LET THEM EAT TURF
DIVOT RENEWAL

Weather its a grass Playing Field or Golfing surface a quality divot free surface is necessary for safety and playability. The surface can be blemished yet needs to be smooth and complete. This typically involves filling the divots wetting the surface then rolling it with a roller to smooth the surface. The wetting settles the air spaces in the subsurface and along with a roller will compact the subsurface. The grass is above the the subsurface and it is important too.

Maintaining a quality playable surface throughout the season is the topic of this article. There are many factors in supplying great looking quality practice facilities and fairways. The varying opinions and views may work locally and regionally. Providing a quality hitting surface throughout the season is the common goal. To have quality practice facilities adds real player value. There is a orchestra of factors that contribute to success or failure of divot renewal. Growing season is a primary limiting factor along with total sunshine.

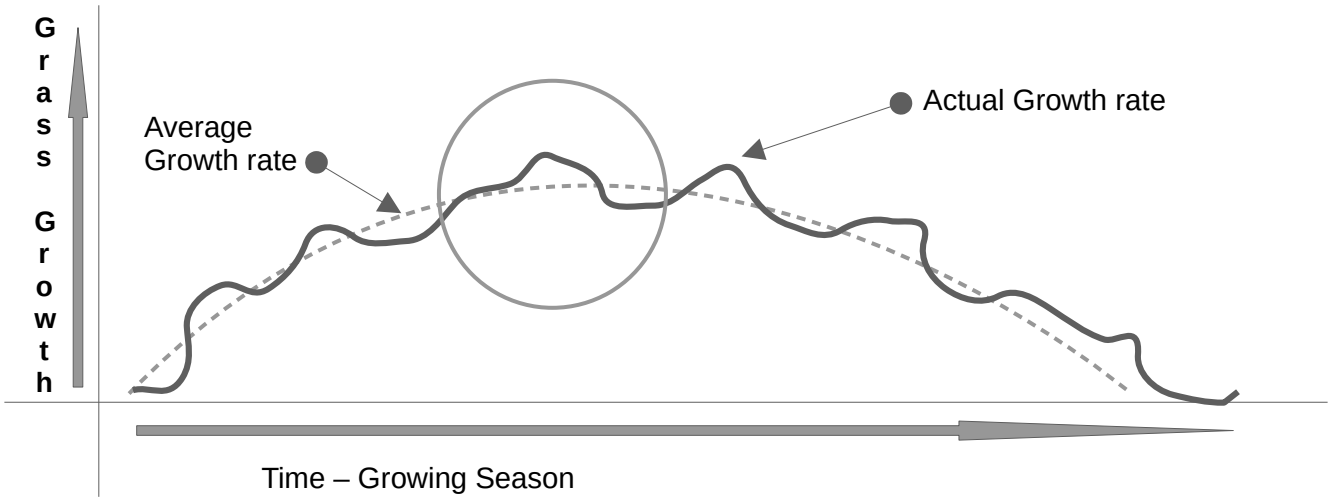


Figure 1.Demonstration of potential grass growth energy over a growing season. Each season is unique and variable due to Sun, water and nutrient content of the growing area. Divot recovery is both horizontal and vertical growth.

The ideal outcome for a properly filled divot is a smooth level grassy surface free of inconsistencies within a set renewal time. To reach this divots must be filled with the correct type of fill for the surface. Creating a consistent level surface below the grass is why the divots are filled. Sand compacts over time creating a quality sub surface. The bigger and deeper the divot the longer the time to heal without added, plugs, seed and nutrients.

The filling of divots is the single event that signals the start of the turf healing process.

Proper leveling and filling of divots is of utmost importance. To just use a top dresser and a drag screen without checking the level of settle and the quality of the divot fill is a waste of time. Remember the driving range plot has to have a level surface to hit from an be free from inconsistencies. Ideally the more even the Sand is leveled the flatter and more even the surface. This is ideal to avoid Sand build up creating an uneven surface. Sand is additive over time so the attention to detail matters.

