onto the same shaft (3).

10. Device according to any of claims 7 - 9, characterized therein, that the fan blades (1 a-d, 2 a-d) are made as flat sheets.

11. Device according to claim 10, characterized therein, that the blades of the fans are oblique relative to the shaft.

12. Device according to any of claims 6 - 11, characterized therein, that it comprises two identical oppositely directed fans so that the resulting flow of air is nil or very small.

13. Device according to claim 6, characterized therein, that the rotors are chains or individual chain links.
**DOCUMENTS CONSIDERED TO BE RELEVANT**

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**TECHNICAL FIELDS SEARCHED (Int. Cl.)**

| E01H     | E01C       |

The present search report has been drawn up for all claims.

Place of search: STOCKHOLM  
Date of completion of the search: 27 June 1995  
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