As a USGA Green Section agronomist who sees more than 150 golf courses each year, I believe the vast majority of cart path projects do not accomplish their most basic objectives, which are to minimize wear problems and improve esthetics. It is truly one of the most overlooked areas in golf course maintenance.

Although there are more than a few ugly cart paths in existence, they all have one or more characteristics in common, including poor design, construction and/or location. Traffic from golfers and their carts can make it impossible to grow healthy turf, and the resulting worn turf and rutted or bare soil is unattractive and provides a poor playing surface.

Also, according to the Rules of Golf, relief cannot be granted unless the area is marked “ground under repair” or is deemed to be a part of the road or path and is so marked. When these situations occur in high playing areas, definition and marking complications ensue.

Aside from the remedial cultural programs that can be employed to minimize the effects of traffic on turf, there are two basic ways of handling traffic successfully: channel the traffic on hard, impervious surfaces or spread it out over as large an area as possible. Although these concepts may seem elementary, it is more complicated when the prospect of making a transition from one method to the other is considered.

Somewhere along the line, concentrated wear usually occurs. If a continuous system of paths is not installed or if golfers are allowed to venture off the paths, provisions must be made for getting the carts on and off the paths without causing excessive wear at these locations. The paths themselves must be wide and durable enough to withstand traffic and retain definition without being a burden to the maintenance staff and the budget. They also must be designed in such a way as to be easily used by golfers, but not be so obtrusive as to affect playability.

“We have met the enemy and they are us”
Some of the most intelligent people in the world play golf, yet when these same people drive golf carts, intelligence often is conspicuously absent. Simply put—golfers sometimes commit incredibly foolish acts of thoughtlessness when they are behind the wheel of a golf cart. Generally, they are concentrating on their game, trying to locate their golf ball or are talking to other golfers when operating these carts. Little thought is given to how their carts should be operated. Since it is not like driving an automobile, where the threat of personal danger tends to keep one’s thoughts more focused on driving, many golfers do not think about obeying golf course traffic rules. Thus, traffic patterns and cart path use should be kept as simple as possible.

The nature of the clientele at a course must also be considered. Golfers at some courses respond favourably to direction and make a concerted effort to operate carts safely and in a non-destructive manner. On the other hand, golfers at some courses are practically impossible to control. For courses with a difficult clientele, directional accessories (signs, stakes, ropes, barriers, etc.) should be sturdy, resistant to damage and highly visible. For instance, a single stake with an arrow or simple message may be sufficient to direct carts to enter or exit a path at a course with conscientious golfers. However, even sturdy stakes and nylon rope may not be entirely effective at courses where golfers are less mindful. Directional accessories should be easy to move, so that traffic patterns can be adjusted frequently.

It is also possible to locate cart paths farther from play at courses where golfers are more co-operative. Although it may slow play slightly, keeping cart paths farther from play can reduce their impact on play and course esthetics. Entry and exit opportunities should be provided only where appropriate.

Planning
It is essential to avoid safety problems regardless of the nature of golfers. Serious accidents can result in disability or death. Where possible, avoid dangerous design features such as steep slopes and sharp, improperly banked turns. For particularly difficult projects, it is wise to involve a qualified engineer in the design
phase and to research local construction codes. It is also a good idea to discuss proposed cart path projects with your insurance agent. Golfers are out for fun and competition, and while safety may not be uppermost in their thoughts, liability and safety should be uppermost in yours.

Whether or not there are immediate plans to install a system of tee-to-green cart paths, a comprehensive plan to do so should be developed early on. A qualified golf course architect can be a valuable aid in planning a cart path system. Such a plan can be implemented over a period of years to minimize disruption and cost and reduce the possibility of waste.

**Avoiding wear around cart paths**

Since the reason for establishing cart paths in the first place is to eliminate wear problems, it does not make sense to install them if the goal cannot be accomplished. Surprisingly, that is precisely what is done at many courses. Wear problems are common at entry and exit points, around feature areas (greens, tees and primary landing zones) and at points where carts frequently have to pass each other.

One key to avoiding wear around paths is to maximize the number of entry and exit points for the carts. This may sound basic, but it is often overlooked. Forcing carts to enter and exit in just a few restricted areas causes unmanageable wear problems. Usually, the solution is to extend cart paths well in front of the feature area to provide 18 m (59 ft) to 36 m (118 ft) of potential entry and exit points. If the location of the path is along the perimeter of the hole, the extensions may start or end in a straight line parallel to the line of play. Unfortunately, the presence of mounding or bunkering (particularly in an approach) may make this difficult or impossible. If that is the case, the cart path can be extended beyond the obstacle or the entry point can be located in a less important play area. If the location is more towards the center of the hole (in front of a tee), the path should end in a wide arc.
The shading and root competition effect of trees are magnified in high-traffic areas. Thus, entry and exit points should not be located in heavily treed areas. Further, avoid cart path locations that place trees between the entry and exit points and the primary traffic flow. Trees form immovable barriers that funnel traffic and compete with turf.

