

Golf Cart Path Planning

By Grant T. Spear

INTRODUCTION

Are golf cart paths really necessary on the average golf course? The use of golf cars and paths on courses is a highly debated issue among individuals within the golf industry. Most Southern and many Northern golf course superintendents believe path systems maximize golf car revenue. Whether or not golf cars are good for the game, even wider use of cars is anticipated in the near future and planning should reflect this fact.

PERSONAL SAFETY OF GOLF CAR DRIVERS

From the initial planning stage, one must fully realize that responsibility for the safety of people and property exposed to the finished path is an inherent aspect of all design activities. The number of golf car connected liability and damage suits has been rising. In some cases the golf course owner, the golf car manufacturer, the car dealer, the course's golf car mechanic, the course architect, the paving contractor who installed the path and others are all named as defendants. Losses in such lawsuits can be well over a million dollars so precautions must be taken in designing golf cart paths.

"The best way to deal with potential litigation is through the use of documentation, (which should be) sufficient to establish what the superintendent and staff have done or observed with regard to the course (Ochs 26)". Equipment maintenance records should be kept which reflect routine maintenance as well as periodic safety checks done on each individually numbered golf car. A list should be made of exactly what is checked in each inspection.

Other precautionary steps should include the following:

(1) Ask golf car suppliers, before signing a contract, to have an engineer on their behalf inspect the course, slopes, bridges and paths for safety. Get a written affidavit stating that an engineer inspected conditions and certified that the equipment is capable of safely and routinely negotiating them, even with inexperienced drivers.

(2) Install all safety features recommended by the designer like curbs, speed bumps, traction grooves, warning signs, barriers route indicators and anything else.

(3) Clearly post driving instructions on golf cars for new and inexperienced drivers. This should include a warning about drinking or using "judgement impairing" drugs while operating a car.

(4) Rental slips should contain a liability disclaimer protecting the owner which was written by a lawyer.

These extra measures may be costly, time consuming, and bothersome, but they may be the difference between winning and losing a court case. Besides, the records may also save money in maintenance and repairs; personal computers are handy for such records.

RULES OF THUMB FOR GOLF CART PATHS

No standards of placement exist for golf cart paths. The extensiveness of paths on a golf course can vary from limited paths near tees and greens of certain holes to a system covering the entire course. The factors in deciding the extend include: (a) the course design relative to traffic intensity, (b) the intensity of play, (c) the funding available, and (d) the personal feelings of members toward golf cars.

WHEN TO INSTALL CART PATHS

Regardless of cultural practices on a course, scarred bare areas may result from intense traffic. Soil erosion is increased in such areas. Also, traffic tends to move around these bare spots enlarging the damage more and more.

The common solution is to install a path to confine the intense traffic and allow turf to grow back into the surrounding area. "Cart paths are the only realistic solution to bare, eroded areas (Beard 536)." Other specific reasons for installing paths include minimizing washout areas on hilly courses, increasing the safety of golf car operation especially when the course is damp, reducing soil compaction in heavy traffic areas and directing traffic flow to minimize slow play problems.

GENERAL GUIDELINES

Paths should be as close to the tees as possible without completely destroying the aesthetics. Ideally, run the path parallel to the length and flow of the tee so golfers will spread possible wear all along the margins. Place the path close to where most people are expected to hit the ball in the fairway, yet reasonably out of play. Although close placement evokes the controversy about the balls hitting the path, if the paths are too far from the fairway, either use of them will slow play or nobody will use the paths. The superintendent and designer must decide on the placement on an individual basis for each hole. Also, one well placed path segment can often serve two holes in the case of parallel fairways.

A combined golf cart path and service road cuts the amount of paving and the overall costs. A double duty path obviously will be built of stronger materials and therefore could also provide random security and emergency help service to stranded or distressed golfers. It is generally wise to locate irrigation satellites near paths, to allow for emergency vehicles to easily penetrate the central core of the course and to design bridges, tunnels and crossings to accommodate light trucks.

MINIMIZING POOR AESTHETIC QUALITIES

Since golf cart paths generally disturb the landscape, conceal them as much as possible. The path can sometimes be used as an accent or can be given a more organic look if it is in concealable. Harsh qualities can be masked with bunkers of comparable coloring, shrubs, ornamental grasses, flowing curves rather than straight lines and by the type and color of construction material chosen. Dark colored materials of a hue similar to the surrounding turf are preferred with few exceptions. However, white limestone may blend well with sand bunkers.

FACTORS IN MAKING PATH DECISIONS

The practical demands of the course's soils, the climate and the amount of available construction funds must also be considered. If the goal is to at least meet the costs of the golf cars and paths with rentals, then the long term financial picture must be considered. A short rental season and/or the probability of low golf car volume may dictate the best type of path to install. A complete path network is not probably necessary.

