

GOLF CAR SAFETY

Design standards supplement courses' responsibilities

by L. A. Benton, P.E.

A golf car should play a subordinate role as a strong, silent contributor to the enjoyment of the game. Nothing mechanical should distract the player's concentration. The car should function safely and not intrude into the consciousness of the players by imposing safety rules beyond those of common sense.

This is the goal of golf car manufacturers subscribing to the safety specifications proposed by an American National Standards Institute (ANSI) subcommittee. The club that purchases a golf car that meets or exceeds these specifications has taken a large first step toward the protection — and better golf — of its members and visitors.

The ANSI safety specifications for golf cars, proposed by the ANSI 2130 subcommittee at its May 13, 1975 meeting, were developed by representatives of the principal golf car manufacturers to cover design and operation of both electric- and gasoline-powered cars.

Handling

The specifications call for both a maximum speed and extensive handling tests. Among the characteristics to be checked out in the tests are:

- Adequate deceleration and durability from the service brake.
- A parking brake that holds on at least a 20 percent slope.
- Stability to assure that car will not roll over when tilted to 45° longitudinally or 30° laterally. (Well designed cars should be expected to be stable at 45° or more both longitudinally and laterally.)

Containment

Battery containment in electric cars is tested by subjecting the car to the two maximum conceivable operating acci-

dents. First a car is run into an immovable concrete wall at its maximum speed, then it is subjected to a 360° axial rollover. The car is examined afterward to see that the batteries stayed in place and that the car retained structural integrity.

Gasoline cars are not subjected to rollover or impact tests by current standards, although such tests should be considered for the next upgrading of the standards. Gasoline and oil containment adequate to keep it from spilling into a hot and electrically active engine compartment during an accident would be a worthwhile goal.

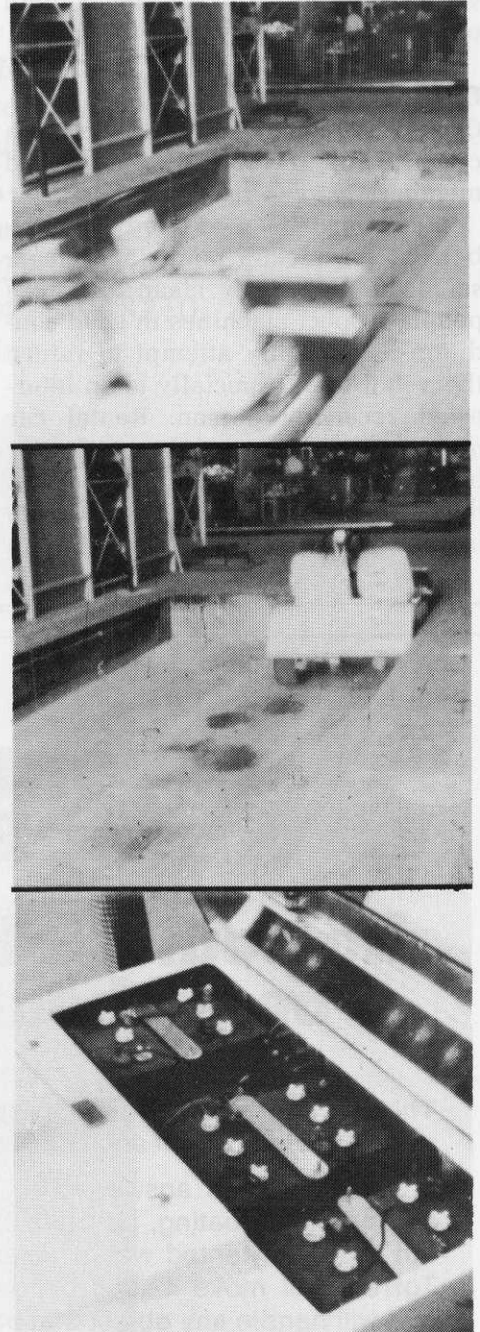
“Once a safe golf car is delivered, it is up to club management and members to keep it safe.”

Under the present proposed specifications, gasoline cars must have reasonable fuel containment, safe fuel line routing, and tank filling and venting locations away from hot areas.

Other requirements

Electric cars are also subjected to stall tests (to the electrically oriented, locked rotor motor tests). With the car stalled or held in place, the motor is powered 10 seconds at the maximum speed position, followed at once by 30 minutes at the lowest speed. This is a rigorous test of wiring, switching, resistor heat dissipation, and of the motor. Some manufacturers, as a policy, exceed this by 30 percent.

While not a standard requirement, it is recommended that seats be designed with high, strong backs to serve as a roll bar. A bucket seat with a steel bottom and back in one inte-



Electric golf cars are tested by running them at maximum speed into an immovable concrete wall, then checking for structural integrity and battery movement.

L. A. Benton is a Registered Professional Engineer in several states and a member of the Executive Committee, R&D Section, National Safety Council. He is manager of product and development for Johns-Manville Club Cars.

grated unit has the rigidity to either help prevent the roll or, failing that, provide protection for the passengers by supporting the car in the unlikely event of a 180° roll or a forward tip. Seat backs should not crush, which would then force the steering column to collapse into the driver's area.

Car and driver

Once a safe golf car is delivered to a club, it is up to club management and members to keep it safe.

Cars must be presented to members at the pickup point in a clean, safe condition. Why clean? Because people respect machines in good condition and usually attempt to return them that way, especially to an interested receiving person. Rental car operators know that a damaged fender breeds more damage. It may be that the psychology is simple: new damage is more obvious if the car had been

clean before use.

