

Rebuilding Greens to Solve Maintenance Problems

By O. J. NOER

REBUILDING an established green is not a pleasant prospect anywhere. It is resisted always by the golfer. In deference to him before the decision is made to rebuild, every other alternative should be considered carefully and exhaustively.

Correction of some basic fault is the only justification for rebuilding. Bad contouring, a poor location or an inferior grass are the principal causes of poor turf condition during adverse periods of weather.

Re-sodding with turf from a nursery is the quick answer for greens which are otherwise satisfactory except for type of grass. Turf may be all poa annua or an inferior strain of bent or Bermuda. Skinning a green is simple with a modern power-driven sod cutter. It can be done in a couple of hours.

Ground limestone should be scattered over the skinned surface at 25 to 75 lbs. per 1,000 sq. ft. if a test shows the soil to be acid. The heavy rate is justified on very heavy soil. Phosphate and potash should be applied also but it is best not to use nitrogen in quantity under the turf. It should be applied on top after laying the sod. An 0-20-20, or similar grade, is a good fertilizer to use under the sod. From 20 to 25 lbs. per 1,000 sq. ft. is about the right amount.

Where the existing soil is of the proper kind for a green, cultivation with a disc or roto-tiller will loosen and mix the soil. It will incorporate the lime and fertilizer with it. Where the soil is too heavy, it can be changed by mixing the proper amount of sharp coarse sand with it. One way is to spread the sand over the surface and use a tiller to do the mixing. Speedy operation of a roto-tiller brings the fines to the surface. They can be re-incorporated with a spring tooth harrow.

Soils of high organic content are bad especially in spots where there is no air drainage. They stay overly wet for a long time during periods of heavy rains. These muck-like soils are hard to modify with sand or mineral soil. The best plan is to

remove the top six to eight inches of muck and replace with soil of the right kind. A medium sandy loam soil with not more than 20 per cent by volume of fibrous organic material is a good one for greens.

After the surface of the green has been reshaped, light rolling should follow to firm the surface and disclose any slight pocketed areas and emphasize the final contours. Any imperfections should be corrected before the sod is laid. It is done by the addition of more soil, or by working soil from the high spots into the low ones with the back of a flat wooden rake. The green is then ready for sod.

Nursery Same As Green

Turf in the bent grass nursery should be comparable to a good green. It should be tight and devoid of any mat or thatch. The nursery should have been mowed frequently with a putting green mower set at $\frac{1}{4}$ to $\frac{5}{16}$ in. The soil underneath the turf should be exactly like that in the green where it is to be laid. When the nursery sod is lifted, it should be cut thin at not to exceed one-half to three-quarter in. Thin cutting exposes more roots so the laid sod knits with the soil quickly.

The importance of care in laying the sod is obvious. Joints should be tight and a little screened soil should be placed under the sod wherever necessary to produce a surface of billiard table smoothness. After the sod is laid it should be rolled lightly, and nitrogenous fertilizer should be used at 4 to 5 lbs. per 1,000 sq. ft. for ammonium sulphate or ammonium nitrate, or at 30 to 40 lbs. for dried activated sludge or other similar natural organic fertilizer.

The green should be dressed lightly with a good topdressing mixture using 1 to $1\frac{1}{2}$ yds. to an average size green. It should be kept moist until the sod gets off to a good start. Re-sodded greens have been back in play within several weeks after sodding where the job was carefully done.

Correction Without Rebuilding

The presence of an excessive mat or thatch and the existence of imbedded sand,

clay, or humus layers in greens have been cited as reasons for rebuilding greens. Nobody can deny that this is the quick way. With the modern tools now available, the mat can be eliminated and the imbedded layers destroyed over a period of several years. Improved putting quality will result right from the start. Maintenance will become progressively easier.

Sand and other layers are best destroyed by using one of the several types of aerifying machines which are now available. After each operation, roots will go down through the layer in the aerifier holes. Before long there will be enough deep roots to keep grass from wilting quickly in hot weather. More frequent topdressing than would be necessary otherwise, is highly desirable also to build a deeper column of soil.

The problem of thatch is simple when recognized early which is before the stems start to undergo decay. The surplus grass can be removed in spring or early fall by alternate cross raking followed by close cutting each time.

