

Teardropping into the past

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July / August
2015

COOL Tears™

and tiny campers

Steam Punk TEARDROP STYLE



HOW TO:
Solar Made Simple

Dual Purpose 'Drop
Little Guy toy hauler

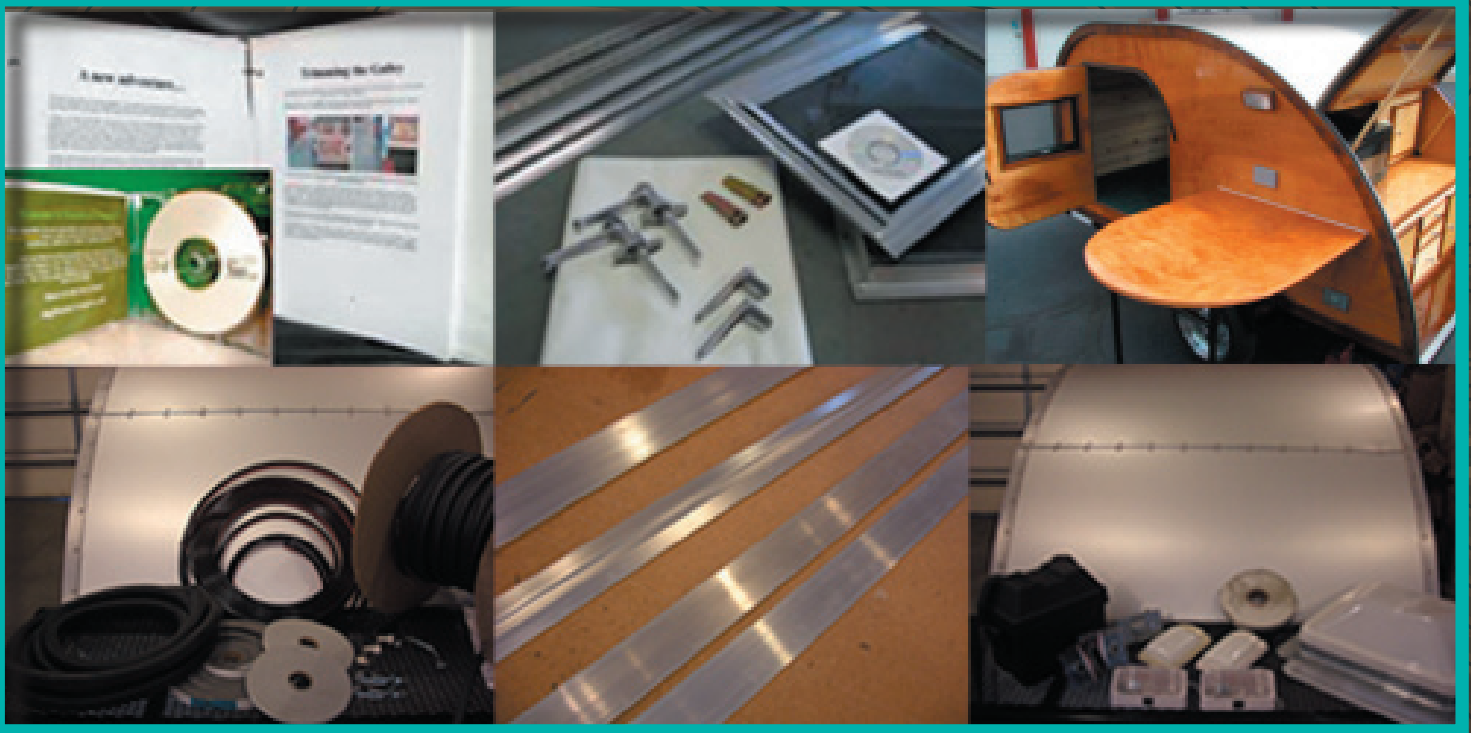
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M A G A Z I N E

Vol. 3 No. 4

July/August 2015

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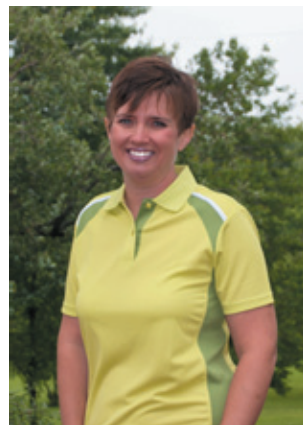
Jon Christianson

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Raffling for great causes!