It is a common practice to build wide fan- or ball-shaped entry/exit pads for cart paths. Often this is helpful, but rarely is it sufficient. Combining extensions with the widened start and stop points is much more effective. Regardless of which method(s) are used, some type of barrier is needed to indicate where carts should enter and exit the paths. Again, keep it as simple as possible when selecting signs and/or barriers.

Topography must be carefully considered when the location and length of the extensions are determined. Paths should never start or stop on/near slopes. Aside from obvious safety concerns, the slopes will tend to channel traffic. More friction and slippage between tires and turf can result when carts change speed on slopes. This will cause even more damage.

**Location**
The location chosen of cart paths has a big impact on playability, and wear and safety, but they also greatly affect esthetics. Unfortunately, their locations are sometimes chosen by default. That is, the path is installed wherever the wear spots develop.

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**Cart Path Checklist**

Here is a checklist for developing a cart path system:

- Have applicable safety guidelines been met?
- Have multiple entry/exit points been created for carts?
- Have multiple entry/exit points been created for golfers?
- Are paths designed with adequate width?
- Has curbing been installed where appropriate?
- Has disabled golfer access been included in the design?
- Has surface drainage been considered?
- Has environmental consideration been given to storm water disposal?
- Have stable materials been chosen for paths subject to erosion?
- Will the new paths be clearly and cleanly defined?
- Have tree root interference problems been avoided in high-traffic areas?

This amounts to taking the path of least resistance and assumes that paths should be located where golfers drive carts.

Assuming the carts have multiple entry and exit points, getting golfers to and from the feature areas must now be considered. Routing a cart path to the edge of a green and off to the edge of the next tee, will create wear problems because it provides a very limited number of entry and exit points. This is made worse by the presence of immovable obstructions between the path, green or tee. Trees, shrubs, severe mounding and bunkers, all serve to funnel traffic.

Wherever possible, wrap paths around tees and greens to provide multiple entry and exit points. Aside from logistical obstacles (hole design, topography, etc.), safety issues may be the biggest limiting factor with this type of installation. Cart paths should not be located in areas where golfers might be subject to shots from adjacent holes. Golfer safety is of paramount importance in cart path design.

In situations where wrap-around design is not possible, be sure the area between the path and feature area is wide and unobstructed. Redesigning bunkers and mounding may be necessary to widen the passageway. Removal or relocation of trees, shrubs, ornamental plantings or even ball washers and trash receptacles may also improve traffic flow. As mentioned earlier, traffic control accessories should be designed to be effective and movable.

Nothing is more esthetically disruptive than an exposed view of a cart path in an otherwise natural setting. Depending on the architectural design of the golf hole and its topography, it is often possible to hide cart paths from view. First, identify the intended line of play and the areas where golfers are most likely to congregate. Tees and landing zones are obvious choices, but there may be others. Next, consider how the existing topography might be used to obscure the cart path or make it less obvious. Mounding, curbing or performing regrading work are all
effective means of blocking the view of a path. However, mounding or curbing must not be so severe as to adversely affect traffic flow.

One of the easiest ways to hide paths is to pay close attention to the angle at which they are installed. Installation at an angle away from the primary view can make them practically invisible. On relatively flat terrain, this may have little impact on the cost of installation and requires only careful planning. This method is also effective when paths cross play areas or are routed up steep slopes. Routing the path across the slope and tilting it inward is an especially good ploy.

Winding cart paths tend to look more natural, but the turns should be banked and gentle. Since golfers are not paying close attention to where they are driving, sharp bends are one of the first areas where golfers will have a difficult time keeping carts on the path. Locating a path in a dense grove of trees may do a good job of hiding it, but entry and exit areas should be free of trees.

**Materials**

Any number of different materials can be used to build cart paths and can be organized into two basic categories—loose and stable. Concrete and asphalt are the most common stable materials and typically require much less long-term maintenance. Due to differing tastes, budgetary constraints and potential effects on play, courses often use less stable materials such as gravel, rock or brick dust, decomposed granite, crushed shells, pine straw, woodchips, mulch, etc. Unfortunately, less stable materials are subject to a number of problems, most of which are related to unwanted movement. For instance, most are subject to erosion, which can be especially troublesome with paths located on slopes. Many tend to be dusty when dry or muddy and prone to splashing when wet. Woodchips may stick to golf spikes and dustier materials may be tracked onto turf areas by foot and cart traffic. Carts and turf maintenance equipment may dislodge coarser materials (stones especially), which may present a hazard or cause costly damage to mowing equipment.

