

# Drainage problems

THE surface drainage of a golf course is greatly influenced both by design and by the character of the soil. This applies to all areas of the course from putting greens to rough. Design should not only take account of the natural features of the site to produce good golfing holes at an acceptable cost, but should bear in mind the varying drainage characteristics and subsequent maintenance of the area.

These latter aspects are particularly important when siting a new green or moving an existing one. Low lying areas are generally best avoided. If these parts are not naturally boggy and ill drained (or extremely difficult to drain artificially) they will nearly always be affected by surface water from surrounding higher land. Some of these problems may be overcome on the green itself by use of drainage carpets with emptying drains and an improved soil mix. Even then such good drainage can be severely taxed by heavy run-off in

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storm conditions. The surrounds and approaches to such greens, usually with unimproved soil and little or no tile drainage, can deteriorate seriously.

Where a green must be of necessity sited in a different situation like this, some help can be gained by reshaping the fairway or surround to direct surface water run-off to the side of the green and, of course, away from the next tee.



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At a point clear of areas that may come into play the redirected water could be picked up by a catchwater drain, i.e. a piped drain trench laid to a positive outlet and backfilled almost to the surface with aggregate and topped off with finer materials.

It may also prove necessary to trap surface water run-off in an area of rough using strategically placed catchwater drains and, where even greater quantities of water might be expected off extensive sloping rough, an open ditch on the top side of the semi-rough may be necessary. Similar considerations apply where greens or tees are cut out of a sloping hillside. Surface water run-off which must be expected in these circumstances has to be adequately catered for.

## Lift and re-lay

Surface featuring of putting surfaces and surrounds, particularly where these are acute as on some of the older greens, can cause many problems. High parts shed water too quickly and cannot, of course, take the pin. Low lying areas even where the natural soil is employed are expected to take the brunt of twelve months play in all weathers and ground conditions. Not unnaturally these places become compacted or the soil structure is destroyed and the lowest hollow becomes a pond after heavy rain. On new sites these pitfalls should be avoided but on the older greens they can often be overcome only by lifting and re-laying.

Tees are usually built up to some extent and thus avoid many problems created by surface run-off. However, as tees get to be 600 sq. yd. or more, which is common nowadays, there is a greater need to consider putting a fall on the surface to actually aid water run-off. The introduction of pipe drainage and soil improvement are also more likely to be needed.

In addition to the points already made, with new fairways it makes good sense to avoid cut and fill grading wherever pos-

sible since nothing is more damaging to natural drainage. Fairways treated in this manner often take a long time to become fully established and have persistent drainage problems.

On most soils bunkers will need to be drained and the drains should be linked into a convenient green or fairway drain or, as a last resort, taken to a soakaway in the rough. On very heavy impermeable soils deep bunkers are inappropriate and in this situation should be kept as shallow as possible, so as to be practically self-draining with the sand level running out virtually at grass level on the low edges.

Soil characteristics are a major factor influencing the drainage of water through the playing surface. The speed of water percolation through the soil to either drains or a naturally free draining sub-soil materially influences the quality of all the main playing surfaces on a golf course. On new golf greens the best answer seems to be to provide a drainage carpet with emptying drains and a specially prepared sand/soil mix designed, as far as practicable in the light of present knowledge, to give good percolation rates and at the same time to provide a satisfactory medium for producing a quality turf and first class playing surface.

## Fibre build-up

On existing greens, particularly inland on heavier soils, poor drainage and its side effects can be particularly troublesome. Often surface drainage problems are linked mainly to surface conditions—fibre has been allowed to build up to such an extent that it behaves like a sponge and in wetter periods never really dries out. In this situation hollow tine forking, sandy top dressings, plus plenty of scarification at the appropriate season, combined perhaps with liming where necessary, can bring about considerable improvement.

In many cases, however, the problems lie with the soil. Compaction and dam-

age to soil structure, whether caused by mishandling during construction or by play or by poor management, will inevitably result in slower water percolation into and through the top soil. If water can only penetrate slowly through the soil to the drainage then inevitably there will be periods when rainfall exceeds the rate of percolation and a wet soft surface or flooding will result.

This sort of problem has always been extremely difficult to put right. Surface treatments such as hollow tine forking are valuable and by this means the poor structured or compact top soil can be replaced in part by working a very sandy compost into the fork holes. This, of course, takes time and needs a lot of compost—never less than 6 lb. per sq. yd. after hollow tining otherwise a very soft surface could result after repeated treatments. This treatment, in autumn, combined with plough of slit tine aera-

tion the rest of the year can bring about big improvements.

However, if the problems lie deeper than, say, the top 5 in., i.e. on many greens there is 9 in. depth of heavy soil over a drainage carpet of stone, or a poorly permeable clay sub-soil, attacking from the surface is much less successful. In these cases very often complete reconstruction has to be faced, and this is still a valid, though costly, solution particularly for the most difficult cases.

In recent years attention has focussed somewhat on shallow sub-soil cultivation with a specially developed, sharp vibrating blade that penetrates 6 or 7 in. deep. This can give some surface improvement, although benefits are confined to the top few inches of soil. The work may be disruptive and on a stony soil may not be possible at all, and tends to be rather short lived, since eventually the cracks and slits formed close up or become silted up.

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