3/11/04

To: Solar Race Cars Instructors

From: Josh Church, Event Grand Marshall

Subject: A few suggestions

Hi Folks. I'm Josh Church and I'll be overseeing the Solar Race Car event. As a seasoned instructor of solar car builders, I have a few suggestions that may save you & your students a few race-day headaches. Most of these tips are given either in the literature or found on the websites, and this by no means is meant to replace such information. I'm passing these tips along the help you avoid some of the unexpected problems that I've encountered over the years. I hope they're of some use, and I look forward to meeting you all.

- Racing Partners: Sprint races, or "drag races" like this event will require two people for each car & lane: one to release the car (usually the builder of the car) and one to catch it on the other end (often the building partner or a partner/sibling/friend). As students from the same school site often compete with one another, it's best to have a partner that is not obligated to another car. Having a partner ready ahead of race day will save some confusion before each heat.

- Guide line height: The cars will run the full length of the course along a guideline; at our event, this will be a length of larger gauge nylon fishing line (30-60lb test). This line will be anchored a few feet beyond the 20-meter course on each end, allowing room for the cars to be behind the start line while allowing the car to fully cross the finish line at the other end.

  The average height of this line should be between 1 & 3 inches from the ground. Participants will benefit from bending the fishing line up or down in their lane depending on the needs of their car. This will help their cars reach their potential top speeds.

- Hot Glue & Solar Racing: In my experience, using hot glue to assemble the racecars has been both blessing & burden. With some materials, the glue bonds well, while with others – such as certain plastics – the hot glue held well indoors, but broke loose outside in the hot sun. At one race, only one of six cars was able to complete a pass down the course (imagine the frustration!) If you plan to use hot glue, thoroughly testing its adhesion to different materials might save a few tears.

- Tool Kit: As the solar cars are often fairly fragile, teams can often stay in the competition with some last minute repairs on site. A team, instructor or parent might bring a tool kit with the following: needle-nosed pliers, masking tape, electrical tape, Super Glue or similar product, screwdrivers, a small file, electrical wire, anything else that might be suitable. A folding table helps too, but it's certainly not necessary.

- Solar Panels: The Solar World panels are well made for this event; they're lightweight & powerful. The downside to their construction is that they're fragile. The two common failures are cracked cells (usually from dropping/bending the panel or crashing the car) and loose wire

terminals. Using care when handling the panels & using partners when testing cars will reduce the number of cracked cells.

As for the loose/broken wire terminals, students will often pull the terminals away from the back of the panel to get a bit more length. I discourage tis because the integrity of the connection then relies on the weak connection at the cell inside the panel. This results in a nearly irreparable failure. I suggest re-taping the terminals to the back of the panel using electrical or masking tape before the panels are used. Keeping those troublesome leads tacked down to the back of the panel will greatly extend their life. It also doesn't hurt to run a little extra long on the wire to the motor, so that there's a bit of slack on the leads.

- Test, test & test again!: Our first year out, our team had some really fast cars, but we hadn't tested them on a guide line; the results were less than spectacular. We ran into two problems that could have been solved by testing: our linkage to the guide lines weren't sufficient & caused lots of extra friction, and our wheels weren't adequate for the surface of the racecourse. I can't emphasize enough the benefit to thoroughly testing the cars along a guide line and on various surfaces. The link between the car & the guide line might take many tries to perfect. In the past, we've bent paperclips and attached them on each end of the car. They're cheap & easily bent to serve the purpose. Of course, students are encouraged to build better mousetraps.