

# Letting the Numbers Tell The Story On Cart Damage

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"Why can't I drive my own cart on my golf course! It seems to me that one golf cart per golfer will cause less damage compared to two golfers per cart (an additional 250 pounds!)."

This is an actual question received recently from a golfer wanting to know why it was better for the golf course to have two golfers in each cart instead of one golfer for every golf cart driven on the golf course.

**Cart damage defined** – Turf wear damage caused by golf carts includes: **1) turf and soil compaction due to the weight of the golf cart, 2) abrasion and wear caused by repeated and concentrated traction including stopping, starting, and driving, and 3) impact damage from the golf cart.**

**Compaction damage** - is typically an indirect problem commonly resulting in soil compaction. The following list detail actual compression calculations in pounds per square inch:

- 200 lb golfer heel of foot (walking) = 25 pounds per sq. in. (psi)
- 200 lb golfer ball of foot (walking) = 16.6 psi
- 200 lb golfer full foot (standing) = 10 psi
- 200 lb golfer both feet (standing) = 5 psi
- hand pull golf cart (17 lb) 2" wide tires = 2.1 psi (two tires)
- hand pull golf cart 3" wide tires = 1.4 psi (two tires)
- hand pull golf cart 4" wide tires = 1.1 psi (two tires)
- electric golf cart (empty, i.e. 950 lb) with four 8" wide tires = 3.7 psi
- electric golf cart with one person & gear (1,200 lb) = 4.7 psi
- electric golf cart with two people & gear (1,450 lb) = 5.7 psi
- Maintenance pickup truck (3,000 lb) = 25 psi

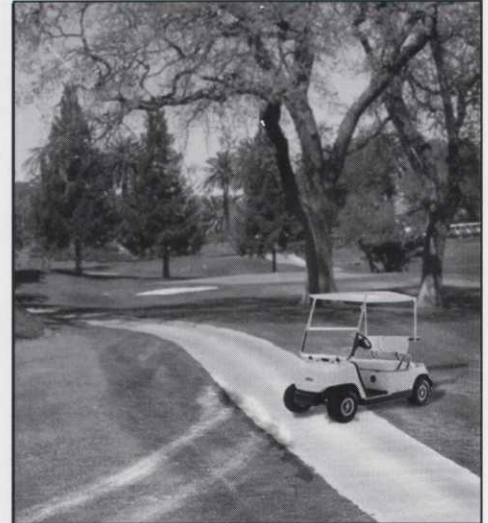
Based on compression pressure, we would expect to see most golf course damage caused by walking golfers yet we see predominantly see golf course traffic damage caused by four wheel motorized golf carts.

Let's examine area impacted by different play types to understand why four-wheel golf carts impact the golf course so dramatically. The following list shows the estimated average area impacted when playing a normal 6,200-yard golf course:

- Walking golfer with golf bag (9 holes) = 15,500 sq. ft.
- Walking golfer with golf bag (18 holes) = 31,000 sq. ft.
- Walking golfer with 3" wide wheel pull cart (9 holes) = 111,600 sq. ft.
- Walking golfer with 3" wide wheel pull cart (18 holes) = 223,200 sq. ft.
- Riding golfer with motorized cart (9 holes) = 2,380,800 sq. ft.
- Two golfers sharing motorized cart (9 holes) = 2,380,800 sq. ft.
- Riding golfer with motorized cart (18 holes) = 4,761,600 sq. ft.
- Two golfers sharing motorized cart (18 holes) = 4,761,600 sq. ft.
- Two golfers each using a motorized cart (9 holes) = 4,761,600 sq. ft.
- Two golfers each using a motorized cart (18 holes) = 9,523,200 sq. ft.

**Lessons learned** – The take home lessons these numbers show backed up by my experience visiting golf courses are listed below:

- Walking a golf course impacts a golf course far less than pull or motorized carts do when considering area impacted.
- Walking carts impact the golf course less than motorized carts but all carts



impact the golf course more than walking does.

- The rules of golf require hand pull and motorized golf carts to follow the same rules designed to minimize cart impacts on golf course playability and turf health.
- Wider cart tires result in more floatation and therefore less compression pressure compared to narrower tires because they spread the weight out over more area. (e.g., a 2" wide pull cart tire exerts twice the pressure of a 4" wide pull cart tire.)
- If you really care about your golf course, share a cart rather than taking your own. When using a cart, keep it away from approaches, collars, putting surfaces, and green surrounds.
- Another way to minimize cart impact is to stay on the cart path when possible and avoid stressed turf when driving around the golf course.
- Refer to Trolley Follies in the USGA Green Section Record publication dated Sep/Oct 2002 for more information regarding cart impacts on golf courses.