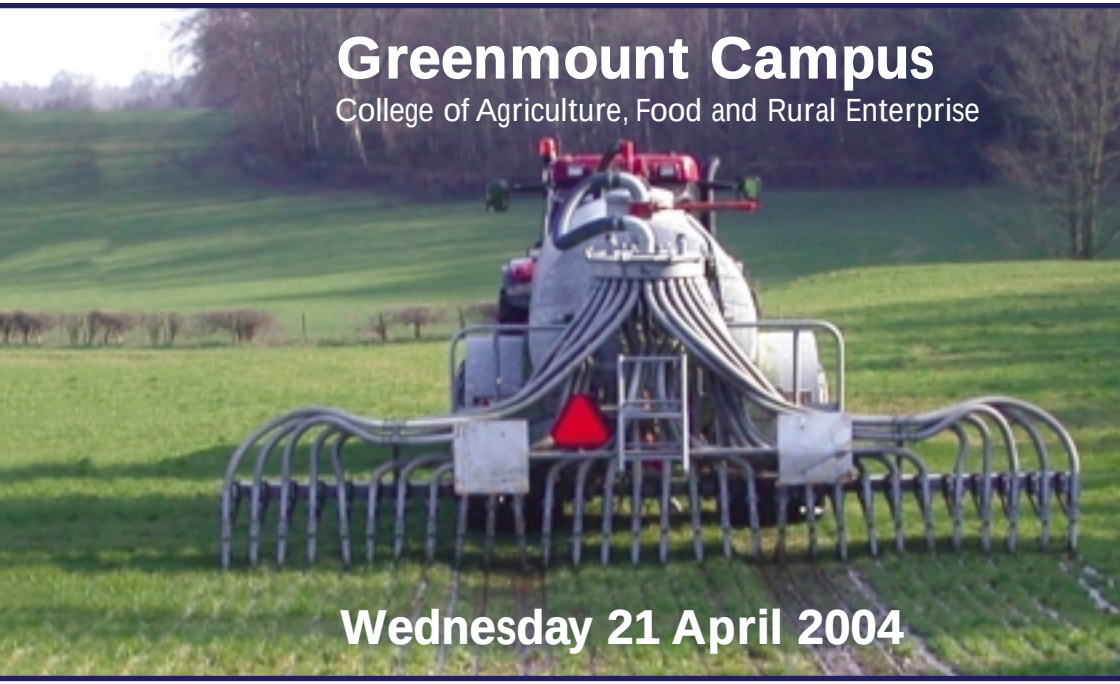
A DARD/UFU
partnership event

slurry

its **value** and **potential**



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Wednesday 21 April 2004

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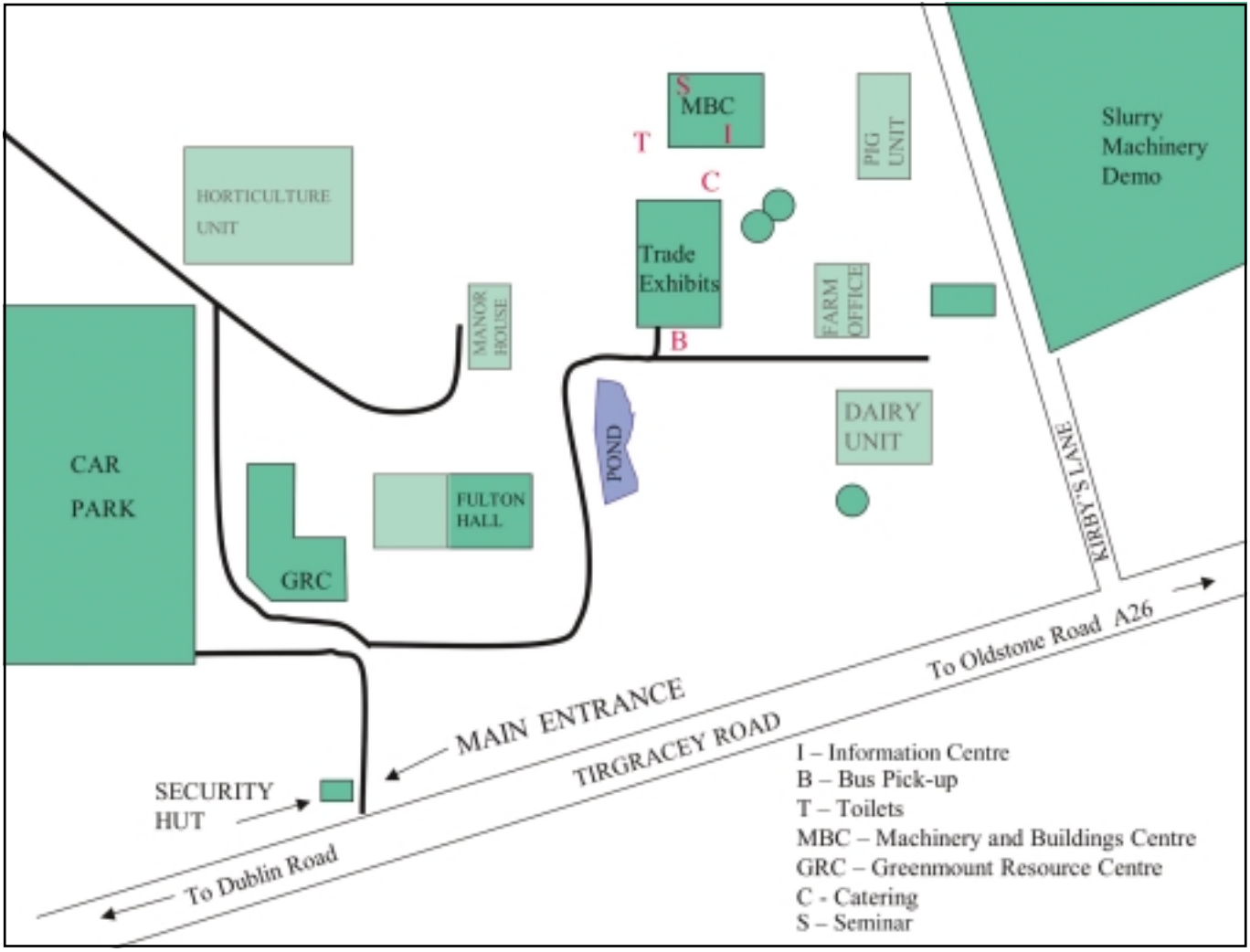
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slurry
its value and potential

Slurry – Its Value And Potential

Welcome to today's event, which has been organised jointly by DARD and the Ulster Farmers' Union, at Greenmount Campus of the College of Agriculture, Food and Rural Enterprise (CAFRE). The clear focus of the event is to highlight the asset value of slurry as well as detailing proposed future changes in legislation related to this area which will impact on farmers.

The event has been planned by a group representing a wide cross section of the industry. It has been very beneficial to join with UFU in promoting the event and I thank them for their support. With input from several branches within DARD, the Department of Environment (DOE) and the Agricultural Research Institute of Northern Ireland (ARINI), 'Slurry - its Value and Potential' will provide comprehensive coverage of this important topic.

Farmers are in the midst of one of the most challenging periods in history with discussion of Mid Term Review proposals now being joined by an industry consultation process on impending changes in waste management legislation.

To allow farmers who are considering their future options to assess all aspects of slurry management we have assembled a range of exhibits. These include discussion of legislative issues by Environmental Heritage Service, DOE. Countryside Management Branch will emphasise the importance of countryside management issues. Storage, handling and spreading options will be considered along with the economic and nutritive value of slurry. Integrated into all presentations will be the latest research findings from DARD Science Service and the Agricultural Research Institute at Hillsborough.

I hope you will have a challenging and informative day.

J FAY
Director
College of Agriculture, Food and Rural Enterprise

Agricultural Regulations (Northern Ireland)

Peter Close, Environment and Heritage Service, DOE

Introduction

The Agriculture Regulation Team within Environment and Heritage Service (EHS) is responsible for the integrated administration and enforcement of regulations to control water pollution from agricultural sources.

