



Each morning many putting green maintenance tasks are completed before play begins. Don't consider the maintenance needed for daily play to be on the same level as preparations for special events.

PUTTING SURFACE PACE

Some factors can be controlled; others cannot.
Are you prioritizing properly? **BY KEITH HAPP**

WEEK in and week out, televised golf events portray tournament and championship venues as landscapes of perfection. The behind-the-scenes stories and efforts to prepare these venues often are not discussed by announcers, leading golfers to believe that these sites are maintained in this manner every day of the year. What is often lost during the hectic golf season is that the playing surfaces are alive and, as such, their performance is subject to many factors. Weather, maintenance equipment, and agronomic factors all impact putting green speed and ball roll. Although many agronomic factors affecting putting green performance are

controllable, not all facilities have the maintenance infrastructure to implement proactive procedures. Many factors that affect putting green speed and performance are just not controllable. Weather is the leading factor that affects plant health, turf growth, performance, durability, and green speed.

Green speed is measured with a Stimpmeter. This tool is a management device that allows surface pace to be evaluated and monitored on a specific course, but it should not be used to compare putting surface performance between courses. There are too many variables, such as budget, labor resources, equipment, and golfer demands, to allow fair and valid comparisons



A polystand consisting of *Poa annua* and bentgrass presents many challenges when trying to condition putting surfaces for play in the spring. Differing growth rates between species affect ball roll.

to be made. Use of the Stimpmeter provides assistance in preparing the greens for special events.

Stimpmeter readings on American golf courses generally range from 7 feet to 12 feet, depending on many factors (e.g., slope, contours, green size, grasses, weather, budget, etc.). Experience shows that trying to keep the speed above 10 feet on a consistent basis usually causes difficult-to-manage turf problems and is not recommended. Standards or an acceptable range for green speed should be established to help manage turf health and the variables associated with putting green performance. Well-defined expectations, which should include a reasonable margin of variability, allow maintenance programs to be developed that can achieve realistic putting green performance goals within a predetermined budget.

There are a number of management techniques that can be implemented to achieve the desired ball roll and green speed. The key is to produce the desired pace without crossing the line and exerting undue stress that predisposes the turf to many potential problems.

AGRONOMIC FACTORS

To condition turf for putting, a number of issues have to be examined. These include: soil texture (well drained vs. not well drained), thatch accumu-

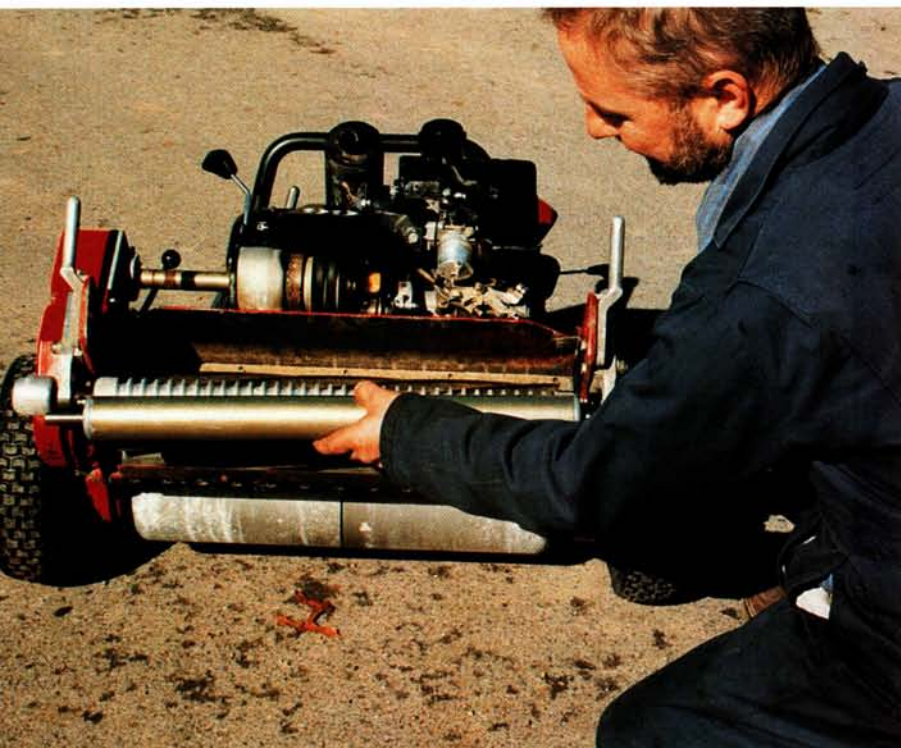
lation, grass type (*Poa annua*, bentgrass, bermudagrass), consistency of turf stand (mono vs. polystand), green size, traffic stress, and environmental conditions such as shade.