DESIGN

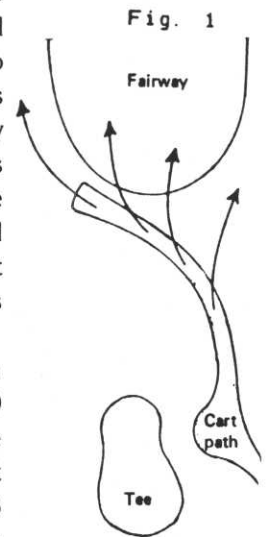
Many people feel golf cart paths should be installed on new courses only after about six months to a year of play. This allows the superintendent to get a picture of the traffic patterns while taking safety and ease of play into account. Others think paths can be built with the new golf course. A major disadvantage of waiting to install a path is that golfers may have already developed habits of driving in the wrong areas which will be difficult to break. A third approach, used when funding is limited, is to draw up an entire path system for a course. As money becomes available, segments are constructed starting with the areas of severe wear to the areas showing the least wear.

Limited Paths. On well-drained golf courses limited paths can be installed only in trouble spots allowing cars to travel on the turf elsewhere. Paths from tees which end abruptly usually see heavy wear at the end. Solutions to this problem include having the path arc slightly at the end to spread out areas of wear, using a flared cart path terminus with portable barriers or combining the two (see Fig. 1).

Measurements. Paths widths usually fall within a range of 6 to 10 feet with 8 feet being considered the norm. A reason for this norm is that asphalt-laying machines will work at 8 foot widths. Besides, carts stay on a path better as it widens and maintenance vehicles fit well, too.

PROBLEMS

Avoid sharp curves by banking and/or widening the curves. Steep slopes near water or drop-offs which paths traverse should have guard rails, walls or curbs. Excessively steep uphill slopes and downhill inclines which cause excess cart speed are best avoided. Surface contours are recommended to allow surface water to freely flow over or off the cart path. A center 3 to 4 percent higher than edges is



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suggested for flat terrain. In hilly terrain sloping to one side works well (Beard 538).

CHOOSING CONSTRUCTION MATERIALS

The types of path construction can be as simple as dumped and graded gravel to concrete of sidewalk standards. The considerations in selection of materials follow: (a) wear tolerance, (b) cost, (c) effects on play, (d) aesthetics, (e) long-term-maintenance, (f) availability, and (g) course topography.

COSTS OF CONSTRUCTION

The cost of materials parallels the sophistication of them starting around 50 cents per square foot of rolled gravel to \$2 per square foot for top quality blacktop and up to \$4 per square foot for top-of-the-line concrete (Hurdzman 14).

Construction costs should be weighed against longevity of the path, since response to internal soil drainage and climate is the most important cost determining factor. Paths rarely have a chance to wear out before weather--specifically wet or freezing weather--ruins them.

The freezing and heaving, thawing and settling of the path's surface or base is primarily responsible for the destruction of any paved surface. Combating these forces in the construction of the path or pavement will increase cost but add to the path's life. The best solution realistically available is to reduce soil water content as much as possible and produce a pavement resistant to settling and heaving.

SURFACE MATERIALS

Cheapest Paths. Spreading stone, gravel, wood chips or other loose organic materials on the ground and compacting it is the least expensive alternative for a path surface. Lower budget courses which start with a gravel surface may, once it has settled and stabilized, wish to use it as a subbase for asphalt or concrete at some future date. Of course, this settling decreases the longevity of gravel as a surface, too.

Organic materials work well on level areas where erosion is not a problem. An advantage besides low costs is that it usually absorbs the impact of stray balls; hence organic materials are often used on paths in areas which often come into play. An obvious disadvantage is that reapplication is periodically needed to replace losses from erosion, weathering and decomposing else they will too rapidly soften and degrade. Another potential disadvantage to organic products is that availability problems may drive up the cost.

Improved Weathering Resistance. A further improvement can be made by installing an engineering fabric between the surface material and the soil. This cloth provides dimensional stability so the path materials cannot be pushed down and provides some underdrainage, as well.

Additional costs of such materials is about 20 cents per square foot, but it may triple or quadruple a path's life. However, these engineering fabrics may have environmental limits since some will become brittle and break in extremely cold environments.

Without these improvements these cheaper paths are short lived compared to paved surfaces. They may last anywhere from a few days, in extremely wet conditions, to

about a year prior to maintenance.

Hard, Long-Lasting Surfaces. Pavements better resist environmental and traffic wear. Although the initial investment is higher, they are more maintenance free.

A simple form of paving, known to some as "chip and seal", is made by preparing a smooth base, applying a thin layer (about 2 inches) of gravel chips, covering it with tar and rolling. Repeating this process to a 4 inch depth reportedly works well for light vehicles. An underbase of gravel (4 inches), engineering cloth, or both will extend the life of this paving by reducing soil water effects.

