

Greens Get Greener with Solid Concepts, PowerFilm's Solar Golf Cart

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An 18-hole round of golf can equate to a lot of time in the sun – anywhere from four to six hours depending on the weather and the players' skills. So why not take advantage of the solar energy available and be a little more “green” than the grass alone? That's what, in effect, the folks associated with the 2011 Principal Charity Classic, held in Des Moines, Iowa, did. And that led to rapid-prototyping and additive manufacturing firm Solid Concepts and solar technology expert PowerFilm Solar teaming to design, fabricate, and produce the solar panels and standoff mounting units to fuel solar-powered golf carts used at the charity event.

Trent Quick, mechanical and applications engineer in product development for PowerFilm, is the lead designer of the solar panels and standoffs used to position the solar setup on the carts. He says that one of the main challenges in the design was keeping the assembly – the solar panels and a tray that funnels rainwater back into the gutter system of the cart tops – light. Quick notes, “Similar products of this type are extremely heavy, and since they have to be mounted to the tops of the carts, there is the potential to roll when cornering.”

Once the design was finalized, it was sent to Solid Concepts for fabrication and production with a week-and-a-half turnaround time. Quick says that PowerFilm's use of SolidWorks 2011 software for part design made it easier and faster to send the 3D CAD (STL) files to Solid Concepts. The company fabricated and delivered the 40 standoffs ahead of schedule.

The initial material used for the prototype was Selective Laser Sintering (SLS) glass-filled nylon, which was changed to SLS NyTek 1100, a more durable polyamide-based material. After the build process, the standoffs were primed and painted to a satin black finish so the solar panels matched the trim on the carts. No other post-processing was necessary.

In addition to the golf carts, PowerFilm designed a 2-kW solar array for the top of a tent overlooking the 18th hole during the tournament to power 10 televisions and other electrical equipment. The event also featured a 1-kW PowerShade – a tent-like shelter with solar panels – that provided relief from the sun and power for additional televisions and an Xbox for spectators to try their hand at a Tiger Woods PGA Tour video game.