Soil texture affects drainage capacity and moisture retention. Heavier soils tend to retain water, are prone to footprinting, and are subject to compaction problems. Surface drainage characteristics play a critical role with regard to management of soil moisture. Not all surfaces have adequate surface drainage characteristics to overcome less-than-adequate soil texture. Green speed and performance are affected by wet soils. In fact, attempts to maintain a high green speed under saturated soil conditions can result in catastrophic turf failure. Scalping damage can easily occur, weakening the plant and having an immediate impact on natural defenses against disease infection. If the turf is subject to excessive shade, further complications will result. The duration of leaf wetness and soil saturation is extended when direct sunlight exposure is limited. Under these conditions, rapid turf decline could be experienced if excessive green speed is demanded.

While some thatch is essential, too much is detrimental. Pest issues are more difficult to control and mower scalping is always an issue on playing surfaces that have accumulated excessive



It takes more than a close shave to prepare putting greens for play. Prolonged use of close mowing predisposes the turf to a multitude of pest issues and potential problems.



Mowing with grooved rollers and using grooming attachments can enhance putting surface performance. However, weather factors must be taken into consideration before these attachments are used for an extended period of time.

organic matter. Maintaining a reasonable amount of thatch ($\frac{1}{4}$ to $\frac{3}{8}$ inch) is beneficial. For example, some thatch is necessary to maintain a “mat” that provides a level of protection and resiliency against traffic stress and ball impacts. With regard to green speed, excessive thatch decreases ball roll. When thatch accumulations are managed, maintenance programs focused on increasing ball roll are much more effective. Basically, there is an inverse relationship between thatch accumulation and putting green performance. Putting quality and turf health decrease as thatch accumulation increases.

Additionally, there will be some inconsistency on small greens that have limited hole locations and/or offer limited entrance and exit points to the green. Focused wear compacts thatch, and in these areas ball roll is faster. In areas that do not receive the same level of traffic, varying green speeds often result.

Grass species affects ball roll. Basal tillering grasses such as *Poa annua* and the newer bentgrasses can offer excellent playing quality. Their upright growth habit allows the ball to roll on the tips of the grass leaves, versus rolling across the leaf blades of an aggressive creeping grass variety. Older bentgrasses, for example, are characterized by their lateral, stoloniferous growth habit. This results in a grainy appearance that, if left unmanaged, negatively impacts ball roll. A polystand of turf can pose problems during certain weather conditions. Trying to get Pennncross creeping bentgrass to grow upright in the spring is a difficult and sometimes losing proposition. Aggressive efforts to alter the natural growth can easily predispose the turf to damage later in the season. A polystand of grass will take longer to condition, but as the weather becomes more favorable, excellent surfaces can be presented.

Surface contours directly impact putting green speed. Severely sloping greens present problems due to the gravitational forces exerted on ball roll. Requests from golfers to obtain unrealistic green speed up a slope can result in unplayable conditions when faced with a downhill putt. Additionally, when green speeds soar on severely undulating greens, usable hole locations will be lost, resulting in concentrated traffic and turf wear.

