Reinventing the Wheel

BIGGA members have been heavily involved in the development of a new winter wheel for Powakaddy trolleys. Lee Manvell explains how the whole processes evolved

Electric trolley use has been on the rapid increase since the turn of the millennium. However, a source of great frustration for golfers, greenkeepers and golf course owners alike is the fact that there hasn't been a universal solution for regular winter use.

Now through the work of PowaKaddy, in collaboration with BIGGA, a new winter wheel solution seems set to give winter golf for electric trolley users the green light.

The new winter wheels have taken their 'open tread' design inspiration from lawn protection products and have been subjected to a rigorous and comprehensive testing process in conjunction with a BIGGA advisory panel of Course Managers. The result is a ground breaking product that should gain widescale approval from greenkeepers; increase winter revenue for Course Owners, Managers and on-course retailers and, perhaps most importantly, allow an ever growing category of golfers to play regularly throughout the winter months.

Terry Hale, PowaKaddy's Chief Executive is delighted with the end product and the ongoing consultation with BIGGA.

"Our designers felt as though they were on to something with the new design but we were very keen to engage with the experts at BIGGA and draw upon the knowledge of their members to help us in the design and testing process. John Pemberton and his team have been extremely helpful throughout the process and I am confident that greenkeepers up and down the country will be pleased with the end product".

Soft turf and electric trolleys have never been happy bedfellows.

Above: Four stages of prototypes
Below left: David Wood supervises the saturation of some ground in preparation for the test
Below right: The test produced minimal denting
Bottom right: The concentrated use test

Damaged grass roots, muddy trails, compacted turf and skid marks have meant that greenkeepers and Course Owners have been reluctant to allow trolley use in certain wet, wintery conditions.

For keen golfers and Course Owners the situation has been far from ideal. For older players or players with injuries, an electric trolley is the only way they can play and for many others it is a major part of their enjoyment of the game. For Owners the equation is simple. Less winter golf means less revenue and less membership retention when subs renewal time comes around.

With a basic design prototype developed PowaKaddy's Group Product Manager, Lee Manvell, worked with BIGGA over an eight month process to test, refine and re-assess the winter wheel concept. Following meetings with BIGGA Chief Executive, John Pemberton, PowaKaddy assembled an advisory panel of Course Managers. BIGGA's Scott MacCallum was joined by Richard Whyman, Burnham & Berrow GC; Colin Webber, Portmore GC; Paul Worster, Minchinhampton GC, and David Wood, Hever Castle GC, at various times during the development process.

"We do have viable solutions for push carts but we have really been looking for a proven solution for electric trolleys to protect our courses and enable us to maximise winter golf revenues," explained Colin, after one of the testing sessions.

Prototype testing, demo days and meetings throughout the spring culminated in a third generation product being subjected to a full test at Hever Castle GC in July. To replicate soft wintery conditions the test area was saturated with water for three and a half hours.

David Wood was very impressed with how the new design tested.

"The testing conditions were tough but the wheel lived up to the expectations and made limited impact on the turf."

The product review centred around eight key tests designed to simulate the usual movements of an electric trolley in wintery conditions, in some cases to extreme levels to test the new design to its limits. The wheel's key performance attributes, such as weight distribution, traction, turning ability and the subsequent affect on the grass blades, root damage and soil compaction were scrutinised. In all cases the new winter wheel passed the performance criteria established by the advisory panel and product design team. Full test results are summarised in the panel below including the final on-course field and general wear and tear tests in September.

The headline feature of the new winter wheel is the open tread, based on a principal seen in lawn protection mesh mat systems, which evenly distribute the load over a smaller surface area avoiding compacting and denting. The new wheel allows minimal ground contact, avoiding ground penetration and maintaining traction to avoid slipping. On soft ground the new wheel causes negligible damage. In addition the small crown on the front and rear tyre reduces dragging while turning without loss of traction.

The wheel is a composite that consists of a structural inner hub, over-moulded with a highly durable rubber. The design is registered and has a patent pending including its method of manufacture.

"We are delighted to have taken a proven design principle from another industry and successfully applied it to electric trolley wheel technology" commented PowaKaddy's Lee Manvell .

Richard Whyman praised Powakaddy's decision to involve BIGGA at a stage where a postive impact could be made on the finished product.

"It was great for a company to approach greenkeepers to ask our input during the design stages. During the trial the wheels gave better wheel to turf footprint helping to avoid that usual wheel spin which is an improvement to what I have seen available to date."

One practical but extremely significant point is that new winter wheel can be easily retro-fitted, with a quick release mechanism, to any PowaKaddy electric trolley from the 2000 models onwards. Estimates vary of how many golfers this may cater for but given PowaKaddy's dominant market share the number is likely to be well over quarter of a million. Importantly the new wheel is the same diameter as a standard PowaKaddy wheel therefore the distance and speed functions do not need to be modified.

The new wheels will be available in limited numbers from December this year and the benefits are likely to be far reaching. Minimising turf damage and more regular winter golf are the most obvious advantages for greenkeepers and electric trolley users but they won't be the only beneficiaries. Golf course owners will not only see increased traffic but an ever increasing number of courses also boast sizeable PowaKaddy rental fleets which can now generate much needed income all year round. Add to this the revenue opportunity that winter wheels present for on-course PGA retailers and one can see that this innovative new product is set be one of the most significant golf developments for 2010.

The 8 Winter Condition Tests

1) Straight line:
Several single passes in a straight line produced no visible tracks with the new Winter Wheel = PASS

2) Turning:
On the spot turning resulted in the Winter wheels twisting grass without breaking the grass blades or roots = PASS

3) Concentrated use:
High footfall on the same ground traditionally leads to muddy trails forming. The low impact and weight distribution prevented the new Winter Wheel from sinking = PASS

4) Forced Slipping:
Trolley set to full speed and held back with reasonable force to simulate loss of traction and slipping. In this excessive test the Winter Wheel lost traction late enough to suggest that it would not slip in normal use and the tread does not scar the turf = PASS

5) Weight Distribution:
Demonstrated in a bunker to visually emphasise track formation and depth of indents. Winter wheels caused minimal indentation = PASS

6) Vibration:
On a rolling road to simulates very rough/ uneven terrain. The Winter Wheel proved to be extremely durable with no mechanical weaknesses = PASS

7) Static impact:
The wheel was hit with a weight to replicate momentary impact such as transit or collision damage. The Winter Wheel proved extremely resilient = PASS

8) Environmental:
UV and salt water test to assess wheel condition if left outdoors for a long period. No adverse affects = PASS