

# Slurry Separators - Rotoscreen Slurry Separator

## ***Self sufficiency for cows from slurry***

Grassland treated with separated liquid from slurry yielded 0.5 to 1 tonne dry matter/ha more than swards given the same quantity of nitrogen as commercial fertilizer, according to the results from a three year field trial at Harper Adams. The amount of nitrogen in dung and urine produced by a cow over a six month winter is technically enough on its own to act as fertilizer for the entire winter forage requirements, the work suggests.

Project researcher Paul Lewis says the results show that the liquid fraction of separated slurry can offer very real benefits to dairy farmers. Quantity applied being the key factor, but timing of applications also has subtle influences on overall efficiency. "Slurry was spread three times a year in varying combinations from the months of January, April, July, and October initially to research the feasibility of using the separated fraction as the sole source of fertility for cut swards of perennial ryegrass. We found that the slurry provided ample nitrogen for good grass growth and could be relied upon to produce good swards year after year. There were no differences in the long term effect of slurry use on yields compared to the use of compound fertilizer".

Timing of applications had a real effect with best results in terms of yield recovery of nitrogen – in the form of protein – gained when two of the three applications were made in January and April. Poorest results occurred when two of the three dressings were given in July and October. Although timing was clearly important when applying liquid slurry three times a year, it was the quantity of nitrogen applied which had the most significant effects on the nitrogen content of the herbage

The response to the nitrogen contained in slurry equalled that due to nitrogen in mineral fertilizer. This was about 20kg dry matter per kg of N between 0 and 300kg N/ha/year and about 5kg dry matter per kg N between 300 and 600kg N/ha/year, Paul Lewis continues. We used the fertilizer control plots as a yardstick to see exactly how efficient the slurry really was in providing necessary nutrients. The overall extra yield from slurry treated plots was surprisingly, between 0.5 and 1.0 tonne dry matter/ha/year above that from plots given the same quantity of available nitrogen as fertilizer.

Extending the figures into a practical situation makes encouraging reading. A dairy cow produces about 50kg N in dung and urine in a six month winter. Using data from the trial, at a year round rate of 2.5 cows/ha, this quantity of N could be used as the sole fertilizer on 0.16ha (0.42acres) to produce 1.6tonnes dry matter (eight tonnes silage at 20% dry matter). This would provide the great bulk of the cow's winter requirements.

"What this really means is that as long as dietary supplementation is provided to complement the cut grass, a dairy cow should be self-sufficient when it comes to producing fertilizer for the forage it requires", commented Paul Lewis. Crop and Environmental Research Centre, Harper Adams. 21 January 1993. Paul Lewis.

## ***Animal Slurry! Disposable waste or farm resource?***

When considering a system for storing and handling animal slurry, there are important issues to be addressed before concluding which is the most effective and economical solution, be it for an alteration or extension to an existing farm buildings layout or a new green field site project.

- The Code of Good Agricultural Practice.
- Public Health and proximity to Urban Areas.
- Nitrate Vulnerable Zones and potential area extensions.
- Local, National and EEC Legislation and Regulation.

In its raw state, the characteristics of animal slurry make it difficult to manage, both in the farmyard and in the field.

- The formation of crusts and sludge in storage tanks and lagoons.
- The cost of time, fuel, labour and inherent dangers in mixing slurry prior to spreading.
- Slurry contamination to grazing and cutting grassland reducing productivity potential.
- Machinery damage to land through spreading in wet conditions.
- Pollution risk to waterways through “run-off”, with potential prosecution and £ 20,000 fine.

Awarded the Silver Medal and Leyland Cup at the R.U.A.S. Balmoral Show 2003 “Technical Innovation Competition”, The Carrier Rotoscreen Slurry Separator System brings environmental control and economic utilisation to the management of the farm business, resolving the listed problems associated with whole animal slurry. The principle is simple, practical and effective. By pumping the animal slurry between a set of compression rollers and a rotating perforated cylinder drum screen (grandmother’s clothes mangle principle), the Rotoscreen unit separates the whole slurry into two constituent fractions, a separated liquid and a solids fibre material, providing more flexible management control and better utilisation of a farm natural resource.

- Representing 75 – 85 % of the volume total, separated liquid can be applied to grazing and cutting grassland as well as cereals and other arable crops throughout the growing season.
- Nutrient content of the separated liquid is fully utilised by the uptake of the crop at the various stages of growth.
- Livestock will graze herbage within days of application due to the rapid penetration of the separated liquid into the soil surface, giving a quicker crop growth response.
- Representing 15 – 25 % of the volume total, the solids fibre can be stacked outside, proving extra liquid storage in the existing tank or lagoon.
- Removal of the solids fibre eliminates the problems of crusting and sludge build up in tanks and lagoons along with the associated mixing costs.
- With a high worm population, the solids fibre is an excellent soil conditioner, improving fertility on a year by year basis.

As an added value product, the solids fibre can be composted for garden, sports turf, landscape, and amenity park applications.

