Submitted by:
Sally Moss, Supervisor
District 6

Safety on our Multi-Modal Paths in The Villages:

We are all aware there is a major problem with the use of our Multi-Modal paths. It seems that everyone has their own idea on what the real problem is, as it pertains to them. It also seems that the Residents are requesting the problems all be solved by The Districts and are willing to put in their suggestions, but are not willing to show any responsibility for being the cause of the problem and making appropriate changes. The Residents are shifting the blame for all that is wrong to The Districts and the Engineers and I haven't heard anyone say, "Hey, you have a responsibility too. Whatever you think the problems are, maybe you should look at yourself and figure out what changes you can make".

Some say the problem is not being able to see the edges of the path safely after dark; some say it is the drift of carts from one side to the other due to distraction or lack of attention; some say when it rains their sight of the pathway is hindered.... Others are concerned about modified golf carts that go at a higher speed and seem to weave in and out of the slower traffic.

There could be stripes down the center of the multi-modal path with or without reflectors, there could be stand alone reflectors and there could be side-striping the multi-modal path; But, will these solutions really fix the problem? The Districts can not do anything about the distracted driver, but the driver can. The Districts can not do anything about the rainy weather or eyesight when driving after dark and we sure can't do anything about consumption of alcohol, but the Residents can modify his or her behavior behind the wheel. Some Residents have a different mentality driving a Golf Cart then they do an automobile. As long as the Residents feel they are not part of the problem, there isn't a solution that The Districts can come up with that will solve the problems. If the Residents aren't going to modify their behavior, there is only one solution to the problems perceived on the Multi-Modal Paths that The Districts can make and that is to set a speed limit on the Multi-Modal Paths.

It is a proven fact that the lower the speed, the fewer accidents and the less severity of the injuries. It is a proven fact that lowering your speed at night or in rainy or bad weather, lessens your chance of an accident. It is also a proven fact that at a lower speed there is more control of the vehicle and less time is needed to stop or correct the possibility of a hazardous situation.

A driver has to lower their speed in a school zone for 'safety reasons'. The speed was lowered on the Multi-Modal Path across Morse Bridge to Lake Sumter Landing for 'safety reasons'. The speed limit was lowered on Canal Street for 'safety reasons'.

We do not have any 'law-enforcement' available on the Multi-modal paths but we do have peer pressure. Maybe one day we will have some kind of law-enforcement on the these paths but it is peer pressure going across the Morse Bridge that enforces the 10 mph speed limit. It can be peer pressure that enforces a reduction of speed on the Multi-Modal Paths also.

The speed limit can be painted on the multi-modal path in strategic locations. There can be speed limit signs just like on the roadway. There can be law-enforcement on the cart paths that are part of a vehicular roadway to deter weaving in and out of cart traffic in the cart lane and speeding of golf carts. It can become 'uncool' to travel at a 'faster then others' speed to get someplace a few minutes faster than if you slowed down by a few miles per hour. Street-legal carts can be required to ride in the street and not in the cart path part of the roadway for "safety reasons".

If you are traveling at 15 mph and going three miles, it will take you 12 minutes to get to your destination. If you are traveling at 25 mph and going the same three miles, it will take you approximately 7 1/2 minutes .... BUT, as the attached chart from the Synthesis of Safety Research related to Speed and Speed Management shows, moderate injury increases from 10.6 per hundred to 29.2 with increasing your speed from 11-20 mph to 20-30 mph; serious injuries increase from 2.6 per hundred to 11.1 with this same increase of speed. This chart shows a direct correlation to speed and accidents without taking weather, time of day or age into the equation.

