

## FARMERS WEEKLY

# Finding ways to deal with slurry

Installing a slurry separator has helped resolve slurry storage, handling and use issues on one West Sussex dairy farm, **Dairy Update** reports

\* Slurry separation has proved a considerable step forward from the “nightmare of dealing with muck”, according to Neil Harrison of R Harrison and Sons.

Mr Harrison had seen the benefits of such a system on a neighbouring farm, so when he was faced with a shortfall in capacity to meet new NVZ rules, as well as a need to use nutrients more effectively, slurry separation provided the answer.

The family partnership operates three dairy units near Horsham, with a total of 1,100 mainly Jersey-Friesian crosses on 890ha (2,200 acres) of owned and rented land.

Initially, a FAN screw separator was installed on the family's 500-cow unit at Pallinghurst Farm, instantly relieving the marginal capacity of an old sleeper-walled lagoon. Following this success, a second separator was installed at the 400-cow operation at nearby Dedisham Farm, where a large area of open concrete adds to the volume of winter waste.

### THE PROBLEM

“The cows on this unit take self-feed silage from open-air clamps,” explains Mr Harrison. “The cubicle housing, feeding and loafing areas are scraped three times a day and with about half an acre of concrete in front of the cubicle sheds and 32-33in of rainfall, we're collecting a lot of liquid.”

Before the separation project began, slurry and parlour washings were collected in a 2,500cu m earth-walled lagoon. “We tried draining off liquid through a weeping wall to apply it by tanker, but it wasn't very successful in the longer term,” Mr Harrison recalls.

Today, the scene is very different. Instead of a vast slurry lake, the concrete-floored lagoon now houses a 150cu m slurry reception tank and provides storage for the light, dry, fibrous material extracted by the separator,

mounted high on a steel gantry alongside.

The liquid fraction is pumped to a new 20,000cu m reservoir. Its contents are applied to nearby land by a dirty water irrigator and farther afield by a contractor's vacuum tanker or umbilical application system.

“Solids are pushed away to storage and in two weeks turn black like compost; the smell goes completely,” reports Mr Harrison. “It stacks up nicely in a spreader, so we can put it on maize fields across the main road, or up to seven miles away, where we have some very hungry ground. It puts some much-needed fibre and nutrients back on the land.”

### SEPARATOR CHOICE

Having dismissed roller screen separators because of concerns over running and long-term maintenance and repair costs, the screw press was selected.

The specific screw press separator chosen includes an oscillator that transmits pressure pulses into the inlet chamber to assist separation of sticky waste materials.

The separator is purpose-designed to handle fluids with a high solids content – this electric-



Slurry separators can help producers like Neil Harrison meet NVZ requirements, while enabling better use of a resource that can improve the fertility and productivity of land.

drive submersible centrifugal impeller pump features a high-flow inlet and externally-adjustable cutter plate.

An automatic seal operating within an oil-filled chamber protects the motor, with automatic low oil level warning and shut-down guarding against oil loss.

The fully submerged pump is activated by a “magic eye” level sensor that leaves 1.2m of liquid

in the tank at all times. It starts up automatically along with the separator between set times during the day once slurry depth exceeds 1.5m.

The separator deals easily with the 20-25cu m of slurry and dirty water that enters the tank with each milking in about four hours, he says. Running costs are calculated at £2/hour (17-18kW at 10p/unit), a figure Mr Harrison considers acceptable for the seven to eight hours a day the machine operates.

Despite being offset by a regional development agency grant, the £70,000 cost of the system, plus the supporting infrastructure, still represents a significant investment, but one that Mr Harrison sees as well worth it.