MAINTENANCE FACTORS

All too often the mowing height is used as the sole strategy to achieve the desired putting green speed. Golfer expectations are a driving influence

on putting green maintenance programs in general and putting green mowing heights in particular. Indeed, golfer expectations have pushed the mowing height issue to the limit of what a turfgrass plant can withstand. Currently, equipment is capable of cutting putting green turf to a height of $\frac{1}{16}$ ". This equates to .0625 inch or, in metric terms, just above 1.5 mm. That is approximately the thickness of a nickel. Excessively low height of cut does not leave any margin for error. It also doesn't leave adequate leaf tissue for the plant to produce the essential ingredients for sustained growth. We are rapidly approaching mowing heights that are, in effect and in reality, cutting the life out of the turf. Ultra-low mowing heights *cannot* be sustained throughout the season without experiencing some level of surface deterioration.

A number of strategies can be integrated into a holistic program to produce the desired ball roll and pace. Courses that host tournaments perform these tasks regularly to prepare for the special event. Preparation often begins months and sometimes years prior to the event, depending

upon the scope of the competition. Five to six years of specific preparation can go into conditioning a golf course for a U.S. Open Championship. The turf is conditioned and plant health is maximized so that it can better tolerate aggressive maintenance regimes and the high volume of play that will be experienced over a short period of time. Maintenance programs are fine-tuned to deliver precise playing conditions. Green speed is a result of efforts to produce optimum ball roll. Once the competition is completed, maintenance regimes are readjusted to support everyday play and turf health.

There has been a great deal of research conducted on the maintenance factors affecting putting green speed. However, there is an art to utilizing these strategies successfully. A balance should be maintained and a certain amount of discretion should be exercised to avoid compromising turf health for prolonged periods of time. Knowing "when to hold 'em and when to fold 'em" applies to turfgrass management. No program should be set in stone, and some level of compromise will always be necessary.

Basic agronomic programs must be in place in order to grow grass that can tolerate aggressive surface preparation strategies. While some thatch is essential, too much is detrimental.





There are controllable and uncontrollable factors that affect putting green speed. The weather greatly influences the pace that the ball travels over the surface.

WEATHER FACTORS

Climatic conditions affect the growth of the grass plant, which directly impacts surface performance. Environmental conditions make a difference and must be factored into the strategies that may be used to produce the desired green speed. For example, green speed will drop during periods of high humidity and/or high soil moisture. The effect is even more pronounced if excessive thatch accumulations are present. When moistened, thatch swells. This is when footprinting and scalping damage can occur. Efforts to counteract this natural phenomenon should be in place well in advance of the condition.

Conversely, when humidity is low and the soil is dry, desired green speeds are easier to maintain. In the Mid-Atlantic Region, these conditions are more often experienced in the spring and fall. Favorable soil temperatures result in consistent and reliable turf growth that allows conditioning programs to be more effective. Soil temperature can be used as a means of detecting changes in turfgrass growth. Favorable temperature regimes allow the turf to tolerate aggressive maintenance practices without experiencing rapid turf decline. Basically, cultural strategies implemented in the fall and continued in the spring prepare the turf for the dog days of summer, and this has a great impact on the level of playing consistency that can be expected.

CONCLUSION

Providing putting surfaces that offer true and consistent ball roll is not as simple as lowering the mowing height. Many variables need to be considered when designing putting green management strategies. The first and most important step is to have well-defined criteria for putting green conditioning. Break down the criteria even further to distinguish between regular daily play and special events. Establish an acceptable range of putting green speed for each category of play. Then weather, maintenance infrastructure, and agronomic factors can be evaluated to produce putting green performance criteria that are realistic and, most importantly, tailored to your operation.

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Maintenance strategies that can be used to influence putting green speed include but are not limited to: multiple mowing, use of grooved rollers, vertical mowing, brushing, grooming, top-dressing application, rolling, water management, application of growth regulators, and balanced fertilization. Through planning and careful implementation, the pieces of the puzzle can be fit together.