The Districts can not do anything about the weather. The Districts can not do anything about the time of day people travel and we sure can't do anything about people getting older, being distracted or their consumption of alcohol. The Districts can not do anything about residents thinking their cart is more like a toy and driving it that way. The Districts can not do anything about residents buying carts with high-speed motors. The Districts definitely can not do anything about companies offering high-speed carts with bigger tires, that raise the cart and it's center of gravity which makes it more susceptible to tilting and turning over when traveling at a faster speed. But The Districts can do something that has been proven to reduce accidents and make driving safer for all drivers, passengers and anyone else that is on the Multi-Modal Path with them and that is reduce the speed on the Multi-Modal Paths to 15 mph which is the top speed of golf cart models off the assembly line. (See attached Club Car and Yamaha Performance Chart.) Make it 'un-cool' to go fast on our Multi-Modal paths ... Make it 'hip' to slow-down and be safe.

Bottom line though is the Residents have to participate in solving the problem of safer Multi-Modal Paths. We have proof slowing down is the best 'road to take' for a safer ride

on the Multi-Modal Paths. It's a 'two-way street' and working together The Districts and the Residents can make The Villages a much safer place to drive golf carts and automobiles.

Please Note: The carts that are rented by The Villages Golf Carts all have 8" tires and operate with factory recommended speed which is 15 mph.

Attachments:
1. Speed & Severity of Crashes - Synthesis of Safety Research Related to Speed & Speed Management.
2. AARP Public Policy Institute: Figure 4 - Safety Issues and Programs
3. Club Car and Yamaha Golf Carts Performance Chart

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Speed And The Severity Of Crashes

The relationship between vehicle speed and crash severity is unequivocal and based on the laws of physics. The kinetic energy of a moving vehicle is a function of its mass and velocity squared. Kinetic energy is dissipated in a collision by friction, heat, and the deformation of mass. Generally, the more kinetic energy to be dissipated in a collision, the greater the potential for injury to vehicle occupants. Because kinetic energy is determined by the square of the vehicle's speed, rather than by speed alone, the probability of injury, and the severity of injuries that occur in a crash, increase exponentially with vehicle speed. For example, a 30–percent increase in speed (e.g., from 50 to 65 mi/h [80 to 105 km/h]) results in a 69–percent increase in the kinetic energy of a vehicle.

The relationship between travel speed and the severity of injuries sustained in a crash was examined by Solomon (1964), who reported an increase in crash severity with increasing vehicle speeds on rural roads. From an analysis of 10,000 crashes, Solomon concluded that crash severity increased rapidly at speeds in excess of 60 mi/h (96 km/h), and the probability of fatal injuries increased sharply above 70 mi/h (112 km/h).

Bowie and Waltz (1994), in an analysis of tow–away crashes reported in the National Accident Sampling System over a 7–year period, found that the chance of being injured in a crash depended on the change in speed at impact (delta V) . As shown in table 1, the risk of a moderate or more serious injury was less than 5 percent when delta V was less than 10 mi/h (16 km/h) and increased to more than 50 percent when delta V exceeds 30 mi/h (48 km/h).

Table 1. Injuries per 100 Occupants by Change in Speed (deltaV) at Impact

delta V mi/h	**Moderate Injury AIS 2+**	**Serious Injury AIS 3+**	**delta V** km/h
1–10	4.5	1.0	1–16
11–20	10.6	2.6	17–32
21–30	29.2	11.1	33–48
31–40	53.4	27.9	49–64
41–50	67.2	40.6	65–80
50+	69.3	54.3	80+

Figure 4
Golf Carts are Used as Everyday Functional Vehicles in The Villages, Florida

Photos by Jana Lynott.

daily trips within the community, largely because of its extensive accessibility for golf carts and LSVs.

Facilities

The Villages features an 87-mile network of concrete golf cart trails that connect all of its golf courses and communities. In addition, golf carts and NEVs can use designated on-road facilities and shared traffic lanes.

Tunnels have been built into most of the locations where a path intersects with a highway, except across US 27/US 441, where an overpass was built. The tunnels and bridges were designed specifically to fit golf carts, but the size of golf carts is steadily increasing—a recent model available from Sam's Club is six inches wider than previous models. Not all of the tunnels and bridges can now properly accommodate two of the larger vehicles at the same time.

The wide variety of routes reflects the evolution of the network over time. When the community was built in the 1970s, carts and cars shared the same lanes. As development progressed, golf carts were separated from traffic within the roadway, and now there are separate pathways for LSVs.