“It's resolved our storage capacity issue, has cleaned up the farm and enables us to make proper use of a resource that's improving the fertility and productivity of our land.”  
fwlivestock@rbi.co.uk

### SCREW PRESS SLURRY SEPARATION – HOW IT WORKS

- \* Slurry enters from above through a 100mm (4in) inlet, where an adjoining oscillator unit transmits pressure pulses to the slurry to maintain its fluidity.
- \* As liquid drains through a stainless steel wire screen, a plug of fibrous material is continuously formed and itself forms a filter to capture smaller particles.
- \* Tight tolerances ensure the screen is repeatedly cleaned by the screw to maintain free liquid flow.
- \* Friction between the solids plug and cylindrical mouth-piece, together with the weighted flaps at the outlet, create counter-pressure for forced de-watering.
- \* This process can be fine-tuned by adjusting the weights to suit materials with solids content from 0.1% to thick slurries with 20% solids.



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Dairy Update  
Wednesday 09 November 2011 09:00

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# FARM WEEK

BEST OF BREED AND A REALLY GOOD READ

FARM WEEK 47  
FEBRUARY 02 2012



**■ LEFT:** The earth-walled lagoon that once held up to 2500cu m of slurry now houses a 150cu m slurry reception tank, the DIY-built gantry supporting the FAN screw press separator and a bulk storage area for extracted fibre. Separated liquid is distributed from a 20,000cu m reservoir by irrigator or field applicator.

**■ RIGHT:** Cattle self-feed from open silage clamps so, together with concrete loading areas, there is a large water collection area adding to the volume of slurry.



**S**EPARATING the constituents of slurry into liquid and solids has transformed management of cattle waste on a West Sussex dairy farm.

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The concept was proven after the installation of a PSS 3.2-780 screw press from FAN Separator, which instantly relieved the marginal capacity of an old sleeper-walled lagoon on the family's 300-cow unit at Pallinghurst Farm. Attention then turned to the 400-cow operation at nearby Deddisham Farm, where a large area of open concrete adds to the volume of winter waste.

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Slurry and parlour washings were collected in a 2500cu m earth-walled lagoon, where attempts to drain off liquid through a weeping wall for field application by tanker was not very successful.

"It left us with a big quantity of very sloppy 'solids' that we dug out using our own hydraulic excavator," Mr Harrison recalls.

"The farm is divided by a busy main road and has plenty of non-farming neighbours, so spreading operations could not extend to all parts of the farm without causing a lot of mess and upset."

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The FAN PSS 3.2-780 press screw separator has several patented features, including an oscillator that transmits pressure pulses into the inlet chamber to assist separation of sticky waste materials.

"A separator is not something you set going and forget about because it's important for efficiency to get the correct slurry consistency," Mr Harrison emphasises. "It works best when the slurry is very sloppy and flows easily, so apart from being able to circulate and mix the tank contents, we can also direct separated water back into the tank to dilute it if necessary."

Pump specification and performance is another key factor and after repeated blockages with another manufacturer's pump, the unit was replaced by a new design from FAN Separator, the Magnum CSPH.

Purpose-designed to handle fluids with high solids content, this electric-drive submersible centrifugal impeller pump features a high-flow inlet and externally-adjustable cutter plate. It is reckoned to be highly power-efficient, giving equivalent performance for 2kW less power in some cases.

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### GA Allen's new McHale F5000 range

WITH McHale manufacturing high quality agricultural equipment for over 20 years, GA Allen is proud to have been associated with the company from its very beginning and to be one of only two official McHale dealers in the North.

With the success of the F550 and F560 over the past seven years, it is exciting to introduce the revamped F5500 and F5600 in 2012. GA Allen had the McHale F5500 at this year's Spring Farm Machinery Show. For further information on the machine call 028 406 51303 or email sales@gaallen.com

As with all McHale machines the McHale F5500 fixed chamber round baler has been designed with the demands of today's farmer and contractors in mind. This common sense approach to design ensures that machine operation is kept simple and user friendly.

Features like progressive greasing and oiling and drop floor unblocking system, when combined with high specification components ensure long life, reliability and a machine that is rugged enough to handle the toughest of crop and ground conditions.