If filled with a Sand like fill air space will settle out over time. After a day of settling and/or watering the top of the divot is roughly a ¼ inch (6.35mm) below the surrounding turf. This is a quality fill. It is compact enough that it does not wash out with heavy watering. This will allow the grass to grow in evenly. Leaving a smooth surface for mowing. For fairway divots a little pressure may be required to even the surface for mowing.

The type of fill for driving range divots is important as it has to match the type of surface to be filled. To add a soft compost as a fill for a lawn could leave a greener soft spot and creating a surface mismatch as well as an inconsistent look. A good quality divot sand contains a small amount of nutrient to help speed growth and has good drainage. Sand used for starting greens works well as some have carbon and other mixed in nutrients.

The ideal outcome is a smooth level grassy surface free of inconsistencies.

Fills can be complicated by cost, quantity and availability. Typically, for larger operations, two types of fill are typically used green sand and regular turf quality sand (#30). Green sand (glauconite) is used mainly for tee boxes as it has many available nutrients for increasing the renewal rate. The down side of green sand is the expense and therefore it is not typically used on large divot plots like driving ranges. It may still find a place in smaller driving ranges that need an increased renewal time and where cost is not an issue.

nutrients as well as microbes to free nutrients over time. A properly filled divot will renew in reasonable yet variable amount of time and leave a nearly ideal playing surface over time if done properly.

Many different factors complicate the problem of renewal time. Weather, Temperature, Sun hours, nutrient availability, grass type all play a variable role. Most important is renewal

time. Reducing turf renewal by even a few days over a season will increase the golfer capacity with limited driving range space and reduce the use of mats.

The event of importance is the filling of the divot.

Regular turf sand (#30) is used on larger driving ranges in combination with a fertilization strategy since the typical underlying surface contains large amounts of sand. Some hot climate strategies contain a combination of sterile top soil and nutrients mixed with mostly sand. Pure sand on a hot surface can reach temperatures that will inhibit grass growth. New strategies are carbon based fills soaked in compost tea. These contain freely available nutrients in a form that plants can use when needed.

The early and late season healing renewal rate can start around 30 days and adjusted for the locality and budget. At the height of growing season shortening significantly towards the middle of the growing season. The variability increased due to the types of grass used, availability of warmth -- temperature, Sun and length of Daylight and water quality. The seasonal growth curve will vary according to latitude and other obstructions such as mountains and valley locations.

Fertilization techniques if done properly and managed well can take up to a week off of the rotation time. This would be critical in the beginning and ending of the growth season when the renewal time is longer. For warm season grasses, such as Bermuda grass, the fastest growing periods will vary depending on the temperature and water availability. Significant here is that the variance in growth rates not only vary by location also by day of the year and are unique by season by location.

In actuality there may be growth spurts and times of stall or colder weather or a combination that may slow or increase the growth. If the actual growth rate is known or logged then close estimate for the renewal time can be made. Not all seasonal growth rates will be the same for the same geographical region with respect to grass type. Example cold weather cultivars are quite resilient and still grow in the cold. Also growth rates vary by season to season to add to the complicated nature. So a rough estimate of the growth rate is an integral thing and sensed or taken a week or day at a time. Also if there are two grass types like a warm season and a cool season the renewal will be different.

The key metric here is the average renewal time for one day of Range use. Renewal time will be the basis of the rotation. Say its 32 days average throughout the year for one row day to get to perfect renewal state. If you made it 34 days just to be safe there are more options in

the Spring and Fall when demand is high for practice on grass. The renewal time in the early Spring may be right at 32 days. In the middle of Summer it may be as low as 24 days. Giving time to recover from heavy use in the early Spring. Late Fall may be the same way with increasing cold and limited Sun the renewal time might increase to 30 days. The extra margin may buy one or two rows as overflow. With this kind of strategy you have met and exceeded demand and a quality golf experience is the reward.