LSVs are allowed on the golf cart paths, as are pedestrians and cyclists. The community has not reported significant conflicts among different path users. Perhaps because the paths were designed from the beginning for golf carts, residents are accustomed to accommodating a variety of travelers throughout the network. They expect to encounter one another, so they may operate with a bit more awareness than they would on a path designed primarily for pedestrians and bicyclists.

Safety Issues and Programs

Many, if not most, of the people who live in The Villages had been driving

Figure 5
A Golf Cart Trail Underpass in The Villages

Photo by Jana Lynott.

carts on golf courses for years before they moved there. Some have difficulty realizing that driving golf carts on paths and roads requires greater alertness and caution. Believing, mistakenly, that golf carts are nothing like cars makes it easier for people to operate them in ways they would never consider when behind the wheel of an automobile, including driving while intoxicated, maneuvering one-handed or with a leg dangling over the door, not using seat belts, and parking on sidewalks.

Perhaps the most challenging safety problem with cart drivers is the propensity to try to make their vehicles go faster than their design permits. Owners will "soup up" their carts to go faster than 20 mph, but the brake, suspension, and restraint systems on golf carts are not designed to handle those speeds—especially when it comes to turns, stops, and collisions. This practice has led to some significant injuries. Public safety officials report the number is not statistically large, but it is still a troubling issue.

Florida law does not require that golf carts be equipped with seat belts, and vehicle owners receive no insurance benefit from installing them.

People of all ages drive or ride in golf carts, including a fair number of young people and children from the many family visitors in the community on any given day. Children under the age of 14 are not permitted to drive carts on public roads or streets, and it is the responsibility of the residents to ensure that younger drivers understand the "rules of the road." But the propensity of teen drivers to drive any vehicle too fast is an ongoing safety issue, especially given the relative instability of golf carts operating at high speeds.

Drivers of golf carts are not required to be licensed. On the one hand, this affords those who have given up driving cars continued independence and mobility; on the other hand, it raises safety concerns. The same physical and cognitive declines that affect driving skill (e.g., reduced vision and reaction time) are likely applicable to the on-road and on-trail golf cart environments. While their speed is lower, the vehicles are less protective in a crash.

Another challenge faced by The Villages is the issue of golf cart parking. Within each village there are central areas with shopping, restaurants, gazebos, and a center square with nightly entertainment. Thousands of people come in by golf cart, parking on the sidewalk so they can get closer to the venue rather than having to walk from the parking lot. Florida regulations state that motorized vehicles are not allowed to run or park on sidewalks, but the rules are enforced and interpreted somewhat differently from county to county.

Safety Enforcement and Education

A number of separate entities work to ensure that golf cart use is safe and enjoyable. The roads and golf cart paths within The Villages are developed and maintained by 12 Community Development Districts (CDDs), a form of special-purpose local government available under Florida law. Because of the CDD's limited powers, and because the roadways are public, the CDD has no law enforcement jurisdiction. All roadway laws are enforced by the three county sheriff's departments and one municipal police department. However, the sheriffs may not go onto the paths to enforce safe driving and prevent problems unless they observe reckless or intoxicated driving.

The CDD and The Villages Homeowners Association (VHA) are working hard with public safety officials to increase awareness of the safety issues of golf cart use and to educate people about making

Figure 6
Examples of Golf Cart Accommodations in The Villages

Photos by Jana Lynott.

wise choices. An educational blitz in late 2010 served as a wake-up call to golf cart users that speeding will not be tolerated. Over a two-month period, the Sumter County sheriff's department issued about 70 golf cart speeding violations, technically categorized as operating a vehicle without a license, because they exceeded 19 mph. In some cases, that resulted in a $1,500 fine and court costs. The project heightened awareness of the seriousness of the issue.

In addition, the VHA works to inform and educate residents about safe golf cart use. Since 1998, the VHA has sponsored a Golf Cart Safety Clinic taught by local law enforcement officers. It is a vital tool for promoting traffic safety in The Villages. In January 2011, the VHA and CDDs launched a joint communication and education campaign related to golf cart safety.