## Bauer FAN Separator is the Answer to Slurry Management

2012-01-06

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### Proven concept

The concept was proven after the installation of a PSS 3.2-780 screw press from FAN Separator, which instantly relieved the marginal capacity of an old sleeper-walled lagoon on the family's 500-cow unit at Pallinghurst Farm. Attention then turned to the 400-cow operation at nearby Dedisham Farm, where a large area of open concrete adds to the volume of winter waste.

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### Pumping performance

Pump specification and performance is another key factor and after repeated blockages with another manufacturer's pump, the unit was replaced by a new design from FAN Separator, the Magnum CSPH.

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## PRESS CUTTINGS



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### **The separator in detail**

The Press Screw Separator 3.2-780 is one of four models in the FAN 3.2 Series; output is 40% higher than the smallest model in the line-up, the 3.2-520, and there are two larger units. The stainless steel screw is driven by a 5.5kW or 7.5kW motor through a gearbox.

Six screen slot sizes from 0.1mm to 1.0mm are available, plus half-screens for different dual- or triple-screen options within the same unit.

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All major components are made from stainless steel; the screw flights are hard-coated for low wear and durability.

## Separation is the answer to slurry storage, handling and utilisation issues on West Sussex dairy farm

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Neil Harrison with the FAN separator. Friction between the solids plug and cylindrical mouth-piece of the FAN separator, together with the adjustable weighted outlet flaps, create counter-pressure for forced dewatering.

## PRESS CUTTINGS

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The separator in detail

The Press Screw Separator 3.2-780 is one of four models in the FAN 3.2 Series; output is 40% higher than the smallest model in the line-up, the 3.2-520, and there are two larger units. The stainless steel screw is driven by a 5.5kW or 7.5kW motor through a gearbox.

Six screen slot sizes from 0.1mm to 1.0mm are available, plus half-screens for different dual- or triple-screen options within the same unit.

Slurry enters from above through a 100mm (4in) inlet, where an adjoining oscillator unit transmits pressure pulses to the slurry to maintain its fluidity.

As liquid drains through a stainless steel wire screen, a plug of fibrous material is continuously formed and itself forms a filter to capture smaller particles. Tight tolerances ensure the screen



The finished product â€” fibrous material freshly extracted from slurry is easily stored and spread to the land anywhere on the farm to provide a welcome source of dry matter and nutrients on hungry land.





| **Muck & Slurry**

## The problem: Management of cattle waste

*Separation is the answer to slurry storage, handling and utilisation issues on West Sussex dairy farm.*

**S**eparating the constituents of slurry into liquid and solids has transformed management of cattle waste on a West Sussex dairy farm. It not only resolved a looming storage capacity issue, it has also turned a waste management headache into an easily-handled resource that will improve the land and cut fertiliser costs.

"We can now utilise the nutrients and dry matter in slurry to our advantage anywhere on the farm," says Neil Harrison. "Before

we started using a FAN screw press separator, slurry was just something that gave us a lot of problems."

The family farming partnership R Harrison & Sons operates three dairy units near Horsham with a total of 1100 mainly Jersey-Friesian crosses on 2200 acres of owned and rented land. Being three to four miles apart, the dairy units are largely self-contained as far as day-to-day operations are concerned but close enough to share forage supplies and

equipment.

The inspiration for a new approach to slurry management came when the farm workshop fabricated a gantry to house a separator for a neighbouring farm's new biogas plant.

"We then saw separation as a considerable step forward from the nightmare of dealing with muck," says Neil Harrison. "We were facing a shortfall in capacity to meet Nitrate Vulnerable Zone rules and we weren't utilising the nutrients in muck to help offset the rising cost of mineral fertilisers. It helped us reassess what we needed to do."

### **Proven concept**

The concept was proven after the installation of a PSS 3.2-780 screw press from FAN Separator, which instantly relieved the marginal capacity of an old sleeper-walled lagoon on the family's 500-cow unit at Pallinghurst Farm. Attention then turned to the 400-cow operation at nearby Dedisham Farm, where a large area of open concrete adds to the volume of winter waste.

