What steps should be taken by golf course superintendents to prevent winter injury? The first and most important rule is not to play on turf when it is not actively growing, especially greens. Temporary greens should be played from the time the ground begins to freeze in late fall until completion of heaving and thawing in early spring. Excerpts from "The Case For Temporary Greens," January, 1966 USGA Green Section Record, document the importance of remaining off turf during this stress period:

'So many more golfers play each course now in regular season that injury due to the increased traffic is mounting and off-season play can only add to the total

traffic injury problems.

"In late fall or early winter when frost enters the ground, turf becomes frozen and the upper fraction of soil becomes moistened with frost. Traffic at these times will break or crack the stiff and frozen blades of grass, weaken them, and Poa annua or other weeds could subsequently encroach, and so the turf is generally weakened. Traffic imposed upon moistened soil results in a cementing of the soil due to the lubricating action of the moisture. This undoubtedly adds to compaction.

"In winter when the ground is frozen solid, turf blades would suffer only if play were allowed while the grass, too, was frozen. The danger here is that during the day while players are on the course, sufficient thawing could occur in the upper fraction of soil to cause footprints and a cementing action of the soil. This occurs when air temperatures are higher than normal and, of course, these are the very days when golfers prefer to play.

"The most difficult time for turf is in late winter and early spring, from mid-February through March when the top one inch of soil (or less) is thawing but the soil beneath is frozen. Traffic on greens at this time will result in severe compaction.

"Any time water stands on a green in winter, no play should be allowed. This results in extreme softness of

the upper fraction of soil and turf.

"All told, any amount of play in winter generally means more rigid management during the growing season, especially more aeration and more topdressing to true and level greens. If play is allowed on regular greens, we cannot stress too vigorously that the days must be very carefully chosen; that someone must make these day-to-day decisions; and that your course must be treated as an individual problem. It should not be kept open or closed simply because a nearby course is open or closed.

"The only way to insure against possible trouble is to have temporary greens. It has often been suggested that the word 'alternate' be used in place of 'temporary,' because the latter bears a negative connotation.''

Second, drainage conditions must be at an optimum if sound turf programs are to be carried out and followed to prevent winter injury. And, third, an adequate budget, good source of labor and communication between the golf course superintendent and his immediate superior must become a reality when facing the winter injury problem in the cool temperate zone of the United States.

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