In addition, path definition problems tend to arise when less-stable materials are used. Installation of forms is suggested and provisions should be made in the budget to permit necessary maintenance, which may be substantial.

Cruising is essential around feature areas to prevent paths from growing wider. Golfers have a subconscious urge to pull carts off the paths by just a foot or so unless they are physically prevented from doing so. Regardless of the material used, curbing should be installed with soil and turf flush with the top of the curb. This makes trimming easier. Materials that are used for curbing vary widely and include, but are not limited to, steel, concrete or concrete fabricated products, asphalt, Belgian block, landscape timbers and railroad ties. Just be sure to install curbing only in areas where carts are not to be given options for exiting or entering the path. Provisions for disabled golfers should also be given full consideration.

Adequate width is an essential component of a successful cart
path project. A common failing is to install paths that are less than two metres wide (six feet). Narrow paths are more difficult for golfers and maintenance equipment to negotiate. Installing paths less than two metres wide leads to wear along the edges and more rapid deterioration of the path. Paths must be even wider in areas where carts congregate or pass one another and in areas heavily used by maintenance staff. Widths in these areas should be three metres (12 ft) or more.

**Drainage**

Cart paths can have a significant effect on surface drainage. Installed above grade, paths can block surface drainage and cause water to collect in adjacent turf areas. Installed below grade, paths may remain wet. Cart paths can be used in a positive way to intercept water and channel it to appropriate collection points. Also, drainage swells can be designed into cart paths. Keep in mind, there may be environmental factors to consider, the most important being the potential impact on course runoff into streams or other bodies of water.

**Conclusion**

Cart path installation can be expensive and disruptive, and since most golfers find them distasteful, there is a strong tendency to do the bare minimum. The shortest routings possible are often chosen and widths are made as narrow as possible. This is false thinking. Cart path systems can be installed in phases to spread the cost over a certain period of time. When considering a cart path project, it is imperative to start with a good plan and to make a firm commitment to quality. Poorly planned and installed cart paths are a waste of money because they are no more attractive or useful than the bare, eroded soil they replaced. Cart paths are a long-term investment, so take the time and effort to design and install them properly.

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**When Rubber Hits the Cart Path Road**

**By Sandro Forte**

Today's rubber cart path system originated in Europe about 40 years ago, when European polyurethane manufacturers introduced a moisture-cured polymer that was later used on synthetic track fields.

Eventually, this durable material made its way to the North American market, where it was primarily used to manufacture various sports surfaces, including tennis courts, running tracks, water parks and playground surfaces. The Canadian Standards Association (CSA) recognizes this synthetic rubber surface in their document CAN-CSA-Z614, *A National Standard of Canada*.

Although the rubber surfacing industry was expanding in Canada throughout the '80s, it was not until the mid '90s when the golf course industry introduced soft-spiked footwear after banning steel-spiked shoes, that rubber cart paths grew in popularity.

**Bouncing off the track**

Rubber cart path systems, which typically range from 38 mm to 50 mm (1.5 to 2 in.) in thickness, are made from polyurethane binders and recycled granulated rubber tires. Rubberized cart paths incorporate a reinforced structural geometric grid that evenly distributes a golf cart's weight, which helps maintain cart path stability, strengthens the rubber's surface and prevents tire ruts.

In addition, rubber cart paths are versatile in design, which allows golf course architects to contour cart paths in various shapes and widths. Such cart paths can be placed on slopes of up to 60 degrees and can be easily installed over existing substrates such as crushed stone, asphalt and concrete. Its porous design, which allows water to pass through its surface, creates a water percolation rate of 60/litres/m2/hour (15/gal/sf/hour). The non-skid surface enables better traction, even under wet conditions and is much safer for elderly golfers. Further, using rubber cart paths on steep slopes helps reduce golf cart speed and sliding.

Irrigation and land erosion are controlled by the rubber's ability to maintain ground structure stability. Rubber systems tend to expand and contract in response to bridge movement, while conventional hard surfaces often crack and deteriorate.

A rubber surface also absorbs impact, stopping the ball's bounce and allowing course play to continue with minimal disruption. And, rubber cart paths are available in a variety of earth tone colours such as terra cotta and forest green that blend with the natural landscape.

Initially, rubber cart paths cost more than traditional asphalt or concrete paths, but in the long-term, require less maintenance and refurbishing.

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David A. Oatis is the director for the Northeastern region, USGA Green Section. Reprinted with permission from the USGA Green Section Record, 1994 January/February Vol 32(1): 1-5.

Sandro Forte is president of Synthetic Golf Surfaces Ltd. He can be reached at sandro.forte@sympatico.ca.