THE NITRATES DIRECTIVE - ACTION PROGRAMME MEASURES

The Nitrates Directive requires that measures be put in place to reduce or prevent nitrate pollution from agricultural sources. It provides a framework for action to reduce and prevent nitrate levels in catchments of rivers and groundwater sources affected by nitrate pollution, and to reduce eutrophication of freshwater bodies, estuaries and coastal waters.

The general requirements of the Nitrates Directive are the:

- identification of Nitrate Vulnerable Zones (NVZs) where the nitrate concentrations of waters exceed or are tending towards 50mg/l or there is evidence of eutrophication;
- development and implementation of an Action Programme to reduce and prevent pollution of waters from agricultural sources;
- monitoring of the effectiveness of the mandatory measures detailed in the Action Programme ;

- development and promotion of the Codes of Good Agricultural Practice to protect water quality; and
- reporting to the EU Commission on the progress of reducing nitrate levels.

NVZs in Northern Ireland

- Currently seven discrete NVZs in Northern Ireland.
- Consultation on the application of an Action Programme across the total territory of Northern Ireland.

What are the mandatory measures affecting farmers in an Action Programme?

- Restrictions on the amount of chemical and organic fertiliser applied.
- Prohibition on spreading fertiliser near watercourses, boreholes or protected areas.
- Environmental considerations – no spreading on steeply sloping, frozen, snow covered or waterlogged fields.
- Closed periods for the application of chemical and organic fertiliser application.
- Minimum requirements for organic manure storage capacity.
- Spread slurry close to the ground
- Records must be kept with details of livestock, cropping regimes and fertiliser applications

Best practice

- Follow the Codes of Good Agricultural Practice

FACTS YOU NEED TO KNOW ABOUT SILAGE, SLURRY & FUEL OIL STORES ON YOUR FARM

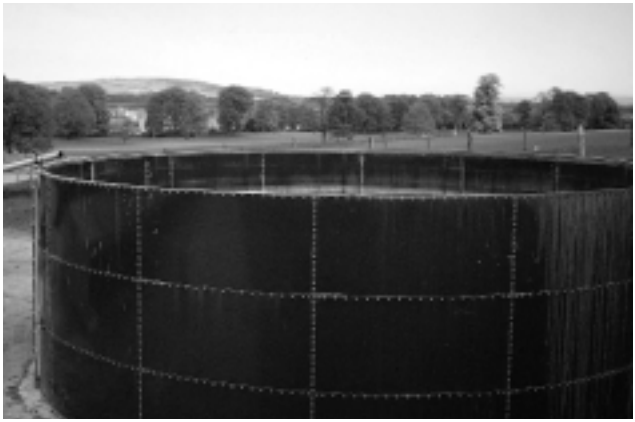
The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations (NI) 2003 cover the design, siting, construction and maintenance of silage, slurry and agricultural fuel oil stores.

The Regulations will apply to:

- Silage stores, including baled silage and silage effluent tanks;
- Slurry stores, including reception pits and stores for dilute effluent such as contaminated yard water;
- Agricultural fuel oil stores;

constructed, substantially reconstructed or substantially enlarged after the Regulations 1 December 2003.

What about storage facilities constructed before the Regulations?
Existing stores, which have not been altered, are exempt from the Regulations **but** can be required to have works or precautions undertaken to minimise any risk of water pollution.



All new (and reconstructed or enlarged) stores must be:

- sited at least 10m from any waterway;
- designed to last at least 20 years (with maintenance);
- designed and built to meet specific standards and requirements;
- notified to EHS 28 days before being brought into use;
- certified by an engineer and builder;
- approved by EHS before use.

What do the Regulations not apply to?

- Tower silos which comply with BS 5061
- Manure from horses
- Slurry temporarily stored in a tanker
- Temporary solid manure heaps (not on hard standing)
- Residues from fish farms
- Underground fuel stores, mobile fuel tankers, domestic fuel stores or where the fuel stored does not exceed 1,250 litres

GROUNDWATER REGULATIONS

The Groundwater Regulations (NI) 1998 seek to prevent and control pollution from the direct and indirect discharges of dangerous substances to groundwater.

IF YOU DISPOSE OF WASTE SHEEP DIP OR PESTICIDE YOU NEED AN AUTHORISATION FROM EHS.

DISPOSAL OF WASTE SHEEP DIP OR PESTICIDE WITHOUT PRIOR AUTHORISATION FROM EHS COULD BE CONSIDERED A CRIMINAL OFFENCE.

You must consider the following when selecting fields for your application for disposal:

- Soil type, soil depth and vegetation cover;
- Distance from springs, wells, and waterways;
- Slope of field;
- Dilution and application rates of waste dip.

Once authorised you must keep up-to-date disposal records.

You must keep your groundwater authorisation documents for inspection for Cross Compliance purposes

Groundwater Protection Best Practice

- **Never** construct a dipper with a drain hole. If an existing dipper has a drain hole fitted, this must be sealed.
- **Never** site dippers, fixed or mobile, within 10m of a stream, ditch or drain, or 50m of a spring well or borehole, or at the top of a slope where there is a risk that spillage could drain directly into a ditch or stream.
- **Inspect** dippers for leaks and make necessary repairs prior to use.
- To dispose of the waste dip, empty the dipper using a vacuum tanker and top up tanker with either slurry or water to dilute the dip prior to land spreading.
- **Do not** add the waste dip/pesticide to a slurry pit as the entire contents of the pit will be contaminated with waste dip and must only be applied to the authorised area.
- **Never** spread waste dip/pesticide within 10m of a stream, river, ditch or drain.
- **Never** spread waste dip/pesticide within 50m of a well, spring or borehole.
- **Never** select a disposal site that is steeply sloping as this could lead to pollution due to runoff.

slurry
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Environment and Heritage Service hopes to work constructively with farmers to implement the Agricultural Regulations, in order to prevent pollution from agricultural sources and improve the environment for rural communities in Northern Ireland.

For further information contact

Kieran McCavana 028 9025 4739	Nitrates Directive
Dr Fiona Wilson 028 9025 4882	Silage, Slurry and Fuel Oil Regulations (SSAFO)
Dr Adrain Gregory 028 9025 4824	Groundwater Regulations

E-mail: ehsinfo@doeni.gov.uk
Visit: www.ehsni.gov.uk

Seminar Programme

Venue: Machinery Buildings Centre

4.00pm **The Nitrates Directive**
speakers: Richard Crowe and Alan Galbraith, Senior Countryside Management Advisers, DARD

4.30pm **Agricultural Regulations**
speaker: Peter Close, Environment and Heritage Service, DOE

5.00pm **The Nitrates Directive**
speakers: Richard Crowe and Alan Galbraith, Senior Countryside Management Advisers, DARD

5.30pm **Nutrient Management Planning**
speaker: Nigel Moore, Grassland Technologist, Greenmount Campus

6.00pm **The Nitrates Directive**
speakers: Richard Crowe and Alan Galbraith, Senior Countryside Management Advisers, DARD

6.30pm **Agricultural Regulations**
speaker: Peter Close, Environment and Heritage Service, DOE

7.00pm **The Nitrates Directive**
speakers: Richard Crowe and Alan Galbraith, Senior Countryside Management Advisers, DARD

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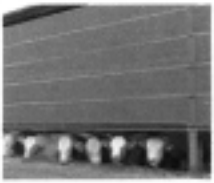

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Slurry – A Valuable Resource

John Bailey, AFESD, Newforge and Nigel Moore, Grassland Technologist, Greenmount Campus, College of Agriculture, Food and Rural Enterprise

Slurry is regarded by many in farming as an unwelcome waste material that must be disposed of. However, used correctly, it is a valuable source of nutrients which should be incorporated into the nutrient management planning on every farm. This approach helps to control fertiliser costs and to prevent any possible damage to the environment.