Peachtree City, Georgia, Golf Cart Network

Overview

Peachtree City, Georgia, is a master-planned community located 29 miles southwest of Atlanta. Founded in 1959, the development was envisioned as a community that would offer residents a better way of life through careful planning and design. The city consists of a series of linked villages, each containing its own shopping areas, recreational areas, and schools, with approximately 20 percent of the land dedicated as open space.[23]

While paths were not part of the plan when the city was incorporated in 1959, the developers built a golf course in the 1960s, and paths were added for residents who wanted a way to take their own carts to the course. More paths were added as more neighborhoods were built, and the city adopted an ordinance requiring that new development include a connection to the system. In 1974, Georgia adopted legislation allowing local communities to permit golf carts on public streets specifically to accommodate Peachtree City.

Usage Patterns

Today, many of Peachtree City's roughly 34,000 residents (about 13,600 households) use golf carts. More than 10,000 golf carts are registered within the city, and residents use them as an extra vehicle for local transportation.[24] Many students at McIntosh High School drive their golf

CLUB CAR

SPECIFICATIONS	IQ SYSTEM ELECTRIC	GASOLINE
Overall height (at steering wheel)	48 in. (122 cm)	
Wheelbase	65.5 in. (166 cm)	
Ground clearance	4.5 in. (11 cm)	
Front wheel tread	34.5 in (88 cm)	
Rear wheel tread	38.5 in. (98 cm)	
Weight (vehicle with canopy, without batteries)	494 lb. (224 kg)	
Weight (dry, without battery)		619 lb. (281 kg)
Forward speed	12-15 mph (19-24 km/h)	
Curb clearance circle (diameter)	17 ft.-6 in. (533 cm)	
Braking distance (at 12 mph (19 km/h))	14 ft. (427 cm)	
Standard seating capacity	2	
LIQUID CAPACITIES		
Transaxle	22 oz. (0.67 L)	
Engine crankcase (without filter)		32 oz. (0.95 L)
Engine crankcase (with filter)		38 oz. (1.12 L)

TRANSAXLE	Mechanical, 2 rear wheel
BATTERIES	STANDARD: Six 8-volt Trojan T875 Batteries. OPTIONAL: Eight 6-volt Trojan T105 Batteries
CHARGER	Yamaha-built automatic microprocessor-based high frequency switching-regulated charger with I.E.I. type charging profile, an in at 48 volts, 9.5 amp 120 volt AC. Underwriters Laboratories (U.L.) Listed. C.S.A. Certified

CHASSIS

FRAME	HybriCore™ Chassis features a robotically welded automotive ladder-style frame mated to a polypropylene structural floor. Frame c multi-step phosphate treatment, electro-deposition epoxy-based coating, and an electrostatically applied polyester/urethane powc
BODY	Custom-formulated thermoplastic olefin painted with a two-part top coat of high-luster automotive-grade polyurethane
STEERING	Self-compensating single reduction helical rack-and-pinion, permanently lubricated with sealed, greaseless tie-rod ends
FRONT SUSPENSION	Tru-Trak II™ fully independent automotive-style strut suspension
REAR SUSPENSION	Mono-linkage
BRAKES	Self adjusting rear drum
SEATING	Seamless, fabric-backed vinyl bonded to pure, virgin foam contoured seat cushions and mated to a warp and moisture-resistant p with plated steel inserts
BUMPERS	Front and rear 5 mph energy-absorbing bumpers

PERFORMANCE

MAX FORWARD SPEED (Gas)	24 km/h (15 mph)
MAX FORWARD SPEED (Electric)	STANDARD: 24 km/h (15 mph) OPTIONAL: 31 km/h (19 mph) with speed kit
MAX REVERSE SPEED (Gas)	16 km/h (10 mph)
MAX REVERSE SPEED (Electric)	8.1 km/h (5 mph)
TURNING RADIUS	2.8 m (9.2 ft)