Chip and seal costs about 75 cents per square foot. This low-maintenance, lower costing pavement has a textured look and will last nearly as long as blacktop (Hurdzan 16).

Blended asphalt, or blacktop, is a commonly used surface (see Table 1) and costs as little as \$1 per square foot to \$2 per square foot using a gravel base and engineering clothlayers to reduce weathering (Hurdzan 16). All blacktopped surfaces are very low maintenance, long lasting and smooth riding.

Many superintendents have found that gravel subbase for blacktop negatively influences drainage unless tile drainage is added. Hence, most pavers recommend direct placement of blacktop layers over the soil over engineering cloth. Usually at least two inches of coarse asphalt is used for the bottom layer, followed by another 1 to 2 inches of coarse asphalt or fine asphalt which feels better under spiked golf shoes. Finally, cement, which has high rigidity, nearly no maintenance requirements, practically endless life and the best ride, is the most expensive paving surface. Water and acid-forming and acid-based chemicals are hard on cement. Reinforcing rods can be added to cement for increased strength much like the addition of engineering cloth to asphalt.

For higher traffic roads carrying heavy equipment, at times, cement is the paving of choice. Good underdrainage is still necessary even though resistance to weather is better than other materials. A gravel subbase (4 inches thick) and tile is usually used. Pavers recommend a 4 inch thickness of concrete with expansion joints in Northern climates. A rough textured surface is preferred in areas of foot traffic since golf spikes don't mix with smooth cement.

Alternatives. Recent innovations not yet fully tested under golf course conditions are honeycomb or matrix structures. Composed of wear-resistant materials ranging from concrete to plastic, these structures are designed to carry the weight of repeated golf cart, vehicle and foot traffic. Such a material with regularly spaced openings or cells in various geometric configurations, if properly installed over a well drained subbase with a coarse textured root zone, allows adequate water infiltration for turf to grow in the spaces (Beard 539). Interspaced vegetation provides cooling of the surface and it blends into the adjacent turfed landscape. The full potential of such a material is yet to be determined.

ENCOURAGING PATH USE

The main way to get golfers to use any golf cart path is to have the proper placement as was stated earlier. Most golf

courses have to route their cart paths in a few areas in patterns that are less convenient or different from previous traffics patterns. The addition of traffic aids to encourage use such as signs, chains, ropes, lines, landscape plantings or movable barriers. They are positioned to direct traffic to the path. Golfers will hopefully adopt the new patterns and allow the eventual removal of the aids.

More drastic measures like new bunkers, trees, grassy mounds or shrub plantings may be necessary in extreme

TABLE 1

Cart path construction materials by percent use.

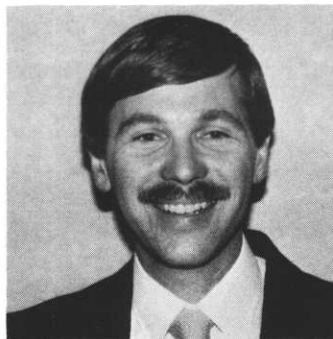
Asphalt	65	Gravel	45
Other	17	Don't have cart paths	12
9 mentions: Cement/concrete			
3 mentions: Dirt			
1 mention each: Limestone-Shells-Lava rock-Sand-Woodchips.			

cases. On golf courses with complete path systems, carts are sometimes restricted to the paths. Even with incomplete paths, courses sometimes restrict cart traffic to the paths on the holes where which have them. These regulations are best enforced by meetings with the club membership.

There are obviously no absolute guidelines for golf cart use on a cart path system. All decisions should be made on the basis of the course's topography, the extent of the cart path network, the physical soil conditions, and perhaps most importantly, the opinion of the course's clientele.

Grant is a senior majoring in Turfgrass Management at Iowa State University. This paper was part of his required study in Horticulture 451.

Credit: Iowa GCSA



EDITOR'S CORNER

TOM FISCHER

We would like to thank the Association members, especially Mike Leitner, for this year's fantastic family picnic held June 13 at Tartan Park. The picnic was well organized with a train ride, treats and playground for the kids, golf for the guys, a raffle of beautiful plants for the gals and excellent food enjoyed by all. The day was a great success not only for the members with families but also for those who came for the camaraderie of the Association. I know my family missed not having a picnic last year but with the success of this year's, I hope the picnic will become an annual event.

Many thanks to Joe Moris and his staff for hosting the golf and picnic grounds. This is an excellent area for recreation and relaxation.

HOLE NOTES is still looking for articles to be published monthly. I know many of you have helpful ideas and sound turf knowledge that could be shared with your fellow superintendents. The article does not have to be lengthy thesis, just good common sense ideas to aide in turf management. Also of interest to write about would be the history of your golf course and/or club and tips from your mechanic on how to keep y our equipment in top condition. Hope to hear from you soon.

Mail your article to:

Tom Fischer
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