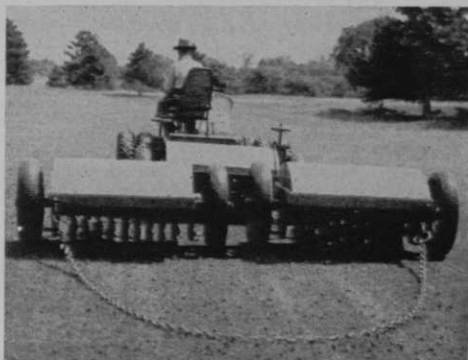
Removal of surplus grass should not be attempted in hot weather. When done in the spring, it should not start until about the time grass is ready to renew its growth. An earlier start may delay recovery whenever the spring is unusually dry. There should be enough time in the fall for grass to recover before the onset of winter.

Topdressing would seem like the logical way to treat greens where the thatch is peat-like in character. Nothing could be worse because it is more difficult to destroy the organic matter of the imbedded layer. Topdressing should wait until it will make contact with the soil below. The organisms responsible for the destruction of soil organic matter must do the job. These organisms thrive in the presence of air because they need free oxygen. They work best when the reaction is at or near neutral. Enough aerification to introduce air and an occasional application of hydrated lime at not more than 2 to 5 lbs. per 1,000 sq. ft. is sound procedure and has produced desired results on many badly thatched greens.

Hydrated lime is better for this purpose than ground limestone because of its greater solubility. It reacts quickly with the organic acids which are intermediate decay products in the conversion of organic carbon in soil humus into carbon dioxide which is a gas.

After the peat-like layer is destroyed, or

COMPLETES AERIFYING JOB



Wilbert Waters, supt., Inverness Club, Toledo, O., put a chain drag back of his Aerifiers when he was giving his fairways aerifying and thatch-removing treatment. Plugs were pretty well broken up and worked in as a light topdressing.

nearly so, topdressing can be resumed. Before it is applied, the green should be spiked deeply with a spike disc, or it should be aerified so the topdressing will make contact with the soil.

Badly contoured surfaces, a poor location, the wrong kind of soil and a poor kind or strain of grass have been mentioned as justification for rebuilding a green. The importance of having the right kind of grass was dealt with first, including greens of *poa annua*. When it is the only grass on the green, re-turfing or rebuilding is justified except in a very few localities of very favorable climate.

Rebuilding Is Only Answer

Rebuilding is the only way to change a badly contoured green. Severe gradients and innumerable slight pocketed areas make the green bad for play and for maintenance. The contouring may limit the amount of cupping area to the point where the turf cannot withstand the traffic of heavy play. Pounded water in slight pockets causes trouble in summer and in winter.

A green should have enough character to test the skill of the golfer. Good design from that standpoint is the architect's responsibility. The contours should not be so severe that the modern greens mower cannot be used to cut in any and every direction.

The design should provide more than one path for run-off of surplus water during and after heavy rains. Downward percolation is too slow even in the best kind of soil, so the importance of designing a green to insure rapid run-off in several

directions cannot be overemphasized. That is the way to have greens ready for play immediately or soon after rain stops.

The necessity for rebuilding a green because of its location is usually because of turf maintenance troubles rather than from the strategy of play. These greens are placed in spots where there is no air drainage, or occasionally on slopes subject to seepage or overflow from surface run-off. Each case is a local problem.

The surface soil on the greens of many new courses is too heavy especially in localities where it is hard to get, or hard to make the right kind of soil. The usual practice is to build better soil in the green by more frequent topdressing at generous rates. This is a slow way. It works best on greens which are out in the open. Rebuilding is the better and quicker way for greens which tend to stay overly wet and for those in low-lying confined spots.

Start Temporary Green Early

A good temporary green should be provided wherever possible for play during reconstruction and afterwards until the grass is well established.

The temporary green must be started sufficiently early so it will have a decent surface. Customary practice is to cut the existing fairway grass short, apply enough topdressing to provide a smooth surface and seed with bent, redtop or a combination of the two.

Where there is no place for a temporary green, sodding may be preferable to seeding or planting stolons. It will cause golfers less inconvenience. When the new green is built in a different location, the old one can be used until the new one is ready for play.