Table 1 - Fertiliser Value of Slurry Nutrients in Northern Ireland

13,000 tonnes available N	£6.4 million
13,000 tonnes available P_2O_5	£4.3 million
35,000 tonnes available K_2O	£9.5 million
	£20.2 million

Table 1 shows the amounts and fertiliser values of nitrogen, phosphate and potash contained in the Northern Ireland slurry reservoir. The total fertiliser value of the nutrients comes to £20 million, which is almost a third of the annual cost of purchased fertiliser nutrients. The fertiliser value of available nitrogen, £6.4 million, is an average value and can vary from £2 to £8 million depending on the time and the method of slurry application. More than half of the fertiliser value of the slurry is owed to its potash content. This is very important. Slurry is in fact the main source of potash for grass production in Northern Ireland.

Table 2 shows the total annual requirements of grass and arable crops for phosphate and potash in Northern Ireland, and how they are supplied.

Table 2 - Northern Ireland Nutrient Balance

	Phosphate	Potash
Fertiliser input:	21,000 t	26,000 t
Slurry input:	13,000 t	35,000 t
Total input:	34,000 t	61,000 t
Total crop requirement:	25,000 t	66,000 t
	Surplus +9,000 t	Deficit -5,000 t

Slurry supplies about 40% of the total phosphate input, and almost 60% of the total potash input to farmland. When the total input of phosphate is compared with the crop requirement for this nutrient, there is a surplus input of 9,000 tonnes. Lowering the fertiliser phosphate input by 40% could eliminate this surplus. This would not only save the farming industry £2.6 million per year but would also help to reduce the amounts of phosphate entering, and polluting, our rivers and lakes.

The situation for potash, however, is very different to that for phosphate. The total potash input is 5,000 tonnes less than the total requirement. In other words, 5,000 tonnes extra potash fertiliser is needed each year just to match current crop and soil requirements. Northern Ireland agriculture is therefore operating with a large phosphate surplus and a sizeable potash deficit.

The phosphate surpluses and potash deficits, year-on-year, have altered the amounts of available phosphate and potash stored in soil. The vast majority of farmland in Northern Ireland (that is, >70%) has soil P indices of 2 or greater, which reflects the on-going excessive usage of this nutrient for agricultural production. In contrast, almost 60% of farmland (excluding mountainous areas) has soil K indices of 1 or 0. This is a consequence of the inadequate usage of fertiliser potash, particularly on cutting ground.

Inefficient use of slurry potash could also be making the current potash deficiency situation worse. Applying slurry at the wrong time wastes nutrients and money. Spread under unfavourable conditions between November and January, half the available potash content may be lost by surface runoff in land drainage water, and almost half the available nitrogen content of the slurry will be lost by gaseous emissions and leaching. As a result, £8.4 million could be lost from the total (£20 million) fertiliser value of the slurry nutrients. Losses of phosphate also occur, which although agronomically very small, are environmentally highly significant.

Table 3 - Value of Slurry Nutrients for 100 Cow Herd

2.0 tonnes available N	£995
1.2 tonnes available P_2O_5	£383
6.0 tonnes available K_2O	£1646
	£3024

At the individual farm level, Table 3 shows the amounts and fertiliser value of available nitrogen, phosphate and potash present in slurry produced on a typical 100-cow dairy unit with followers. When the slurry is applied under the correct conditions, in accordance with the Codes of Good Agricultural Practice, between early spring and autumn, the fertiliser value of the nutrients is around £3,000. This is about one third of the cost of purchased fertiliser. Applied at the wrong time during winter, however, losses of nitrogen and potash can result in a £1,390 reduction in the fertiliser value of the slurry, the biggest part of this reduction being due to the loss of potash in land drainage water.

It is best, therefore, to apply slurry during the growing season, to ensure that the valuable potash component is utilised most efficiently for grass production. Applying at this time also minimises phosphate losses in drainage water and hence the potential for river and lake eutrophication.

Treat your slurry as a valuable resource and, by applying it at the right time, maximise the benefit to your farm and minimise any potential damage to the environment.

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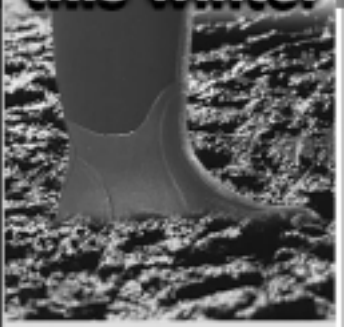

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Options For The Storage Of Slurry

Ronnie Burns, Senior Buildings Adviser, Department of Agriculture and Rural Development

Introduction

It is recognised that farm wastes contain valuable plant nutrients. To make the most of these nutrients for grass, follow the Codes of Good Agricultural Practice for the Prevention of Pollution. In particular, spread during the growing season. Lack of storage is the main reason for spreading slurry when conditions are unsuitable. Impending legislation will require periods and conditions when slurry cannot be applied to the land.

It is therefore essential to have sufficient well designed and properly constructed slurry stores on farms. The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations (Northern Ireland) 2003 (SSAFO regulations), which came into effect in July 2003, specify criteria that dictate the volume of storage required and state the construction standards of new effluent/slurry tanks. This piece of legislation includes some of the following requirements:

- A suitably qualified engineer must certify the design specifications of all stores;
- No part of the storage facility should be sited within ten metres of any waterway or field drain;
- Storage facilities must have freeboard (a specified distance with no slurry or liquid) at the top of the tank. The type of structure used to store the slurry determines the depth of the freeboard as shown below:
  - Below ground concrete tank and above ground stores 300mm
  - Earth banked lagoons (lined or non lined) 750mm
- Anyone intending to build a new structure or substantially alter or reconstruct an existing structure should advise Environment and Heritage Service, DOE at least 28 days before it is to be used for its intended purpose.

Calculations should be made to establish the quantity of slurry, which must be collected over any proposed closed period. Good planning is required to determine the best storage system to select.

The quantity of slurry produced per animal from the different stock types is shown within the Codes of Good Agricultural Practice for the Prevention of Pollution of Water, Appendix 3.

Using the figures from the Codes, the total volume of slurry and associated liquids which must be collected, can be calculated for the recommended period of storage. However, the volume of storage that is required in practice will depend on the volumes of other pollutants that are collected. Also, it might be possible that clean water is entering the slurry storage facility.

Example 1

Consider a dairy farmer with a herd of 100 cows, 26 maiden heifers, 28 year-old heifers and approximately 30 young calves.

Table 1 shows the calculations for the total volume of slurry to be collected for five months.

Table 1: Total Volume of Slurry to be Collected for Five Months

Stock type	Number housed	Slurry produced per animal (litres/day)*	Volume of slurry produced for 1 month (litres)	Volume of slurry produced for 5 months (litres)
Dairy cow	100	64	192,000	960,000
Maiden heifer	26	42	32,760	163,800
1 year old heifer	28	26	21,840	109,200
Calf	30	7	6,300	18,900**
Runoff from concrete aprons and dirty yard area				220,000
Dairy parlour washings (for 5 months only)				270,000***
TOTAL VOLUME (litres)				**1,741,900**
TOTAL VOLUME (m^3)				**1,742**

* Based on slurry production at 10% dry matter.

** 3 months storage.

*** Presently collected in slurry tank.

Example 2

Consider a beef/sheep farmer with 60 spring calving suckler cows, 60 finishing cattle, 60 year-old cattle and 8 maiden heifers. Also runoff from a sheep house for 180 ewes, needs to be collected.

Table 2 shows the calculations for total volume of slurry to be collected for five months.

Table 2: Total Volume of Slurry to be Collected for Five Months

Stock type	Numbered housed	Slurry produced per animal (litres/day)*	Volume of slurry produced for 1 month (litres)	Volume of slurry produced for 5 months (litres)
Suckler cow	60	32	57,600	288,000
Maiden heifer	8	32	7,680	38,400
2 year old cattle	60	32	57,600	288,000
1 year old cattle	60	26	46,800	234,800
Adult ewe	180	4	21,600	64,800**
Runoff from concrete aprons and dirty yard area				150,000
TOTAL VOLUME (litres)				**1,064,000**
TOTAL VOLUME (m^3)				**1,064**

*Based on slurry production at 10% dry matter.