The Carrier Rotoscreen Slurry Separator System enables a new approach and concept of management to be implemented. The important transition from spreading farm slurry in the winter months, with its listed limitations and higher pollution risk, to a system that brings more flexibility, environmental control and better economic utilisation of a natural farm resource in the form of separated liquid and solids fibre as fertilisers, represent a major change in policy and purpose. The capability to spread with appropriate timing and rate of application for a particular crop throughout the growing season when land and weather conditions are more favourable, make a strong case for this sound and sustainable system.

There are over 500 Carrier Rotoscreen Slurry Separator Systems on farms throughout Great Britain and Europe which illustrates the fact that the manufacturer, Carrier Pollution Control Ltd based at Braintree in Essex, are the market leaders in effluent and slurry treatment technology. Proven reliability due to sound engineering and quality of manufacture are the hallmarks of this successful company and their systems.

The agricultural industry is experiencing constant economic pressure and competition, throughout the food chain, and as the primary producer with a farm business, any system that reduces input costs through improved management and use of a major farm resource, merits serious consideration and appraisal. While the Carrier Rotoscreen Slurry Separator System may not suit the layout on some farms, there are certainly many farms with substantial livestock enterprises who could take advantage of this tried and tested technology. It could also be considered by a group of farmers sharing a mobile unit or a larger centralised project.

As more legislation and control over the storage and handling of farm slurry is introduced by other countries including the EEC, it is evident that in time, spreading of farm slurry,

particularly in the winter months, will be restricted or possibly completely banned. In anticipation of such action, the present maybe an appropriate time to decide on your own plan of action for the future.

For more information on Carier Systems, please contact us for assistance.

## ***The most common questions asked about the Carier Rotascreen Slurry Separator***

Q What is the capacity of the machine?

A On cow slurry, 15 cubic meters per hour can be expected. More liquid slurries such as pig, will increase up to 60 cubic metres per hour. Drymatter percentage of slurry determines throughput.

Q Do we need to mix?

A No, it is not necessary to mix slurry before pumping to the Carier separator as the overflow unit with return pipe to the reception tank creates a natural circulation and mixing process.

Q Do we need to dilute the slurry?

A No need to dilute or add water. Whatever the pump can lift, the Carier machine will separate.

Q What about bedding?

A The separator will handle sawdust, shavings, straw bedding as long as a chopper pump is used.

Q If solids are stored outside, will they turn back to slurry?

A No, solids do not reconstitute.

Q Does slurry need to be fresh to be separated?

A Most separators will handle fresh slurry but not more than say 3 months old as their fixed screens will become blocked. Because the surfaces of both the compression rollers and the perforated are rotating and pressing together, this design principle allows the Carier to handle slurry of all ages.

Q How dry are the solids?

A Separated solids from cattle slurry are in the range 22 – 25% dry matter. Separated solids from pig slurry will be up to 30% dry matter. When squeezed in the hand, only a few drops of liquid will appear. Solids stack well outside and are readily composted

Q What quantity of solids is produced?

A Slurry from 100 cows produces about 1.3 cubic metres of fresh solids per day. This is fluffy when fresh, but sinks to about 40% of its initial volume after 3 months storage.

Q Is the fertiliser nutrient content in the liquid or solid?

A Usually more nitrogen in the separated liquid and conversely more potash and phosphate in the solids. Because differing feeds will alter the N,P,K composition of both liquid and solids, best to have analysis done to match nutritional requirements of a particular crop.

Q What are the proportions of separated solids and separated liquid?

A Cattle slurry 20-30% solids, 70-75% liquid Pig slurry 10-20% solids, 80-90% liquid

Q Do separated liquids smell?

A As the liquid does not stick to the crop and enters the ground surface more readily than raw slurry, the smell is considerably reduced because the rotting solid matter that creates the smell has been removed.

Q Do liquids need agitation in store?

A As there is no solids fibre in the liquid to form a crust, no mixing or agitation is necessary.

Q How long has the separator machine been in existence?

A Invented in 1972, and apart from a few early minor changes, the same principle of design has been used for over 30 years now, making the Carrier Rotascreen Separator the most successful and most used, with more than 1000 machines in operation.

Q What size and type of pump do we use?

A A chopper type pump that can both pump and mix at the same time, either tractor driven PTO or an 11Kw 3phase electric motor

Q Can the system be automated?

A Yes. A full electrical system can be supplied with an automated stop / start float switch system controlled from an electrical panel and timer, to take advantage of low cost economy seven tariff.

Q Do we need to adjust the machine to work in differing slurry types?

A No. Once the initial settings are completed during installation, the machine will cope with wide variations in slurry consistency

Q What routine maintenance is required?

A The eight bearings that carry the compression roller shafts on each side of the separator machine require periodic greasing. Regular washdown of the machine would be a good practice.

Q At what height should the machine be installed?

A Usually mounted on a platform, gantry with access ladder, the machine is located high enough to allow separated liquid to flow by gravity into an above ground tank or surface lagoon. This also permits the solids fibre to be collected in a trailer or form a stack of material.

Q Why a Carrier Rotascreen separator?

A Fabricated in stainless steel for long life, the reputation for reliability, high output and low operating cost, coupled with the ability to handle slurries of all consistencies and ages and a proven record over 30 years with a 1000 machines operating on the same and original design principle, clearly makes the Carrier separator the market leader in this specialised technology.

## **Linton Solutions**

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