In rebuilding any green, good drainage is imperative and that applies to surface and internal soil drainage. The role played by surface run-off during wet periods has been discussed. Good internal soil drainage is important also. It insures speedy, downward movement of soil water after surface run-off has removed most of the water from heavy downpours.

Tile drains are not needed for greens located in gravelly or open textured subsoils. The situation is different where the subsoil is of a clay nature. Then the herringbone type system should be installed. The principal main should be in the direction of the general slope, and should bisect the green if possible. Laterals should cross the line of slope and should be closely spaced, at not to exceed 15 ft. The lines should be two to three ft. deep and the trench should be back-

filled with pea gravel to within 6 to 8 in. of the surface or to where the blanket of topsoil begins.

Some architects and golf course superintendents favor a gravel blanket between the subgrade and the topsoil. It is of no value where the subsoil can dispose of water quickly. The situation is different on tight, compact subsoils especially in localities of hot humid summers. A herringbone system of tile should be placed immediately underneath, so the trench becomes a part of the blanket. The tile lines will remove water quickly and enable the gravel blanket to move water rapidly. Without the tile the gravel blanket may become a false water table.

Topsoil Composition

The topsoil should be six to eight in. thick or more after settlement. It should be a medium sandy loam with not more than 20 per cent by volume of organic matter. Few people realize the relative effects of sand soil and humus on soil texture. Fine sand packs as badly as clay; the same is true of muck-like humus. It takes very little clay to change a sand, and by the same token, large amounts of sand must be used to have any effect on clay. Those who use ratios of two parts soil and one of sand, and even equal parts of each, seldom achieve the desired result. More often, two parts sand to one of soil and one of humus is needed to make the right kind of topsoil. The sand should be sharp and reasonably coarse with a gradation of sizes from coarse to moderately fine. The soil should be a friable garden loam and the humus should be fibrous. The final mixture should have a springy feel when squeezed in the palm of the hand.*

Lime, if needed, and fertilizer should be worked into the surface soil during final seed bed preparation at rates suggested earlier on re-turfing except that the nitrogen should be used before seeding or planting the stolons. The same procedure should be used; namely, light rolling to firm the soil and disclose slight pockets.

It is easier to get the surfaces right at this point rather than after the grass starts growth. Light raking just before seeding or planting is advisable to prepare a good bed. Surfaces must be kept continuously moist after seeding or planting stolons until the grass is well started. Best practice is to hand-water three or four times every day using a rose nozzle with a fine spray. Not more than 10 or 15

minutes need be spent on the green each time.

Selection of Grass

Selection of the right grass is important. The choice for those who seed is limited to seaside or one of the colonials. Polycross now called Penncross is not available and will not be for another year in all probability. Seaside is frowned upon in the far North because of its susceptibility to snow mold. It does not do too well in regions of prolonged hot humid weather. Colonial behaves badly as a rule under these conditions.

Cohansey (C-7) is doing well in Oklahoma and Louisville. It has many staunch champions in those regions. The region for it should include the belt from Washington to Kansas City. Arlington (C-1) and the mixture of Arlington (C-1) and Congressional (C-19) are behaving well. Those who use the mixture, plant one bushel more of Arlington than Congressional because it spreads more slowly. Arlington is less popular when used alone farther North, but Congressional is liked because it resists snow mold and holds its color well in fall and spring.

Toronto (C-15) has its admirers and

Washington is still doing well on many courses. The newly named Pennlu selection promises to be another good bent. It has been outstanding at Penn State and has done well at Purdue.

Danner Solves Weed Problem

GOLFERS' demand for perfect turf conditions regardless of weather, money and labor available, and the golfers' own neglect of courses continues to increase.

In amazing jobs of meeting this demand the golf course superintendents have employed many resourceful and effective ideas this year. Turf problems in many areas were accentuated by prolonged drought which always makes the weed situation on golf courses troublesome. Some progress in contending with labor shortage was reported.

Charlie Danner, supt., Richland GC, Nashville, Tenn., tells of a satisfactory solution of a persistent weed problem.

Says Danner:

"This past season I have been much impressed and pleased with the work done at my club on weed control. Until this year crowfoot has been one weed we have had to fight the hardest on our Bermuda

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