** 3 months storage.

Calculate present storage

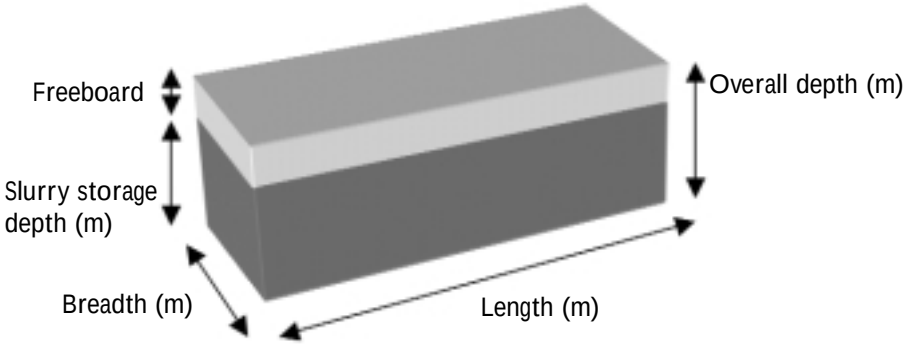
The present storage needs to be calculated. The dimensions (in metres) of all storage tanks should be taken and volume measured in cubic metres. Remember to allow for freeboard,

- below ground concrete tank and above ground stores 300mm
- earth banked lagoons (lined or non lined) 750mm

The present storage needs to be calculated. The dimensions (in metres) of all storage tanks should be taken and the volume measured in cubic metres. Remember to allow for freeboard,

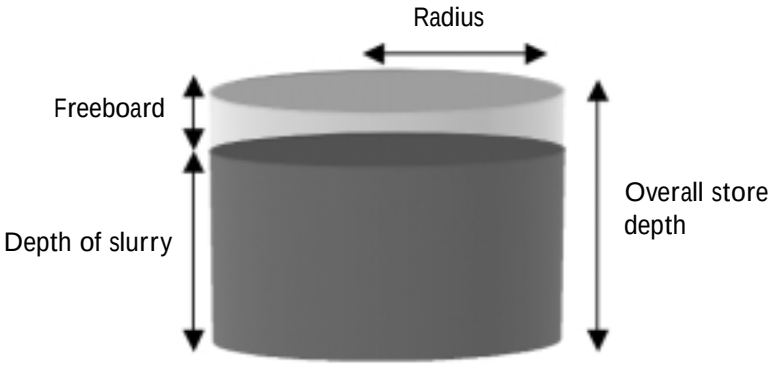
- below ground concrete tank and above ground stores 300mm
- earth banked lagoons (lined or non lined) 750mm

1. Volume of storage in a covered below ground tank



Volume of storage – undercover (m^3) =
length (m) x breadth (m) x (overall depth (m) – appropriate freeboard)

2. Volume of storage in an above ground store not covered



Volume of storage (m^3) = 3.14 x radius (m) x radius (m) x
(overall depth (m) - appropriate freeboard)

Storage requirements

In the previous worked examples the total storage requirements for five months has been calculated and listed below.

Example 1 - Dairy farmer

Present storage	327m³
Required storage for five months	1,742m³
Extra storage needed	1,415m³

Example 2 – Beef/sheep farmer

Present storage	512m³
Required storage for five months	1,064m³
Extra storage needed	552m³

Storage options

Storage options to consider are:

- Below ground concrete store;
- Above ground circular store;
- Earth banked lined lagoon.

Each option will be considered for the dairy farmer example:
Storage requirement 1,415m³.

Option 1 – Below ground covered concrete tank

Under SSAFO regulations this system must allow for 300mm freeboard. Therefore the tank below is only able to store slurry to a depth of 2.1m

Excavate tank, construct new tank (40m by 16.8m by 2.4m) according to engineers specification, piers, heads and slats

Approximately	**£92,500**
Cost/m³	**£65**

NOTE If this tank was not covered, rainfall of 550mm would need to be considered. Over the five month period 370m³ (approximately 82,000 gallons) of rainwater would be collected.

Option 2 – Above ground circular tank.

Under SSAFO regulations this system must allow for 300mm freeboard. Therefore, the tanks will only be able to store slurry to a depth of 5.33m. A new central reception tank will need to be constructed and a fixed pump installed.

Supply 2 stores, one at 15.37m diameter by 5.63m high and one at 12.81m diameter by 5.63m high, including clearing the site, construction of the bases, erection of a central reception tank and fitting a new pump

Approximately	**£56,500**
Cost/m³	**£40**

NOTE If these tanks were not covered, rainfall of 550mm would need to be considered. The volume of rainwater collected in these two tanks is calculated at approximately 175m³ (38,500 gallons) over a period of five months

Option 3 – Earth banked lined lagoon

Under SSAFO regulations this system must allow for 750mm freeboard. Therefore, this structure will only be able to store slurry to a depth of 2.25m. Also a security fence needs to be erected to comply with Health and Safety regulations.

Excavate tank (50m by 20m by 3m), sides and floor blinded to reduce risk of puncture, fit liner, construct mixing points and erect fence.

Approximately	**£50,000**
Cost/m³	**£35**

NOTE The volume of rainwater collected in this lagoon is calculated at approximately 540m³ (120,000 gallons) over a period of five months.

Example 2 – Beef/sheep farmer

Storage requirement 882m³

The options available remain similar and when calculated the cost per cubic metre is similar.

Which system do I choose?

While the previous examples help identify the costs of each option, cost should not be the only method of selecting a suitable storage system. The present layout of the farmyard and future development, needs to be considered as does the site for a below ground tank. Each option has its own merits and problems.

Below ground tank

Advantages

- All of the structure below ground and not in public view.
- A solid cover could provide a storage area provided the cover is designed to carry any loading that would be imposed on it.
- If inside an existing house;
  - the tank below the house requires no extra land
  - if covered with slats, it requires less labour input, for example, slurry scraping reduced.

Disadvantages

- Expensive to construct.
- Difficult to detect possible leakages.
- Difficult to construct inside existing houses.
- Rainwater will be collected if not fitted with a solid cover.

Above ground store

Advantages

- Can be sited away from existing housing to allow for planned developments.
- Large capacity for a small "footprint".
- The store can be mixed without the removal of animals from farm buildings.

Disadvantages

- To comply with SSAFO and when not covered a depth of 0.95m is not available for the storage of slurry.
- Rainwater is collected which must be subsequently spread in a specific time period.
- Regular mixing required to assist in the management of store.

Earth banked lined lagoons

Advantages

- Low cost system.
- Quick and relatively simple to construct.
- The store can be mixed without the removal of animals from farm buildings.

Disadvantages

- Large surface area that will collect a lot of rainfall, which must be subsequently spread in a specific time period.
- A substantial volume of the structure not available for slurry storage due to freeboard and rainfall – a depth of 1.4m.
- Large amounts of excess spoil to be disposed of in an environmentally friendly manner.

Conclusion

Each farmyard will have different requirements and an audit of the complete farmyard must be carried out to calculate the actual storage needed. It may be that clean water is entering the storage facilities, for example, a damaged guttering. Small investments to improve such facilities could result in large financial savings by reducing the size of the extra storage volume.

It is important that all farmers calculate the:

- Volume of slurry produced;
- Volume of other pollutants to be stored;
- Storage capacity on farm;
- Extra capacity required to meet proposed compulsory storage periods.

Good planning is required to ensure the selected system fits in with current and future farm requirements. Management of clean water and reducing the need to collect uncontaminated rainwater could be the first and most cost effective measure to consider.

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Separation Of Slurry

George Wallace, Greenmount Campus, College of Agriculture, Food and Rural Enterprise

Slurry is a semi-liquid of varying dry matter. Pumping a semi-liquid is difficult, blockages are likely and when left in a store for a time, slurry separates out into sludge, a liquid fraction and perhaps a crust of the fibrous material.

Almost all of these handling difficulties can be eliminated if the slurry is treated to remove the larger particles, leaving the truly liquid fraction. It is this process which is referred to as 'separation' and may be brought about by a form of slow filtration or at a much more rapid rate by a machine.

The best example of the slow filtration method is the weeping wall. This type of wall is constructed with panels placed either vertically or horizontally with gaps left between each panel. This will slowly filter out the liquid leaving behind the solids.