### **Separator choice**

Having dismissed roller screen separators because of concerns over running and long term

maintenance and repair costs, the screw press was selected from the four-model 3.2 Series heavy-duty range made by FAN Separator, a business unit of the Bauer Group.

It was supplied along with most other equipment by FAN dealer Negus Chase at Staplehurst, Kent, and all installation, including groundworks, was handled by the resourceful Harrison family.

The FAN PSS 3.2-780 press screw separator has several patented features, including an oscillator that transmits pressure pulses into the inlet chamber to assist separation of sticky waste materials.

The separator deals easily with the 20-25cu m of slurry and dirty water that enters the tank with each milking in about four hours, he reports. Running costs are calculated at £2/hr (17-18kW at 10p/unit), a figure Neil Harrison considers perfectly acceptable for the seven to eight hours a day the machine operates.

Despite being offset by a regional development agency grant, the £70,000 cost of all plant, plus the supporting infrastructure, still represents a significant investment. "But the benefits we're getting are tremendous".

## Separation is the answer to slurry storage, handling and utilisation issues

**Separating the constituents of slurry into liquid and solids has transformed management of cattle waste on a West Sussex dairy farm.**

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"We can now utilise the nutrients and dry matter in slurry to our advantage anywhere on the farm," says Neil Harrison. "Before we started using a Fan screw press separator, slurry was just something that gave us a lot of problems."

The family farming partnership R Harrison & Sons operates three dairy units near Horsham with a total of 1,100 mainly Jersey-Friesian crosses on 2,200 acres of owned and rented land. Being three to four miles apart, the dairy units are largely self-contained as far as day-to-day operations are concerned but close enough to share forage supplies and equipment.

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"The cows on this unit, where we installed a second Fan separator, take self-feed silage from open air clamps," notes Neil Harrison. "The cubicle housing, feeding and loafing areas are scraped three times a day

and with around half an acre of concrete in front of the cubicle sheds and 32-33 inches of rainfall, we're collecting a lot of liquid."

Slurry and parlour washings were collected in a 2,500 cubic metre earth-walled lagoon, where attempts to drain off liquid through a weeping wall for field application by tanker were not very successful.

"It left us with a big quantity of very sloppy 'solids' that we dug out using our own hydraulic excavator," Mr Harrison recalls. "The farm is divided by a busy main road and has plenty of non-farming neighbours, so spreading operations could not extend to all parts of the farm without causing a lot of mess and upset."

Today, the scene is very different. Instead of a vast slurry lake, the concrete-floored lagoon now houses a 150 cubic metre slurry reception tank and provides storage for the light, dry fibrous material extracted by the separator mounted high on a steel gantry alongside.

The liquid fraction is pumped to a new 20,000 cubic metre reservoir before being applied to nearby land by dirty water irrigator and further afield by a contractor's vacuum tanker or umbilical application system.

"Solids are pushed away to storage and in two weeks turn black like compost; the smell goes completely," reports Mr Harrison. "It stacks up nicely in a spreader, so we can put it on maize fields across the main road or up to seven miles away on very hungry ground where it provides some much-needed fibre and nutrients."

### Separator choice

Having dismissed roller screen separators because of concerns over running and long term maintenance and repair costs, the screw press was selected from the four-model 3.2 Series heavy-duty range made by Fan Separator, a business unit of the Bauer Group.

It was supplied along with most other equipment by Fan dealer Negus Chase at Staplehurst, Kent, and all installation, including

groundworks, was handled by the resourceful Harrison family.

The Fan PSS 3.2-780 press screw separator has several patented features, including an oscillator that transmits pressure pulses into the inlet chamber to assist separation of sticky waste materials.

