

TAKE CARE OF THE SAND



Being able to recycle the sand from the sand bedding that falls in the aisle saves resources and work in manure management. It can also contribute to reusing all the sand in the future.

Text & foto: Ann Christin Olsson

SAND WASHING, SAND SEPARATION or sand recycling are some of the different terms used to describe the process where manure-mixed sand is returned to the barn. In Sweden, technology is still in its infancy, but now it starting to move here as well. Dairy entrepreneur Anders Birgersson at Gammalstorp's Farm in Vikingstad is the first Dairy farmer in Sweden with sand washing. The plant was bought three years ago by the Dutch dealer Mavasol, with technology from the company Daritech in the USA. The model is called **Sand Cannon**.

- Sand separation is not completely uncomplicated, states Anders Birgersson. It's not just about picking up the phone and then you recycle 90 percent.

The manure from the scraper passages first goes to the sand separator, which catches the coarser sand. Thereafter, fine sand is allowed to settle to the bottom of a shallow basin, which is not currently reused. Manure and liquid go on to a fiber separator, DT 360, where the liquid can be recycled and used in the first step.

THE ART IS TO tune the system together so that there is a reasonable flow through the system. The fiber press should run every day so that a fresh liquid fraction is obtained at all times until the sand is washed. One problem has been that washing water from the pit goes out into the pump well, which causes the sand to start separating already there. It would have been better to add the washing water first at the sand separator.

- We will put a screw in the pump well to make it easier to lift out the sand, says Anders Birgersson.

He has had sand in the lying stalls for eight years and believes that it is an advantage to first learn to handle it before proceeding with sand separation. Right now, about 70 percent of the sand is recycled. They have refined the routines by, among other things, installing flow

meters. It is also more careful to order the correct grain fraction, of 0.5 to 1.0 millimeters. Too fine-grained sand is more difficult to separate.

- Once we have achieved that, we can certainly extract 90-95 percent. We are constantly learning more about control, says Anders Birgersson.

WITH CURRENT recovery rates, he does not describe the economy as so brilliant. Sand is cheap to buy, while laundry is an investment of four million Kronor. Approximately 1.5 hours are added daily to handle the sand separation. Almost 2,600 tonnes less sand is purchased now, which gives an annual saving of approximately SEK 340,000.

Before reuse, the sand is stored in piles for a couple of weeks. Water drains off and the bacterial level goes down. When the cows' stalls are sprinkled, a mixture of old and new sand is used. The manure fiber is used as fiber litter for the heifers.

A year ago, the news came that a municipality in Halland forbids a farm to use sand. That decision was appealed but is upheld in the Land and Environmental Court of Appeal on the grounds that it is a finite resource.

- I hope that there will be no cross stop, says Anders Birgersson. There is a job for the industry to do to make decision makers understand that sand is good for cows. Maybe sand washing can reduce the risk of a ban. Today there are 1,000 cows on Gammaltorp's farm. If he were to build for cows again, Anders Birgersson would continue with sand stalls, as it provides good cooking comfort and animal health. Among other things, the mastitis frequency is down to two percent, one tenth of what it was before.

AT THE COMPANY Mavasol, there are two different sand separators in the range. Sand Cannon, which Gammaltorps gård has, and the One Shot. Both are based on the same principle, herd size and conditions on the farm determine which one fits best. The facility is controlled automatically and support can log in from the Netherlands.

- When you have trimmed the system together with the type of sand, technology, flow and layout of the facility, you get up to 90 percent recycled sand, says Klaas de Vries at Mavasol.

IT IS ORIGINALLY mining technology developed for sand separation in cowsheds.

There are not that many facilities in Europe yet. Mavasol combines personal advising with the American products.

From the stable, the manure is scraped into a tank where liquid is added and the coarser sand is allowed to settle. The organic material flows and flows over one edge to another tank. The manure layer can go to a fiber press, and the liquid can then be reused to add the liquid manure and make the sand fall out. At the bottom of the tank is a screw that carries the sand to the separator. The manure water is pumped to a hydrocyclone where the finer sand can be recycled. The recycled sand is fed with a screw to the separator which is a rotating drum where liquid is pumped in to wash the sand in another step.

THE SYSTEM IS BASED on extracting the sand using the law of gravity and then washing it, a technology that will make it possible to recycle fine-grained sand down to 125 micrometers. The plant can run completely automatically and can separate 1 ton of sand per hour, which corresponds to the sand from 50 cows.

The water may come from the pit or be collected surface water. First, the manure goes through a screw pump where straw and stones and more are crushed. Then manure is mixed with water and the mix goes into a cyclone where the sand is separated from the manure.

Husdjur.

The sand then passes through a dewatering station before being discharged to a layer via belts.

ALTHOUGH the technology for sand washing is new in Sweden, it is already in use in many other countries.

- Sand in the lying stalls is widespread in the USA and there it is also becoming common to recycle the sand, says Rebecka Asplund, construction consultant at Växa Sverige.

Environmentally, sand is not in question either in the USA or in Denmark, where sandboxes are also common. But in the US, some sand from oil extraction from shale is used and it is questionable. As described, sand recycling is not really so much about washing, but more about separation. - It is clear that the sand becomes coarser when it has been washed a few times when the finest sand disappears, says Rebecka Asplund.

A FARM IN THE USA Rebecka has visited had as a strategy that the high-milking cows got new, finer sand in their stalls, while the low-milking cows got recycled, coarser sand. Based on what Rebecka has calculated, she estimates that it takes about 500 cows to get finance in the technology.

THEME MACHINE & TECHNIQUE

FACTS

Plus and minus with sand washing

Lower cost of buying sand.

Reduced cost of spreading the sand with manure.

Reduced need to dig out sand from the manure pit.

Possible to be able to use the manure in a biogas plant.

With lower sand consumption, the risk of a general ban on using sand decreases.

Requires 1.0 grinding to trim the system and reach a high recycling rate.

High return on investment in sand separation.