By using a machine for separation, the process can be carried out at a much higher rate, producing under all conditions a stackable fibrous solid and a free flowing liquid. There are a number of different types of mechanical separators including rotary screens, roller presses, screw presses, inclined screens and vibrating screens. Performance varies but as a general guide, positive separation machines such as the rotary screen produce higher dry matter solids than the less aggressive types, for example, inclined screen.

Products of Separation

The process produces separated liquid and separated fibre.

Separated Fibre

This comprises the larger particles in the manure together with pieces of wasted food and bedding, resembling a friable brown material with much less smell than the original manure. Separated fibre will usually amount to about one-fifth of the original slurry volume.

In general terms, separated fibre appears to stack satisfactorily provided that its moisture content is not less than 16% for cow manure and 20% for pig manure. At these levels, there is very little seepage of liquid from the manure. In practice, higher dry matter levels are desirable so that the heap, seldom stored under a roof, when doused with heavy winter rain will not increase in moisture content. Separated fibre remains inert and creates no real smell problem so that the material can be held in store without difficulty until the most suitable time for application to crops. This is undoubtedly an advantage, but more important is the lack of smell when spread on land – in contrast to whole slurry.

At Greenmount Campus the separated fibre is stacked and spread as FYM using conventional machinery.

Separated Liquid

Separated liquid looks like brown gravy and flows like water. Its dry matter content is much less affected by the dry matter of the original slurry and by separator design than is the case with separated fibre.

The free pumping nature of separated liquid is maintained even after 18 months storage in large containers. Cow separated liquid may develop a very thin skin or crust on the surface, but pig separated liquid does not seem to do this. Stored in bulk, separated liquid is reported not to generate nearly the same level of odour as whole slurry and it is ideal for application to land.

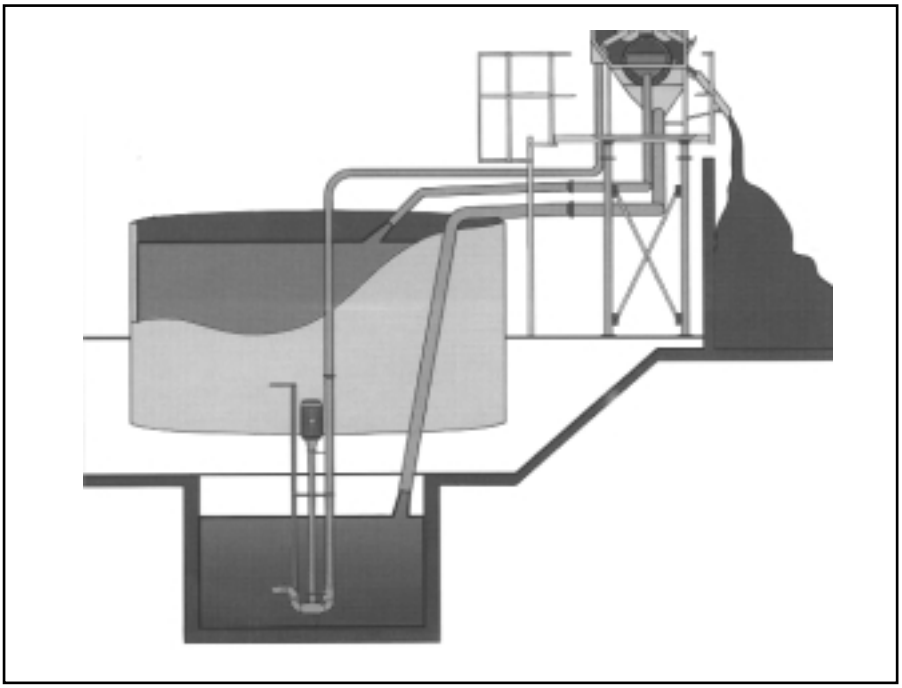
Again, because of its nature, separated liquid is rapidly absorbed by the soil surface, washes easily off plants and does not clog or shade foliage. This further reduces any tendency to persistent smell from a field, following application.

One of the downsides of conventional slurry application is that of taint – discouraging cows from grazing – which can still be noticed one month or more after spreading. Where separated liquid has been applied, animals can return to grazing within a few days of application accepting that care over pathogen risk is necessary.

Grazing too early after application raises the possibility of some risk from disease carry-over. However, separated liquid runs into the bottom of the herbage and so gross contamination of the grazed foliage is unlikely. That animals will voluntarily graze is a sure sign that very little, if any, of the liquor remains on the leaves. Hence the partial rejection by cows of pasture spread with whole slurry is largely avoided when separated liquid is used and this may ease pasture management problems.

Greenmount Separator System

Fig 1: Diagram of a typical separator installation



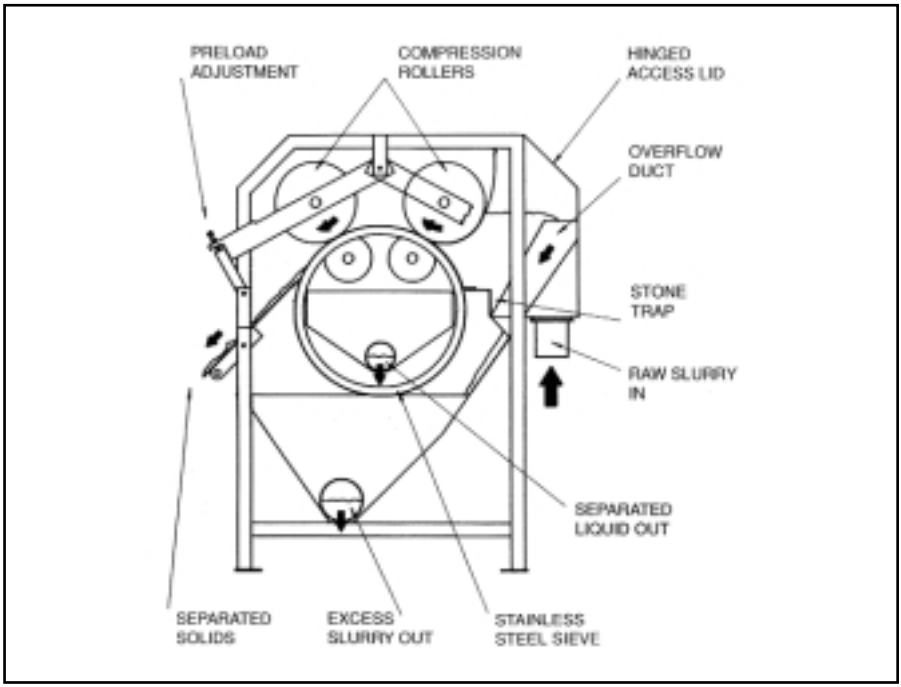


Fig 2

Diagrams courtesy of Carier

A Carier separator (Fig 2) is being used at Greenmount Campus. It is situated on a gantry alongside two above ground stores which are used as the main winter storage for the pig and dairy units. Slurry is pumped from slatted tanks at the dairy unit through underground pipes to a reception tank using an electrically-powered slurry pump. Slurry from the pig unit can also be moved under gravity to the reception tank for separation. From the reception tank, the slurry is pumped up to the separator using a second electrically powered pump. An overflow takes care of excess slurry being pumped to the separator so no adjustment is needed for flow fluctuations. Any excess is returned to the reception tank.

The separated solids are collected in a trailer situated under the delivery chute and tipped in the farmyard manure collection area.

Costs

Typical installion costs of a separator and gantry similar to the installation at Greenmount Campus will be around £20,000, depending on the height of gantry required. A separator without gantry will cost around £16,500. The control panel will add a further £2,500 to the cost. As previously mentioned, the Greenmount system uses electric pumps. Depending on the size of pump required, this would add a further £4,500 - £5,500 to the cost. Running costs for an electrical system are low (around £0.83/hr) compared to a tractor pumped system (running cost £6 - £10/hr) but an electrical system will require the availability of a three-phase supply.

Performance of Greenmount Separator

The figures presented are the results obtained from one slurry separation session, collected as part of an ongoing project. It is too early to draw conclusions from the figures obtained thus far, though the relative quantities of separated liquid and separated fibre are in line with expectations.