"A separator is not something you set going and forget about because it's important for efficiency to get the correct slurry consistency," Mr Harrison emphasises. "It works best when the slurry is very sloppy and flows easily, so apart from being able to circulate and mix the tank contents, we can also direct separated water back into the tank to dilute it if necessary."

### Pumping performance

Pump specification and performance is another key factor and after repeated blockages with another manufacturer's pump, the unit was replaced by a new design from Fan Separator, the Magnum C5PH.

Purpose-designed to handle fluids with high solids content, this electric-drive submersible centrifugal impeller pump features a high-flow inlet and externally-adjustable cutter plate. It is reckoned to be highly power-efficient, giving equivalent performance for 2kW less power in some cases.

An automatic seal operating within an oil-filled chamber protects the motor, with automatic low oil level warning and shut-down guarding against oil loss.

"The new pump's been a great success," says Mr Harrison. "The previous one was a source of some frustration but this one hasn't missed a beat."



Cattle self-feed from open silage clamps so, together with concrete loafing areas, there is a large water collection area adding to the volume of slurry.

The fully submerged pump is activated by a 'magic eye' level sensor that leaves 1.2m of liquid in the tank at all times. It starts up automatically along with the separator between set times during the day once slurry depth exceeds 1.5m.

"If we have a problem, there's three days' spare capacity in the reception tank and we could always run slurry into part of the lagoon if necessary," says Neil Harrison. "In practice, apart from the occasional blockage in a feed pipe, the separation system has run very reliably and consistently."

The Fan separator itself has particularly impressed, he adds.

"We're very much into good engineering here – we fabricated the gantry ourselves and always tend to have machinery more than capable for the job," Mr Harrison points out. "Fan produces equipment for industrial applications, so that gave us confidence using it for a farming application. It looks very well engineered, so I'm confident we'll get a long service life."

*continued over...*



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...from previous page

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Despite being offset by a regional development agency grant, the £70,000 cost of all plant, plus the supporting infrastructure, still represents a significant investment.

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#### The separator in detail

The Press Screw Separator 3.2-780 is one of four models in the Fan 3.2 Series; output is 40 per cent higher than the smallest model in the line-up, the 3.2-520, and there are two larger units. The stainless steel screw is driven by a 5.5kW or 7.5kW motor through a gearbox.

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1.0mm are available, plus half-screens for different dual- or triple-screen options within the same unit.

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As liquid drains through a stainless steel wire screen, a plug of fibrous material is continuously formed and itself forms a filter to capture smaller particles. Tight tolerances ensure the screen is repeatedly cleaned by the screw to maintain free liquid flow.

Friction between the solids plug and cylindrical mouth-piece, together with the weighted flaps at the outlet, create counter-pressure for forced de-watering. This process can be fine-tuned by adjusting the



The finished product - fibrous material freshly extracted from slurry is easily stored and spread to the land anywhere on the farm to provide a welcome source of dry matter and nutrients on hungry land.

weights to suit materials with solids content from just 0.1 per cent to thick slurries with 20 per cent solids.

All major components are made from stainless steel; the screw flights are hard-coated for low wear and durability.

#### In brief...

**Kubota** appeared to have its nose ahead in the bidding war to buy shares of Kverneland as Farmers Guide goes to press.

Its initial mid-December offer of 8.50 Norwegian krone (about £0.92) was trumped on the next working day by CNH and Chinese company Chery Heavy Industries.

Kubota's response was to increase its offer to 10.5 krone per share which secured the 31.8 per cent stake held in Western Europe's fifth-largest farm machinery manufacturer held by its largest shareholder, Umco.

**JCB** has announced plans for a new £31m engine development project, having been awarded £4.5m from the Government's Regional Growth Fund.

It will create about 350 jobs at its Midlands and Wales plants. Design and research will take place at JCB Power Systems in Foston, Derbyshire, where the company's JCB Dieselmex engine has been manufactured since 2004.

The new engine will be installed in JCB's own products and sold to third parties and should lead to increased sales from 2016.

