

An even spread

Michael Bird looks at fertiliser spreaders and how to make the best out of them. On Page 39, Chris Boiling meets a head greenkeeper whose problem is not so much how to use his fertiliser - but how to get it to his course...

The fertiliser spreader is probably one of the most undervalued machines on the golf course. Normally costing between £500 and £1,500, the spreader is responsible each year for accurately distributing fertiliser worth four or five times its value, and often more on a multi-course golf and leisure complex.

Apart from fertiliser, most modern machines can, with very little adaptation, handle sand, salt, seeds and top dressings, making the spreader a highly cost-effective member of the machinery fleet. Yet, all too often the machine is not maintained, adjusted nor operated properly, leading to inaccurate, uneven spreading and a waste of time, effort and money.

Six key factors influence the ability to apply fertiliser accurately and precisely. They are the condition and setting-up of the spreader, the type of fertiliser, operator skill, the weather and ground conditions.

It would be wrong to give any one of these points precedence over another, says Ted Crooks of independent advisory and test firm, Spreader Calibration Specialists (SCS), based near Lincoln.

"All are inter-related and cannot be taken in isolation," he pointed out. "When we are asked to calibrate a spreader, that service is just one part of a package designed to ensure that all fertiliser is applied accurately during the year. The other points are equally important in achieving this goal."

Although working primarily in

agriculture, SCS is looking to extend its operations into associated areas, knowing that turf professionals face similar problems to farmers and growers. "Most work with a variety of materials with differing spread characteristics," commented Mr Crooks. "These have a marked effect on the ability to spread accurately across a consistent bout width."

Prills, pellets, granules, crumbs, flakes and powders all have differing flow rates which need to be allowed for during the spreading operation. For example, a smooth, shiny prill will leave a spinning disc or oscillating spout at a higher speed and angle than a rougher, duller granule or a fine powder.

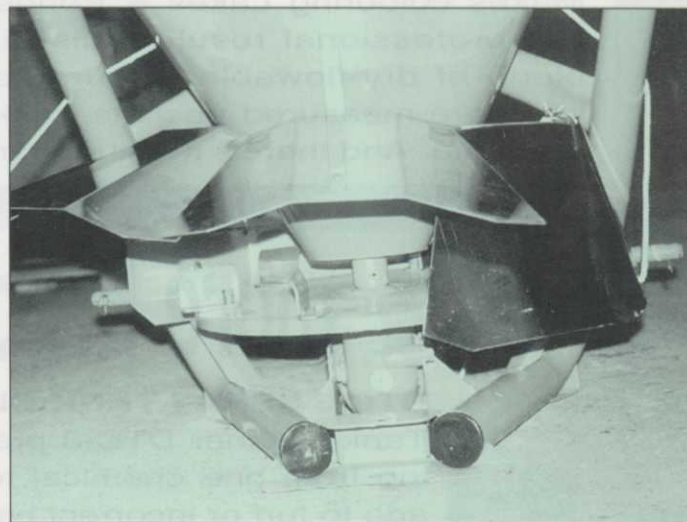
To ensure accurate and even application, the spreader needs to be set up and operated with these points taken into account, in line with the manufacturers' setting and operating recommendations.

Correct calibration of the machine is particularly important when handling fertilisers with large variations in size, shape and consistency. Ted Crooks pointed out that such variations are not found solely within different types of material. They are evident also in those of a similar specification coming from a range of suppliers, especially within imported materials.

For that reason, sound operator training is a fundamental element of precision fertiliser application. "If the operator can recognise the differences in materials and make adjustments accordingly, it will be a major step forward in



Amazone's EK 300 spreader is a single disc machine with a 300 litre hopper capacity and spread width from 3m to 12m depending on material. Ensure that the machine is set level and at the recommended working height.



A range of spread limiters is offered by manufacturers to prevent fertiliser being thrown into waterways and hedgerows. This stainless steel 'skirt' is raised and lowered on cords from the tractor seat.

improving the effectiveness of fertiliser applications," stressed Mr Crooks.

Training elements should include general machine care and use as well as the recognition of materials and their varying characteristics as they move from the hopper via the metering and spreading mechanisms onto the turf.

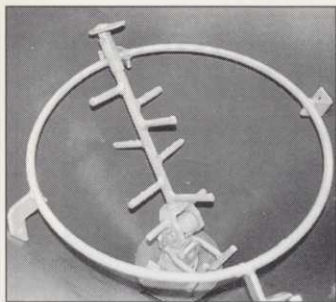
The first point that is checked by Ted Crooks when called out to test a spreader is the speed of the tractor's power take-off shaft. Using a hand-held meter, the speed of the PTO is compared with the tractor's tachometer to ensure that the spreader is being driven at the recommended input speed.

This test is also of help when

the tachometer is broken or missing as it can be used to establish the required setting on the hand throttle to achieve the required PTO speed.

Incorrect drive speeds are one of the principal reasons for inaccurate spreading and Ted Crooks advises greenkeepers to have their tractors tested regularly. Many machinery dealers offer this service using optical or mechanical instruments.