Output from slurry separator running for eight hours

Volume of slurry pumped from cattle house to separator	**100,620 litres**
Volume of slurry after separation	**74,790 litres**
Reduction in volume	**25.6%**

	% Dry Matter	% N	% P	% K	% S
Slurry	**7.19**	**0.37**	**0.064**	**0.369**	**0.047**
Separated Slurry	**4.89**	**0.36**	**0.058**	**0.353**	**0.041**
Separated Solids	**21.8**	**0.42**	**0.097**	**0.352**	**0.097**

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Slurry Spreading

J P Frost and R C Binnie, Agricultural Research Institute of Northern Ireland, Hillsborough

In Northern Ireland most slurry is land spread by the splash plate method. This method of application can result in up to 80% of the available N applied in the slurry being lost to the atmosphere in the form of ammonia. Not only does this result in a loss of this valuable nutrient but it also causes atmospheric pollution.

Splash plate spreading

Following surface spreading, approximately 30% of the total ammonia loss takes place in the first hour and 80% within the first 12 hours. A basic concept to minimise such losses is to reduce the surface area of the spread slurry that is exposed to the air. Consequently, soil incorporation of slurry within an hour of spreading is desirable, though this is normally only feasible on arable land. For grassland, slurry to air contact can be minimised and slurry to soil contact maximised by injection. Deep injection (150 mm; 6 inches) is limited by soil texture, soil moisture, stone content and slope. Therefore, in Northern Ireland deep injection is only suitable for a relatively small proportion of the land area. Research at the Agricultural Research Institute of Northern Ireland (ARINI) has shown that injection of slurry into shallow channels is likely to be suitable for greater areas across Northern Ireland than deep injection and has the potential to improve efficiency of nitrogen use from slurry. Band spreading of slurry also reduces the surface area of slurry exposed to the air. In addition, the machinery used for band spreading can achieve a more uniform spread pattern and less contamination of grass by slurry solids. A development of band spreading is the

trailing-shoe application system in which a metal shoe parts the grass and slurry is deposited in bands on the soil surface, with the minimum of herbage contamination.

Trailing-shoe slurry spreading at ARINI

Research

In Germany, research has shown that application of slurry by trailing-shoe leads to lower ammonia losses, better nitrogen use efficiency and higher crop yields than either splash plate or band spreading. In Holland, slurry applications by trailing-shoe, shallow injection and deep injection have resulted in 69%, 86% and 99% less ammonia emissions respectively than splash plate spreading. Recent research at ARINI has compared slurry application by splash plate, trailing shoe and band spreading methods in May after the first silage harvest. Slurry was applied 9, 17 and 23 days after the first silage harvest, which was on 12 May. Average application rate was about 50 t/ha. Compared with the conventional splash plate method, the band spreading and trailing-shoe methods increased grass yield by 19 and 21% respectively (Table 1). The increased yields obtained with the band spreading and trailing-shoe methods were equivalent to applying inorganic fertiliser N at, on average, 79 kg/ha compared with 18 kg/ha when slurry was applied with the splash plate.

Table 1. Effects of Slurry Applications after First Harvest on 12 May on Grass Yields (t DM/ha) at Second Harvest.

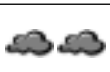
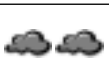
Time of application			Method of application (Grass yield (t DM/ha)				
Slurry application date	Harvest date	Days between application and harvest	No slurry	Splash plate	Band spread	Trailing-shoe	Slurry average
21May	27 June	37	4.26	4.88	5.09	5.63	5.20
29 May	2 July	34	3.87	4.60	5.70	5.47	5.26
4 June	3 July	29	4.04	4.06	5.33	5.30	4.90
Average			4.06	4.51	5.37	5.47	

There have been some suggestions that the application of slurry to grassland can lower silage quality. There is no research evidence to suggest that application of cattle slurry by either splash plate or band spreader at moderate rates makes grass more difficult to preserve as silage due to poor fermentation. However, heavy slurry contamination of grass leaves, at the time of harvest, may affect fermentation and the intake potential of the silage. In recent research at ARINI, observations at the time of harvest indicated less contamination of herbage when slurry was spread by trailing-shoe rather than by splash plate. Similarly, research in England has shown that slurry can be applied six weeks before a silage harvest by the trailing-shoe method with no contamination of the herbage or adverse effects on silage quality.

Systems in practice

The additional costs of alternative systems of spreading over and above those of conventional splash plate spreading have to be considered. These extra costs could result in spreading costs being up to double those of conventional systems. Some recent Dutch work (Huijsmans *et al*., 2004) has indicated extra costs of between 33% and 72% depending on spreading system and quantity of slurry spread. Table 2 summarises the relative features of different spreading systems.

Table 2: Relative Features of Splash Plate, Band Spreading, Trailing-shoe and Shallow Injection.

	Splash plate	Band spreader with macerator	Trailing-shoe with macerator	Shallow injector with macerator	Deep injector with macerator
Requires mechanical separation or maceration	✗	✓	✓	✓	✓
Work rate					
Even spreading	✗	✓	✓	✓	✓
Ammonia loss					
Purchase cost					

(Derived from Chambers *et al*., 2001)

Any system that involves pumping slurry through relatively small-bore pipes will be prone to blockage. Therefore with band spreading, trailing-shoe and injection equipment it is necessary to remove any solids that might cause blockage. This can be achieved by mechanical separation of slurry through a slurry separator or by chopping the slurry at the point of fill and/or point of discharge with a macerator. Developments in macerator technology have led to reliable systems that seldom block. Many macerators at the point of discharge include means for separating out foreign bodies, such as stones, as well as chopping and evenly distributing the slurry. In order to ensure even distribution most tankers are fitted with equal length hoses.

Spreading widths for band spreaders can be between 6m (20ft) and 27m (88 ft). To ensure practical transport widths the booms are designed to fold manually or hydraulically. Cut off of slurry flow to the hoses is typically by boom inversion. Work rates in the field at the wider widths should be similar to splash plate spreading, provided pump capacity is sufficient. Positive displacement pumps are common on slurry tankers in Europe. Since flow rates of slurry through positive displacement pumps are proportional to pump speed, this type of pump offers a means for controlling application rate.

Spreading widths for trailing-shoe spreaders are typically 3-9m. As for band spreaders; macerators and positive displacement pumps are common in Europe. Work rates in fields for trailing-shoe spreaders are lower than with splash plate tankers. However, since the most time consuming aspect of slurry spreading is likely to be transport to and from fields, a slower work rate in the field will not result in a proportionally slower overall work rate. For example, information presented in Table 3 indicates that a 50% increase in spreading time in the field for a tractor and tanker travelling 1km (0.6 miles) each way to and from a field at 18kph (11mph), results in only a 9% decrease in the volume of slurry spread over eight hours.

Table 3: Slurry Tanker Loads Per Eight Hours at Two Different Work Rates in the Field.

	Travel time to field from slurry store	**Time to spread slurry in field**	Travel time to slurry store from field	Time to fill tanker at store	Efficiency	**Tanker loads per 8 hours**
A	4 minutes	**4 minutes**	4 minutes	4 minutes	80%	**24**
B	4 minutes	**6 minutes**	4 minutes	4 minutes	80%	**22**
Difference A-B	0	**+50%**	0	0	0	**-9%**

(Derived from Lenehan 2004)

Shallow injector spreading widths are typically 3 - 9m. The comments above on maceration, even distribution and work rates apply to shallow channel injection.

Research in England and at ARINI has shown that it is possible to spread slurry with a trailing-shoe system much later after silage harvest than is feasible with a splash plate (see above). Whilst the shallow channel injector gives similar possibilities, dry weather after spreading could result in significant sward damage.

Conclusions

Slurry is a valuable source of nutrients. Recent DARD funded research at ARINI highlights important opportunities to recover more of the nutrients present in livestock slurry. Furthermore, new methods of application can increase the flexibility of slurry management by permitting a longer period of application after a silage harvest. Although these new methods can be more costly, they provide important opportunities to minimise environmental pollution and improve availability of nutrients from slurry for plant uptake.