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The earth-walled lagoon that once held up to 2500m<sup>3</sup> of slurry now houses a 150m<sup>3</sup> reception tank, the DIY gantry supporting the FAN screw press separator and a bulk storage area for extracted fibre.

## Separation is the answer to slurry storage, handling and utilisation issues on a West Sussex dairy farm. Ian Marshall reports

When the slurry storage regulations now in place for dairy farmers in Nitrate Vulnerable Zones (NVZ) were first proposed, Neil Harrison recalls: "We knew we were potentially in a losing position from day one; when cows are on an open face self-feed silage system with big areas of concrete as soon as rain falls you have dirty water."

The family farming partnership of R Harrison & Sons operates three dairy units near Horsham with a total of 1100 mainly Jersey-Friesian crosses on 2200 acres of owned and rented land. Being three to four miles apart, the dairy units are largely self-contained, as far as day-to-day operations are concerned but close enough to share forage supplies and equipment.

Faced with a shortfall in capacity to meet the NVZ rules (under which dairy farmers are required to have sufficient capacity to hold at least five months slurry production), the inspiration for a new approach to slurry management, and an alternative to creating larger lagoons, came some five years ago when the farm workshop fabricated a gantry to house a separator for a neighbouring farm's new biogas plant.

"We saw separation then as a

water back into the tank to dilute it if necessary."

FAN dealer Negus Chase at Staplehurst, Kent, supplied the unit, along with most other equipment. The resourceful Harrison family did all the installation work, including groundworks. It instantly relieved the marginal capacity of an old sleeper-walled lagoon on the 500-cow unit at Pallinghurst Farm. Attention then turned to the 400-cow operation at nearby Deddisham Farm, where a large area of open concrete adds to the volume of winter waste.

"The cows on this unit, where we installed a second FAN separator, take self-feed silage from open air clamps," Neil explains. "The cubicle housing, feeding and loafing areas are scraped three times a day and with around half an acre of concrete in front of the cubicle sheds and 32-33in of rainfall, we're collecting a lot of liquid."

Slurry and parlour washings were collected in a 2500m<sup>3</sup> earth-walled lagoon, where attempts to drain off liquid through a weeping wall for field application by tanker was unsuccessful.

"It left us with a big quantity of very sloppy 'solids' that we dug out using our own hydraulic excavator," Neil recalls.

### Separator choice

Eighteen months later R Harrison & Sons "decided to go for it". Due to concerns over the running and long-term maintenance and repair costs of roller screen separators, a screw-type press was selected in the FAN PSS 3.2-780.

One of the four models in the 3.2 Series heavy-duty range made by FAN Separator, a business unit of the Bauer Group, it has several patented features, including an oscillator that transmits pressure pulses into the inlet chamber to assist separation of sticky waste materials. "A separator is not something you set going and forget about because it's important for efficiency to get the correct slurry consistency," Neil says.

"It works best when the slurry is very sloppy and flows easily, so apart from being able to circulate and mix the tank contents, we can also direct separated

apart from the occasional blockage in a feed pipe, the separation system has run very reliably and consistently."

### Nutrient value

Separation has also turned a by-product into an easily handled resource that will improve the land and cut fertiliser costs. Neil says: "Before the separator slurry just gave us a lot of problems. Through separation we could utilise the nutrients and dry matter in slurry to our advantage anywhere on the farm. It helped us reassess what we needed to do to offset the rising costs of mineral fertilisers."

Despite being offset by a regional

development agency grant, the £70,000 cost of all plant, plus the supporting infrastructure, still represented a significant investment. "FAN produces equipment for industrial applications, so that gave us confidence using it for a farming application. It's very well engineered, so I'm confident we'll get a long service life," Neil says.

"And the benefits we're getting are tremendous. It resolved our storage capacity issue, cleaned up the farm and enabled us to make proper use of a resource that's improving the fertility and productivity of our land."

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