At this stage, it is vital also to ensure that the tractor's linkage is in good order and can be adjusted to set up the spreader at the recommended working height and attitude at the rear of the tractor. The correct operating height will be specified in the machine's handbook ➔ 27



Agitators prevent bridging of fertilisers within the hopper. This large eccentric option for the Amazone spreader is recommended for powders and dense materials.

25 → and must be adhered to if optimum spreading width and accuracy are to be achieved. Always check operating height with the hopper half filled.

One point often overlooked is tyre pressures. These should be equal, otherwise the machine may sit at an angle resulting in uneven spreading.

Machine maintenance is a very important, but often neglected point. Worn or damaged outlets, vanes or spouts, a misaligned disc, and bent shafts, agitators or framework can all adversely affect the spreader's performance.

"The state of some machines is quite alarming," commented Mr Crooks. "One cannot bend or neglect a fertiliser spreader without affecting its operating characteristics. These will change in any case with the fertiliser being applied. Why add to the challenge with a faulty, worn or damaged machine?"

For optimum accuracy, the spreader should be tested with each of the materials to be applied during the year. In practice, this will usually be impractical due to constraints on time and labour. It will, however, be of immense help if at least the principal material used on the course is tested through the machine to ascertain the effective spread width and the distribution pattern.

There is a very good reason for this. Although a machine may have a claimed maximum spread width of, say, 12m (39ft), the effective spread width may drop by more than 50 per cent when applying lighter or less free-flowing materials. Unless compensation is made for this during application, large gaps will result in the spread pattern, causing uneven grass growth.

Similarly, the distance between the tractor's passes needs to be increased when moving from a fine, light material to one which is spread wider due to its weight and greater speed through → 36

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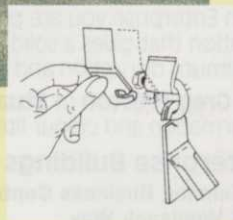
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27 → the air. Lack of compensation will create over-application and wastage.

Because all fertilisers display differing spread characteristics in different machines, the only sensible way to determine the accuracy and consistency of spread is by a tray test. SCS carries out tray tests nationwide on all types of spreaders, including spinning disc machines and Vicon oscillating spout units. A national test service is offered also by Amazone, but only for its own spreaders.

To tray test a spreader, it must first be set up and calibrated for the required application rate, according to the manufacturer's recommendations in the operator's manual. The machine is then driven at working speed over a row of collection trays placed on level turf and spanning two complete bout widths.

The fertiliser collected in each tray is emptied into a row of test tubes corresponding to each tray to show the actual spread pattern across the bout width achieved. The measure of uniformity of the pattern across this width is known as the coefficient of variation (CV).

Under ideal test conditions and with the spreader set up accurately to suit the material, a CV of less than 10% should be the aim. In practice, this can rise to 15% depending on turf conditions and wind speed. A CV of more than 15% is not acceptable, says Mr Crooks.

"Striping due to under or over application does not normally become visible until the CV exceeds 20%. So a CV in excess of 15% will produce significant wastage and variable grass growth without any visible warning signs," he explained. "Even if striping highlights a problem, it is often too late to take corrective action. It is better to tray test and calibrate a machine to achieve the lowest possible CV in the first place."

One drawback with the CV method of uniformity measurement is that it irons out single narrow variations within the overall bout width to produce an average figure which can appear quite acceptable. It is important, therefore, to examine the material placed in each test tube after a tray test for any major peaks or troughs across the spreading

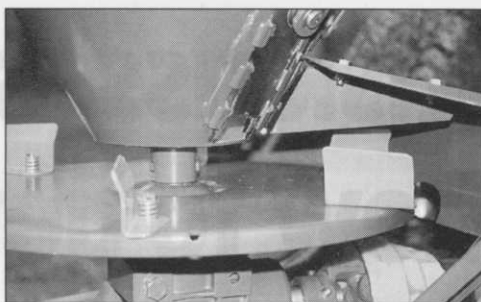
width. Individual variations of 20% from the average can indicate a mechanical problem with the spreader or in its specific setting for the material being applied.

Because of the difficulty in maintaining a consistent width of spread on golf courses due to undulating and sloping fairways, trees, bunkers and other obstructions, the ideal spread pattern is a gradually tapering pyramid from the centreline of the tractor, points out Mr Crooks. Providing the operator achieves an overlap on each pass, this pattern will permit quite large variations in driving width without seriously affecting the overall rate or evenness of spread.

An undesirable pattern is of a rectangular shape with a marked cut-off, leaving little margin for any deviation from one fixed driving width.

Wind speed is another factor which is often overlooked. As a rule of thumb, if it is considered too windy to spray, then it is too windy to spread fertiliser. Humid

Check the working components of the spreader for damage or wear prior to going to work.



conditions can also affect spreading, as damper materials have reduced flow rates.

Accessories and special attachments are available for most spreaders to prevent fertiliser being thrown into ditches, ponds and hedges. They limit the spread to one side of the machine and help prevent wastage and pollution. Similarly, there are special agitators for powders or damp materials to maintain an even flow from the hopper.

One of the most important points is the cleaning of the machine. This must be carried out at the end of the season using a good flow of water. After drying, all exposed metal parts should be lubricated and the spreader examined for wear, damage or faults before being stored carefully ready for the next time it is needed.

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