References

Chambers, B., Nicholson, N. and Smith, K. (2001). Managing Livestock Manures: Booklet 3 – Spreading systems for slurries and solid manures (2nd edition, 2001). Published by IGER/ADAS/SRI and funded by DEFRA.

Lenehan, J. J. (2004). New slurry spreading systems. Presentation to Institution of Agricultural Engineers Northern Ireland Branch, 12 February 2004.

Huijsmans, J., Verwijs, B., Rodhe, R. and Smith, K. (2004). Costs of emission-reducing manure application. Bioresource Technology, 93, 11-19

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Getting The Best From Your Tanker

Gary Connolly and William Richmond, Greenmount Campus, College of Agriculture, Food and Rural Enterprise

While a significant proportion of slurry produced on farms across Northern Ireland is now spread by contractors using specialist equipment, many farmers keep their own vacuum tanker so as to retain maximum flexibility. Given the corrosive and dirty environment in which these tankers need to work, coupled with a tendency for farmers to view slurry spreading as a method of handling a waste product rather than applying a valuable source of nutrients, it is perhaps not surprising that slurry tankers would come close to the bottom of a league of "Best Maintained Equipment". However, a little care and attention paid to these machines will reap benefits, both in terms of longevity and ability to perform effectively in the field.

As with any piece of farm machinery, health and safety should always be considered before putting a slurry tanker to work. Starting at the front, the first point to check is the condition of the drawbar ring. As with all trailed equipment, the drawbar ring on a slurry tanker will wear and can eventually break, possibly leading to serious consequences. Another area for attention is the drawbar itself. Constant flexing when under load can cause metal fatigue and/or cracks - again, a breakage could potentially be very serious. While at the front end, the condition of the PTO guard should be checked. While these guards can break or become damaged frequently, replacements are inexpensive and should be fitted if the original guard is damaged. Given that the slurry tanker is effectively a specialised trailer, the other safety checks applicable to any trailer are also relevant here; namely, tightness of wheel nuts, condition/inflation of the tyres, operation and visibility of the lights and finally condition/operation of the braking system.

Speaking of brakes, given the range of hydraulically operated services on a modern vacuum tanker, it is important to regularly check the condition of all hydraulic hoses. Hoses can be vulnerable to damage and here the best line of defence is tidy routing along the tanker right to the point of attachment to the

tractor spool valves. Damaged hoses should be repaired or replaced as soon as is practicable. The dangers associated with hydraulic oil escaping from a high pressure line have been well documented and unfortunately many farmers have been permanently disabled as a result of oil penetrating the skin when checking for leaks along a hydraulic hose.

Apart from ensuring that the tanker is in a fit state from a health and safety perspective, regular maintenance will prolong its working life. Apart from the components already mentioned, the main area of concern should be the vacuum pump. The primary consideration here is to make sure that the pump oiler is working correctly and dispensing oil at the correct rate onto the vanes of the pump, as per the manufacturer's recommendations. In theory, the vacuum pump itself should never come into direct contact with slurry but the air being sucked from the inside of the tanker will be contaminated and will in turn contaminate the inner workings of the pump. The effects of such contamination can best be countered by sucking some diesel into the pump at the end of the day. This can be done by operating the pump in "pressure" mode while holding a small jar of diesel up to the air intake. If the tanker is to be laid up for some time, that is, a number of weeks, this process should be repeated using a heavy lubricating oil, for example, a gearbox oil and this will combat the effects of corrosion within the pump.

On older tankers, once full, a certain amount of slurry may be ejected from the air inlet/outlet on the vacuum pump. For the reasons already mentioned, this is not desirable and is caused by wear in the cut-off valve at the top of the tanker. The repair of this valve is straightforward and a delayed repair here will seriously shorten the effective life of the vacuum pump. Also related to the operation of the vacuum pump; most efficient operation will obviously be achieved if no air can enter the tank when the vacuum pump is in fill mode and so attention should be paid to the quality of seal around the various inlets into the tank. Poor seals will result in inefficient filling which will impact on the amount of diesel consumed by the tractor and the overall cycle time.

In terms of field performance, one area which is often overlooked is the splash plate. Students studying the National Diploma in Agricultural Mechanisation course at Greenmount Campus decided, in conjunction with staff, to assess the performance of the inverted splash plate fitted to one of the College tankers. Plastic trays laid out in a long line were used to capture the output of the tanker (See Figure 1).

Figure 1: Tray test to measure the distribution from an inverted splash plate

In the interests of health and safety and bio-security, it was decided to use water for the tests instead of slurry. The tractor/tanker combination was operated at a similar forward speed and PTO speed to those which would be used in the field under normal spreading conditions. To minimise errors due to driving inaccuracies or changes in wind speed, the tanker made three passes in the same direction before the water collected in each tray was measured. For comparison purposes, the same tests were carried out with the existing splash plate and a brand new version. Measurements obtained were plotted on graphs to demonstrate the spread pattern for each splash plate (Figures 2 & 3).

Figure 2: Spread pattern achieved from a new inverted splash plate

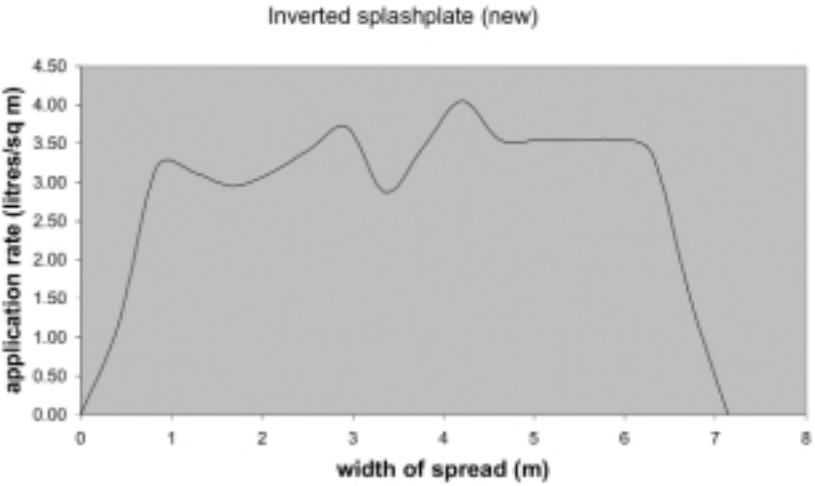
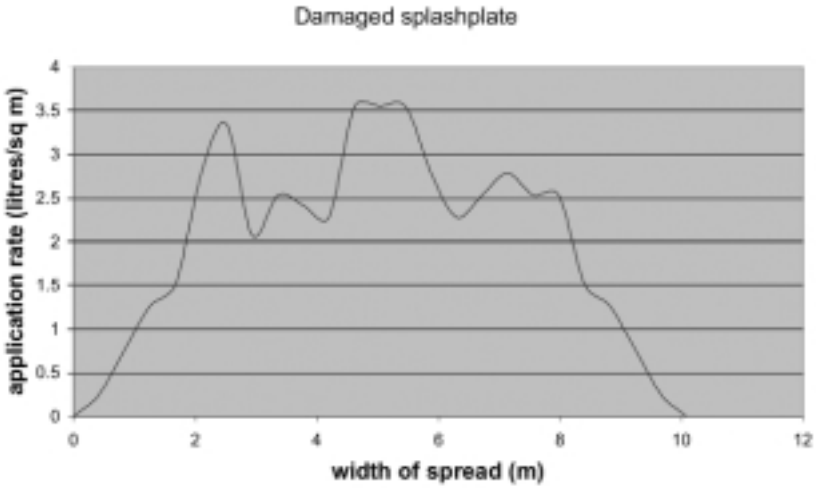


Figure 3: Spread pattern achieved from a used inverted slash plate



Simple statistical analysis allows the coefficient of variation to be calculated for each splash plate. In straightforward terms, the lower this figure, the more even will be the application of slurry in the field. As a comparison, fertiliser spreaders should achieve figures in the region of 15 –20 % Coefficient of Variation (CoV). Research by ADAS suggests that a CoV of 20-25% for a slurry tanker is good. Table 1 lists the coefficient of variation for each splash plate.