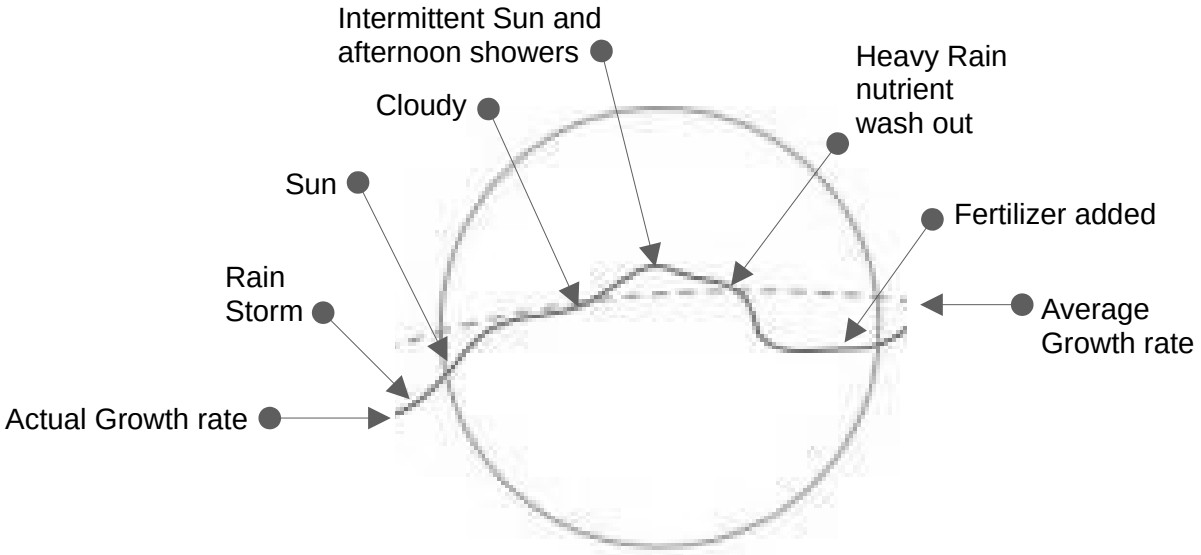


Figure 2. Explaination of the weekly detail on the variability of grass energy potential/renewal rate.

The mechanics of grass driving range hitting area placement is key for renewal. The event of importance is the filling of the divot. Even though the grass may grow when not filled the surface will not be correct. Sometimes with large divots they may need to be filled many times to even the surface. A consequence of not doing this or doing this sloppily is an uneven sub-surface and potentially a longer renewal time.

When measuring divot renewal throughout the season. The renewal time is triggered by the fill event. Placement of hitting area rows would wisely take this into account. There is some leeway during the height of the growing season where divots can wait to be filled. There is a point of diminishing returns. If it takes a week to fill divots it will take slightly longer to renew. Again the many factors mentioned above will contribute to a successful renewal. Basically its about temperature, Sun amount, nighttime temperatures and nutrients.

Cataloging heavy use days may lead to some insight. Monitoring high growth days and conditions as well as usage by Golfers. For example driving range may have high demand for practice early in the Spring when the grass growth rate (renewal rate) is much slower. Fertilize if possible. Use mats to catch up or delay grass use. For fields covers or radiant heat systems can help speed recovery if temperature is an issue. Especially if the temperature of the soil

and air temperature close to the grass is in the growing range of the chosen grass type.

Large divots require both horizontal as well as vertical growth. This takes energy (Sun), water and nutrients that the grass(es) can use. Large wide deep divots take longer. Driving range etiquette is well known among serious golfers. They will use stripes which heal faster.

A Golf driving range example. In some cases divots can be extreme. Much deeper and wider than horse hoofs or foot spikes can make. This may require multiple fills to bring up to level surface. Train members, if possible, on proper Driving Range cultural and club practices. Renewable strategies are a win for the operation and the golfer. It requires some patients and understanding about the process of getting to a sustainable system of renewal more from the Golfer.

