Practical Sand Slits or 'Sand Injection'

by

G. W. Davison, *Director, Cambridge Soil Services Ltd.*

DRAINS filled with permeable material have existed for many years. Much of the credit for applying this idea to sports turf in the form of sand slits, stems from operations carried out by Harold Clark at Twickenham.* His practical work was soon seen to be of great advantage. Others took up the cause. It became a fashionable theme for popular talks and the idea was swept along by a tide of enthusiasm. As a consequence, words said were not always based on practical experience, controlled experiment or economic sense. It is time for a re-assessment of this very valuable technique.

About a ton of water falls on every square yard of Britain every year. Unless natural permeability is extraordinarily good, every area of sports turf requires a drainage system if it is to remain in good playing condition. The most efficient and cheapest basic method of removing these thousands of tons of water is to have a properly designed underground pipe system. To suggest that a complicated system of sand or gravel slits is a feasible alternative to this principle is usually quite wrong, both from the point of view of cost and efficiency of operation. On the other hand, no pipe drainage system is of use if the water falling on the surface cannot run quickly through the soil to reach these pipes. Therefore, it is essential to have a gravel or similarly permeable backfill above every pipe to within a few inches of the surface.

Even then, unless the topsoil is unusually free-draining, a surface pan can soon form. Mud, and even pools, lie on the surface just because water cannot get down those vital first few inches. It is here that the sand slit is so valuable. However, the water must have a ready outlet from the bottom of each band of sand. Sand slits in any form which simply fill with water obviously do no good. It is surprising how often this point is not fully appreciated.

Having established that sand slitting would benefit an area. how wide and deep are the cuts to be? What distance should be allowed between centres? How are the slits to be cut? What sort of sand is to be used and how is it to be persuaded to go down? How much will it cost? It is in answering these points that pure theory is most vulnerable. Specifications have been made involving literally thousands of tons without sufficient regard for the cost either of the basic material or the labour of handling. Faced with the problem that sand is 'funny stuff' (it just will not flow), it has been suggested that dried sand should be used, again regardless of either the cost; or that dry sand very easily becomes wet sand if there is a lot to handle in bad weather.

Attempts to carry out the work were based on unsatisfactory adaptations of existing machines. The size of slit recommended was based on what these machines could do, rather than what was most desirable. It seems that our team at Cambridge is alone in having spent a good deal of time and (our own) money in systematic trials and machinery development to deal efficiently with these problems at a moderate cost. For example, a conventional blade, 2 inches wide, produces far too much surface 'heave'. Its use usually means that an area has to be re-levelled. A chain type trencher is too slow and handling the spoil increases the cost. We have produced a much swifter working method of installing and filling 2 inch or wider slits but, at the same time, our trials strongly suggest that narrower cuts carried out by a completely different method are, in some cases, producing better results at a lower cost.

Slits, even with spoil removal, as wide as 2 inches may cause 'corrugation' due to

*Under the auspices of the S.T.R.I., Bingley.

summer drying-out. For safe use their tops have to be buried and this means the risk of a pan forming above them. Narrower slits are 'bridged' by the grass roots and are held positively in place right to the surface. After all, each slit is only draining the surface area within a few inches. You do not need a 12 inch main to fill a tea-cup! It may be argued that a narrower slit will not last. Again, supported as it is by the grass root structure it holds up throughout the year. When the wider cuts dry out they become yet wider, the sand level falls, the top edges collapse, fill with soil, and their efficiency is seriously impared.

Of course, none of this is necessary where a good pitch has been properly designed as, for example at Leeds United. The most modern design can give first class playing conditions in virtually any weather. Professional clubs really should aim to have pitches that do not need any type of sand slit. However, such pitches are expensive. Sand slits, or 'Sand Injection' as we chose to call our development, can be of very great benefit on many playing fields, golf courses, race courses and other recreational areas. This intriguing and important technique is worthy of a balanced and methodical approach. Practical contracts can now replace theoretical specifications.

Turning from the general use of this technique to its particular application on golf courses, there are two main types of requirement. A large, economical machine to treat fairways at a reasonable cost and also a small light machine capable of working on greens without damage. Both of these are now available. Many greens benefit enormously by having a localised pipe-drainage scheme installed and the surface sand-injected. The resultant permeability not also greatly improves drainage and playing conditions but also helps in thatch control. It is virtually giving permanent aeration.