Table 1: Coefficient of Variation for new and used inverted splash plates

	Coefficient of Variation
Inverted splash plate (new)	24%
Inverted splash plate (used)	47%

It is obvious from the graphs and the table that the new splash plate performed significantly better than the old one, even though a visual examination of the existing splash plate did not show up any significant damage. However, when observing the tests being completed, it was obvious that that the old splash plate was not performing as well as the new one, even before any measurements were taken. The other point worthy of note from the graphs is that, when spreading in the field, minimal overlap (< 0.5m) is required to ensure an even application across the whole field, provided that the splash plate is in good condition and is properly attached to the tanker.

Figure 4: Uneven application is visually evident from this used splash plate

In practical terms, how can the slurry tanker be made to perform effectively and apply nutrients evenly across the field? The following are useful pointers.

- Good condition of the splash plate is vital. It will be impossible to achieve good results with a damaged or badly worn splash plate.
- Have a look at the tanker from behind while it is spreading - significant damage and/or faults will be obvious and will give an indication of the need to replace the splash plate.
- Relatively minor adjustments can have a big impact on effective performance, for example, correct orientation, angle of the splash plate.
- In most cases, little overlap will be required to ensure an even application of slurry across the field.

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Nutrient Management Planning

Grainne McCarney, Countryside Management Adviser, DARD

Nutrient Management Planning aims to balance the nutrients supplied to a crop with the nutrients required for growth. By taking into account the nutrients available in soil reserves, slurry and manure, purchased fertiliser can be used to balance any outstanding crop needs. This ensures that nutrients are neither over supplied nor under supplied and that the environment can be maintained, and productive crops grown.

Why use nutrient management planning?

1. **To protect the environment.** Eutrophication is the enrichment of water with nutrients especially by phosphates and/or nitrates and is considered to be the most widespread threat to water quality in Northern Ireland. Over supplying phosphates and nitrates or applying them when conditions are unfavourable for plant growth, increases the risk of these nutrients being lost from the soil and damaging water quality. Since the 1990s, agriculture has been identified as the main cause of eutrophication in Northern Ireland.
2. **To reduce fertiliser costs.** There is no point in supplying inorganic nutrients to crops and grass if they can be supplied by soil slurry and manure. Soils can have a huge reserve of valuable nutrients for plant growth. In Northern Ireland, 40% of soils are oversupplied with phosphate and no longer need additional supplies of this nutrient to be productive. In contrast, almost 60% of soils are deficient in potash.

   Too often, slurry is seen as a waste rather than an on-farm source of valuable nutrients. Cattle slurry, for example, contains high amounts of available potash, which can often supply most if not all of the grass requirements for this nutrient.

   Bought-in fertiliser should only be used to balance the outstanding needs of the crop after taking account of on-farm nutrients supplied in soil reserves and slurry and manure.

3. **To maximise yields.** All plants need a balanced diet of nutrients for optimum production. Oversupplying nutrients will not result in an added yield response and may also adversely affect crop quality. Alternatively, undersupplying nutrients, for example potash can lead to inefficient use of applied nitrogen fertiliser, reducing yields and resulting in expensive nitrogen fertiliser being wasted.

How to use Nutrient Management Planning

Soil analysis is the essential first step in nutrient management planning. It measures the amount of available nutrients in the soil, and is the basis for making accurate decisions on slurry/manure and fertiliser applications.

Follow the Codes of Good Agricultural Practice for the Prevention of Pollution of Water to ensure slurry and manure are utilised effectively. Always apply organic manures at the correct rate, time, and place and with the appropriate equipment.

Nutrient Management Planning Workshops will soon be available to help you to interpret soil analysis, make best use of slurry and manure and use fertilisers to balance crop needs.

Proposed Farm Waste Management Scheme (Northern Ireland) 2004 (Subject to EU approval)

Mark Kingston, Countryside Management Adviser, DARD

Introduction

The aim of the proposed scheme is to provide financial assistance to farmers who are installing or improving farm waste facilities. This will assist compliance with Action Programme measures in Nitrate Vulnerable Zones to be introduced under the Nitrates Directive and with the recently introduced Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (Northern Ireland) Regulations 2003 (SSAFO Regulations).

Who is eligible?

Established viable farm businesses that meet the eligibility criteria may apply for the scheme. The economic viability of each business will be assessed on the basis of a business plan and three years accounts, or accounts for as long as the business has been in operation where it is less than three years.

Two or more farms managed as a single unit, or in single ownership, or which to some extent have common management, accounts, livestock, machinery and/or feeding stores, will normally be subject to a single investment ceiling.

Applicants will be asked to demonstrate adequate agricultural skill and competence. They must confirm that they have at least five years full or part-time farm management experience, or else name relevant agricultural qualifications as evidence of competence.

How much grant is available?

Grant is available, at a rate of 40%, on the first £85,000 of eligible expenditure for each agricultural business (maximum grant payable per farm business is £34,000).

What is eligible for grant?

1. **Clean and dirty water drainage systems**
   - This includes guttering, down pipes (excluding roofing) and associated pipework and gullies.
   - GRP, plastic or one-piece concrete tanks to collect seepage from bedded cattle or sheep houses or silage storage facilities.

2. **Improvements to existing facilities**
   - Roofing existing middens.
   - Channels and pipework to drain effluent from existing silage stores to suitable effluent collection facilities.

3. **Provision of additional storage**
   - Above and below ground slurry storage tanks constructed outside buildings including lids, covers, manholes and safety covers.
   - Slurry tanks constructed inside buildings.
   - Lined, earth walled lagoons.
   - Roofed middens.
   - Slurry reception pits.
   - Facilities for storing silage effluent.

4. **Slurry/dirty water management equipment**
   - Fixed slurry separators and associated fixed pumps and pipework.
   - Fixed transfer and disposal facilities.

5. **Ancillary items**

   The following items are eligible only if they are an integral part of a waste storage facility, which is itself, being grant aided.

   - Access ramps and aprons.

- Safety fencing.
- The provision of dedicated new wiring to the farm waste facility from the mains distribution board.
- The provision, alteration or uprating of an electricity supply between the grid supply and the farm.

6. Other eligible items

- **Fees.** The fees of a consultant, solicitor, suitably qualified architect, engineer or surveyor, employed to advise on or supervise eligible work, may qualify for grant.
- **Conservation work.** Grant may be available to cover the cost of any conservation or amenity work in connection with grant-aided farm waste facilities.

Materials

New materials must be used. The use of second-hand materials is not permitted.

What standard of work is required?

To meet the minimum standard acceptable for grant the work must:

- be designed to last for at least 20 years, with maintenance, for those installations covered by the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (Northern Ireland) Regulations 2003, and 10 years for all other items;
- be properly designed for the agricultural purposes for which it is to be used;
- comply with all relevant statutory requirements, in particular:
  - > the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (Northern Ireland) Regulations 2003;
  - > Health and Safety legislation;
  - > Animal Welfare legislation;

- satisfy all relevant British Standards (BS), or other relevant standards acceptable to DARD. Your attention is particularly drawn to the provisions of BS5502, Buildings and Structures for Agriculture, Parts 11, 22 and 50 and BS8007;
- be carried out in accordance with the Codes of Good Agricultural Practice for the Prevention of Pollution.

What is not eligible?

- Roofing open livestock yards;
- Maintenance and repair;
- Mobile plant and equipment, for example, mobile irrigation systems;
- Automatic slurry scrapers;
- Own labour costs.

Application procedure

Quotations for any proposed work must be submitted with the application form. Grant will be paid on actual nett cost of the work.

Applicants will be required to submit pro-forma sheets with their application detailing:

- volumes of slurry and dirty water production;
- existing storage capacity;
- additional storage capacity required to meet NVZ Action Programme/ SSAFO requirements.

Applicants will be asked to submit a farmyard plan showing the location of proposed works and proximity to existing waterways and drains with their application.

Application forms will be available from Agriculture Development Centres.

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For further information and details of open days contact:

Enniskillen Campus:
Freephone: 0800 3282237
E-mail: enquiries@dardni.gov.uk

Greenmount Campus:
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E-mail: enquiries@dardni.gov.uk

Loughry Campus:
Freephone: 0800 216139
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