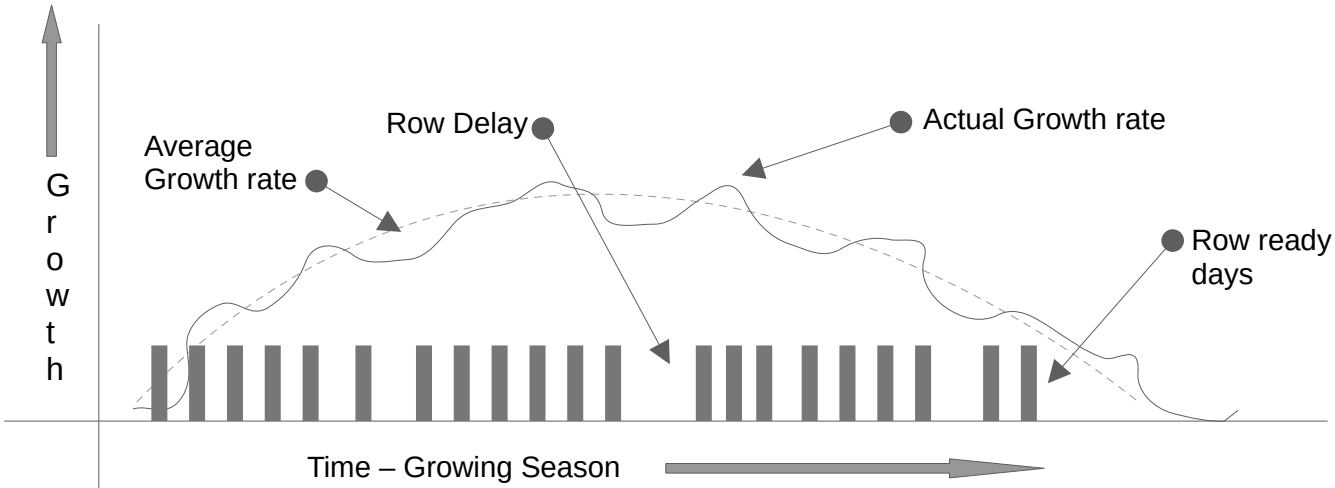


Figure 3. An illustration of ready row days and row delay based on variable grass growth.

What row ready means is a row of driving range has grown in and is ready to use. Grass has grown in completely and there has been enough water, sun and nutrients to help the grass. If this is a horse jumping area then maybe four different spots can be rotated to make a renewable arena. The spaces between the red rows means that grass growth is not ready to be used and has not finished growing yet.

If the grass growth in figure 3 includes a row delay. The driving range should not be used and a row has to stopped from use and be redirected to another spot. This is necessary for the grass to fill in. In the case of driving ranges this means that another area has to start use. Which may mean that there are two areas of rotation.

Sunny day with good water and nutrients the grass grows well. Any less than this and growth is slowed and it will take longer for grass to fill in.

The divot fill in time is started when the divot is filled. If it is filled properly the area will stay level. If not it will have to be rolled after a soaking rain to flatten the area. This will impede growth and introduce delay. If this is in the high use season there will be a problem and mats

will have to be used.

The use of divot mixes and regular watering and time release fertilization are very important to keeping the grass growth moving. Other types of limiting action like a sign up sheet or a Range time limit may help. Hitting off of grass is important to the Golfer. There is a big difference when practicing a swing. Many high end clubs pay good dollar for a quality practice area.

Renewable Driving Range Strategies

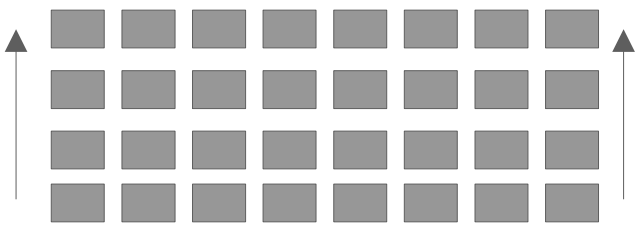
Calculate and/or observe how long it takes for an average size divot to renew. Design a station rotation around the number of renewal days in the space provided. Renewal days will be longer in the Fall and Spring in latitudes farther from the equator.

Draw out a renewal rotation complete with rotations in the Fall and Spring. Spring driving range grass usage rates tend to be highest all year. Reserving and preserving grass for this demand can be tricky if not planned for. Start and maintain a steady rotation. A good start can make for an easy and rotation plan. Large tournament demands and other events can make subsequent rotations difficult. When in doubt use mats for even a few days to help with the rotational renewal. Renewal time starts when the divot is filled. Nutrient Sand or other quality Sand mixes will help speed renewal.

