

Put a charge in your golf car operation

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Optimum results in the operation of battery powered golf car rental fleets are achieved only through a balanced blend of proper golf car facilities, good personnel maintaining the golf cars and good maintenance.

FACILITIES

While it is realized that many golf courses already have a heavy investment in existing facilities which cannot be modified immediately, it should prove helpful to outline optimum facilities for those that can be improved, and for any new construction. Proximity of golf car storage and maintenance area in relation to the first tee or pro shop and nature of the facilities are of almost equal importance. Proximity assumes much greater importance than suspected when considered in terms of most productive use of key personnel time. In many courses, the distance between the two points is so great that key golf car personnel spend an inordinate amount of their time making up mule trains to tow the cars to the rental point, breaking down the train, and returning to the storage area to repeat the procedure. As a result, the golf car personnel have too little time for vital preventative maintenance of the cars and proper battery care. Many golf courses put emphasis on getting the cars up to the rental point regardless, and too little importance is placed on maintenance.

For year-round operation, in climates which experience a wide range of nighttime temperature

Utilize proper facilities, quality personnel and good maintenance to boost your fleet's effectiveness

extremes, an enclosed car storage area is a good investment. Location of this storage area underneath the pro shop has become extremely popular in the past three years because, subject to terrain limitations, it offers economy of both available space and construction costs. As a by-product, this arrangement provides warmer climate for the cars in the winter and cooler temperatures in the hot weather. However, the layout of car storage, charger mounting and installation of electrical outlets for the chargers should be considered carefully within these following guidelines:

1. For the long daylight hours of late spring and early summer, the parking of cars should permit "last-in, last-out" operation without the maneuvering of a large percentage of cars. Access to exit doors in this storage area is naturally a very critical factor.
2. Chargers should be preferably mounted above the cars on shelves or hung from hooks in such a manner that the golf car man has easy access to the charger controls and charger ammeter visibility without climbing all over the cars or ascending a step ladder. In such an arrangement, it should be possible to gain access to all the battery terminals while the batteries are still on charge, even with Surry tops.
3. For flexibility in permitting increase of the fleet or temporary additional leased cars

for tournament purposes, the optimum electrical installation employs ducted AC busses routed strategically throughout the car storage area. Additional circuit breakers with outlet receptacles for charger plugs can be inserted readily in such ducted busses when additional outlets are required. In electrical system design, allow for 15 amps minimum per outlet and circuit breakers of not less than 15 amps per single charger outlet.

4. In one section of the storage area, allow for a work area with air compressor, work bench, drive-up ramp for work to be performed underneath cars, water outlet for hose attachment and good drainage facilities.
5. Provide good cross-ventilation in the car storage area in such a way that it can be reduced in cold weather.

PERSONNEL

As in every well-run business operation, personnel is one of the most important factors of success. Most country clubs and golf courses have overlooked the importance of this factor to an amazing extent. Too frequently, the golf car attendant is assigned the additional duty of gathering up balls on the driving range. When such a person is paid too little, he is often found playing "bag-boy" for the tips he can garner. The tendency to assign golf car maintenance responsibility to the junior or apprentice

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pro has merit only as part of his training.

The fallacy of these past and present practices becomes readily apparent when a financial analysis is made of the capital investment and the income potential from an optimized operation. Such analysis should take into consideration refunded rental fees resulting from enroute failures on the course, cost of preventable or reducible parts and battery replacement, and potential lawsuits that might arise from possible accidents attributable to poor maintenance. The most progressive country clubs have confirmed the wisdom of hiring a good key man, paying him well, and according him a position of stature.

At least one manufacturer of golf cars holds maintenance clinics in strategically located cities throughout the United States and also operates at its plant a one week detailed training course for those who can arrange to attend. A club with more than 50 cars could easily justify the transportation and daily living expenses of their key golf car man for participation in such a training course.

MAINTENANCE

As a generalization, the batteries are probably the most mistreated parts of the electric golf car. This may be due to the fact that previous exposure of most people to lead-acid batteries is limited to their automotive experience.

However, the design and manufacture of batteries for golf car use is different from automotive types to provide good life under the more severe operating requirements in repeated deep discharge cycling. As a result of this more severe duty cycle, proper battery care is of critical importance. At a recent session of the American Golf Car Manufacturers Association Technical Advisory Committee, battery manufacturers reported that a large percentage of the

short battery life cases were due to excessively deep discharge of new batteries and insufficient charge during the long daylight hour days of the year.

This report of the battery manufacturers emphasizes the importance of charging new batteries and older batteries which have not been used for a month or so before they are sent out on the course and limiting the use of new batteries to 18 holes between charges for the first five cycles. It also lends credence to the recommendation for a car storage area layout which permits last-in, last-out operation and points up the importance of rotating cars in use.

In proper care of golf car batteries it is exceedingly important that batteries be checked for water level every week and water added as necessary after they have been charged rather than when they are in a discharged state. The one exception to this rule applies only when electrolyte level is below the plate separators. In that case, water should be added to cover the separators and watering completed after they are fully charged. Overfilling cells causes loss of acid, not just water, decreasing the specific gravity and thereby reducing available battery power very markedly. When batteries are brand new they appear to need additional water very infrequently, but don't be misled by this initial experience. After they get cycled-in and start aging, water requirement increases steadily throughout their remaining useful life.

Some fleet operators have been guessing the number of hours for timer setting according to the number of holes the car went instead of following the instructions furnished with the charger. In many such cases this has been a cause of shortened battery life. With the newer types of chargers which compensate automatically for AC supply voltage, the initial charge rate into lightly discharged batteries is relatively low and this charge rate tapers more rapidly than with deeply discharged batteries. However, the specific gravity of the electrolyte rises

more slowly under the charge pattern and hence the full charge time is necessary for a full charge with equalization of cells. When all 18 cells of a 36 volt golf car show equal and normal finish charge voltage, overcharging at the low finish rate is preferable to undercharging.

The ampere-hours of power that batteries can deliver and receive from the charger varies directly with the electrolyte temperature. Hence, in periods of cool or cold nights, the cars should not be sent out for as many holes as they go in warm weather. In addition, the cars should be put on charge as soon as they come off of the last rental while the electrolyte is warm and they should be given a 4-6 hour equalization charge once a week.

Batteries and their hold-down devices should be kept clean and dry at all times. Be sure that the charger is "off" whenever inserting or removing the charger plug in or from the car. It is good practice to turn every charger on when first opening the car storage area in the morning to ascertain which cars taper down below five amps within 15 minutes. The ammeter should jump up to a high reading initially tapering steadily to a point below five amps. Those that do behave thusly have been fully charged and should be good for 36 holes. Those that don't taper down should be given additional charge until they do taper down to below three amps without the batteries getting exceedingly hot. The number of cycles (discharge-charge) available from a set of batteries varies inversely with the depth of discharge between charges. Thus, if cars are run 45 or 54 holes between charges, a reduced number of cycles life can be expected versus 36 holes between charges.

Lastly, in field experience it has been noted that battery powered golf cars are being used more intensively than previously. In a more intensive operation a lesser number of months of battery life should be expected, but the net income of a fleet operation should be higher. □