A signed checklist is not too much to ask from the car preparation group. The sample on page 42, with 25 items, was intended for initial delivery, to assure that the car was in factory condition. But with few exceptions all of the checks can be made while driving the car to and from the charging shed. Attaching a copy to the scorecard holder shows that the club cares.

The back of the checklist could contain a simplified operation instruction identifying parking brake, service brake, and accelerator locations. It should also contain safe parking procedures: key off, direction selector at neutral for an electric, and parking brake on. Such instructions will not only go a long way toward preventing accidents, but will help avoid a charge of negligence if one happens.

Such instructions will be especially useful at semi-private oper-

ations where cars are operated by relative strangers. Some leasing or rental situations call for a "Hold Harmless Statement" to be signed by the leasor. Such a statement could be on the checklist indicating that at the time the user signed for and accepted the car, it had received a safety check and was in reasonably good condition. The given caveats of the ANSI safety warning label might also be included.

Maintenance

The greatest peripheral damage to golf cars occurs in the service, storage, or charging sheds.

Design of the service area is critical. There should be enough space paved to maneuver the cars without contact.

If outside storage is necessary, cars should be selected which have weather-resistant bodies and self-

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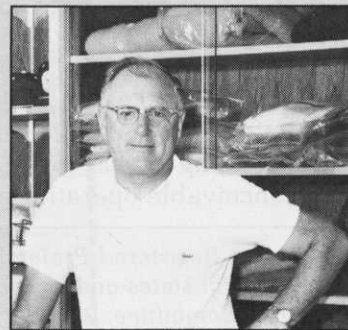
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This safety checklist was developed by a manufacturer for initial delivery purposes, but could easily be adapted for use on the course when a golfer checks out a golf car.

draining seats, preferably without sewn seams that absorb moisture and tend to quickly rot.

Maintenance area floors should be of concrete to safely withstand jacking loads and to permit quick cleanup and oil removal. Degree of enclosure depends upon the climate, but they should be well ventilated on one hand, and have at least a shed roof on the other.

Lighting is best done with wall-mounted projector floods set well above traffic. Trouble lights with extension cords, if really needed, should be shatterproof globe lights meeting OSHA standards.

Liquid fueling areas should be remote from the maintenance area for obvious fire-safety reasons.

Charging areas should be dry, sheltered, and well-ventilated with roof and side wall vents to assure dilution of the evolved hydrogen. The chargers should be strongly hung and located so an accidental movement of the car while it is still connected will not pull the unit down. Timers should be within easy reach from the car. Car wheel guides will assure positioning and reduce impact and rubbing damage.

The electrical installation should be consistent with the national and local codes and sized for the specified voltage of the charger. They should definitely have groundfault detectors.

Batteries should be selected, in accordance with ANSI specifications, with side venting caps to reduce the possibility that some internal pressure or impact will eject battery acid upward.

Safe workers

Battery servicing can be hazardous. Eyes should be protected by an acid face mask when filling a battery, and a safety shower with an eye wash should be available in or between the service and mechanical areas.

Disabling accidents to employees can cost from \$30,000 to \$250,000 depending on the state and conditions. Now is a good time to check your service operation to see that employees are thoroughly instructed in handling hazardous liquids — as in filling batteries — and other safety procedures. They should routinely make

sure that keys are off, direction selectors are in neutral, and brakes are on when servicing cars. Batteries should be disconnected during many servicing operations because, while the voltage is low, there is a high energy level and the possibility of a fire hazard. Disconnection also insures the immobility of the car.

Lifting equipment should be inspected regularly. Jacks should be supplemented with locking-type stands. All work should be planned so

that the inadvertent activation of an electric or gas golf cart will cause no injury. There should be an appreciation of the relatively high power potential of a moving golf cart and its ability to seriously injure.

A final suggestion: read the proposed ANSI specifications. Copies may be obtained from (and suggestions for improvement made to) American National Standards Institute, 1430 Broadway, New York, NY 10018. □

CLUB CAR DISTRIBUTOR'S ACCEPTANCE CHECK

CAR NO. _____

This CLUB CAR has been service checked as indicated:

	<u>DONE</u>
1) Body and Trim Clean	_____
2) Floor Mat Clean	_____
3) Bright Work Waxed	_____
4) Seats Cleaned	_____
5) Battery Caps in Place, Water Level Full	_____
6) Battery Charged to 1.265	_____
7) Battery Terminal Greased	_____
8) Battery Hold-Downs Firm	_____
9) Charger — Operated	_____
10) Wheels — Tight	_____
11) Wheels — Aligned — Clevis Nuts Tight	_____
12) Steering — Checked	_____
13) Tires — Pressure Checked	_____
14) Brakes — Park Checked	_____
15) Brakes — Service Checked	_____
16) Hydraulic Fluid Checked	_____
17) Forward Reverse Switch Checked	_____
18) Lock — with key & car number checked	_____
19) Accelerator	_____
1st Speed Checked	_____
2nd Speed Checked	_____
3rd Speed Checked	_____
4th Speed Checked	_____
R Speed Checked	_____
20) Seat prop clipped in place Checked	_____
21) Wiring — Visual Inspect for defects checked	_____
22) Drive Unit — Lube level checked	_____
23) Axel End Play — Normal	_____
24) Mast and Cowl Bolts firm — Checked	_____
25) Bag Straps Buckled	_____

I have made the above listed checks:

SIGNED _____

for _____ DISTRIBUTOR

DATED: _____