Most strategies move backward from a front most position. In this way the filled divot renewal is undisturbed and will grow in slightly faster. Always reserve an area for emergency overflow.

Grass is a community. There has to be quality growing grass in proximity of divots in order to heal properly. The type of Sand or fill mix used to fill divots is important as well. Nutrient Sand will heal faster. Leave a fair amount of space between each station row usage (6 feet – 10 feet). There is a always a preference to less grass use than more. This means leave space around your driving range stations if you can. It will heal faster. If you are in doubt about this test it for your area.

Scheduling of grass time is an option for some places. Members and patrons would have to schedule time on grass and be limited to a time limit otherwise use mats.



This example uses one station area scheduled by appointment per day for 32 days for a renewal strategy. At the end the first station is used again and the last station restarts on the first one.

Another example:

For a single grass example using a Bermuda cultivar on a fictional a driving range with say 30 rows of 25 golfers. Using a rough healing or renewal metric of 30 days. The total golfers per day is 25. One row is used per day. 30 rows. Each row is divot filled everyday and the next row back set up the following day. This will allow 30 days before the starting row is reached again. This is our renewal strategy. As it gives thirty days to renew and when we reach row one the divots are healed and its ready. When using reverse rotation allows the previous days filled divots undisturbed the next day. In Fall and Spring may have to go to mats to buy some time for divot healing. There will always be a time in the Spring where it is important to use the mats. Schedules and plans can be published in news letters and member communication for improved support. Most of the time the resource can be made renewable with a little ingenuity and communication.

Notes on how to use this article

Every grass surface has a different set of parameters and variables with out artificial influence. It is important to be flexible with respect to the budget, labor, and local culture. Important to consider your locality and also on a global level the Latitude and Longitude and associated season characteristics or lack thereof in order to reduce renewal rates. This combined with local conditions such as valley, hilltop, or Ocean proximity can add to more understanding. Access to water and Sun and nutrients is essential. The type of grasses used along with the ability to recover or grow quickly and what it takes to do that will help. The type of playing turf as well as the surface underneath all add value and understanding. How well it looks after heavy play is just one tell.

When in doubt gather data all year long. Look closely at Sun wind and rain. Measure carefully growth rates on the different grasses if used. Note important peaks of growth and lack of growth will help create a unique understanding of your environment. Try different techniques and times on covering divots. Understanding of your specific environment increases the chances that the best solution for the time of year may present it self. When in doubt look at the data.

Key Points

- Grass that is taken away will have to grow back for a quality experience. Renewal.
- Grass renewal can be highly variable. Seasonally variable and unique by year.
- If possible catalog use/growth per day per site and renewal times.
- The start of renewal time is typically after the divot is filled properly.
- Use well known techniques to reduce renewal time. Use a quality fill and a nutrient strategy. Maintain or reserve one or more backup areas for overflow and events.
- Slow early Spring season grass growth may not match demand.
- Use mats or schedule use to catch up on growing days. For a single grass example using a Bermuda cultivar on a fictional a driving range with say 30 rows of 25 golfers. Using a rough healing or renewal metric of 30 days.
- Renewal time takes longer in Spring and Fall yet not necessarily.
- With large divots there is both horizontal as well as vertical growth.
- Grass renewal requires Sun, Water and nutrients (energy) and temperature.
- The renewal rate is proportional to the size of the divot.
- Bigger the divot longer it takes to renew.
- Grass can grow from 0 to 2 inches in a week and can be highly variable.
- A faster divot recovery may be realized if it is left uncovered for a few sunny days. This may be very dependent on grass type growth factors, soil, water, and nutrient availability.
- End of season golf strategies might want to go to mats one month before first frost (see fig 3).
- Both a diligent and easy approach achieve nearly the same outcome for filling divots.
- Larger divots may have to be filled many times for the surface to be even out.
- Roll your driving range after a soaking rain with a large street roller in the late Summer well before the grass goes dormant to flatten the surface. Go slow and be gentle with turns and only do what you need to do. Leave the other areas that are flat alone.