Over the course of the last couple months, I have been blessed with many wonderful emails from readers across the globe. What fun it has been to hear about creative builds, questions about accessories, and even a raffles going on for unique campers. Two raffles in particular caught my eye, both for the great campers involved and for the wonderful charities they will help.

A custom built, vintage canned ham camper is being raffled near Tusla with the proceeds benefitting JDRF International. JDRF is the leading global organization funding type 1 diabetes. This canned ham camper was built by Jerry Ragon of [CH Campers](#) who began remodeling campers in his driveway and now runs a successful business.



He says, "The most favorite part of my business is giving back to the community. My only sibling was diagnosed with juvenile diabetes at a young age and had a short life because of juvenile diabetes. He left behind a wife and 3 young sons."

You can buy tickets online at <http://tulsa.jdrf.org/jdrf-tulsa-glamping-raffle/>

Every year the River Valley Drifters car club from Peoria, Ill. builds a teardrop and sell raffle tickets. All the money goes to wounded veterans! Tickets are \$1 each or 6 for \$5.00 to the left is a picture of what the the tear drop will look like. Please note the pull out section making the tear drop twice the normal size.



Tickets can be purchased by **sending a request via e-mail to garydaniel1939@att.net**.

Until next time...enjoy every sunrise!

SARAH TUCKER

Editor

Cool Tears and Tiny Campers Magazine™
sarah@cooltears.com



Teardropping
INTO THE PAST

by **Tony H. Latham**

The man was kneeling by a cold campfire. His lips were tight but he looked relaxed. A razor hadn't touched his beard for several days. The skin on his face and hands was almost as dark as the leather jacket he wore over his well-used bib overalls. A clean white undergarment poked around his neck. The brim of a crumpled fedora shaded his eyes that looked through black-rimmed glasses. His left hand held a cigar that seemed to be his signature.



Four men, two women, and a young kid, that was perhaps four, stood behind him. One of the women held an infant in her arms. The campfire ring had a frying pan and several other cooking pots around it. A four-door sedan was parked behind the group and a fly rod sat on its top. A steep sagebrush hill with a few Doug fir trees formed the background.

The infant was my mother. The man kneeling was my great grandfather, George E. Hill. On the back of the photograph was written, "August 1927, Slate Creek—below Crater Mine," along with a list of names identifying the group.

My grandmother had given me the black and white photo some thirty-five years ago. She'd explained that her father had invested in a mine in Slate Creek and had told her, "There are more gold mines than gold in Idaho." I'd framed the photograph and it had hung in my office for two decades.

The kneeling man intrigued me. He looked like he'd been in the hills all summer and owned the campfire. Most of the group looked fresher, as if they'd just arrived. But George looked like he belonged there.

Two Teardrops

I'd purchased a commercially built 4 x 10' teardrop in 2004 and loved it. In 2013, my wife and I ran into a guy pulling a five-wide manufactured by So-Cal Teardrops and we got a look inside. A foot can be a lot. Three weeks later I was building a 5 x 10'. That fall we took our new teardrop on its maiden voyage to Zion National Park. My sister and her husband joined us and they camped in a tent. The weather was cold and wet and of course they kept eyeing our 'drop.

That winter they started shopping for a teardrop. They focused on a 4 x 8' and planned to pull it behind their Honda CRV. During a frail moment, I offered to build a teardrop cabin if they'd weld the chassis and buy the materials. I'd work for free. How could they pass it up?





Five months later the four of us bolted the cabin to the chassis and headed for western Montana for a two-teardrop tour and had a blast.

Meanwhile, I kept looking at the photograph. I studied the drainage using Google Earth's aerial photos and topographic maps.

They had camped on a sagebrush flat, presumably next to the creek—who wouldn't? The vegetation on the hillside in the background showed that it was a south-facing slope. I concluded that the site was findable.

Slate Creek was about an hour and a half drive from our home in Salmon, Idaho and five hours from Jay and Jane's residence in Salt Lake. The drainage

is within the Salmon-Challis National Forest and a few miles from the one-block town of Clayton.

Eighty-eight years had passed since my nine-month old mother had camped along this creek. It was time to try to find the spot. The idea was a great excuse for a double teardrop adventure.

The Hunt

In early June, we turned off the highway and drove about a mile along the Salmon River on a forest road before we arrived at the mouth of Slate Creek. My wife and I were in the lead pulling "Flash" with our white Tacoma, followed by my sister's copper-colored CRV towing their "Tiny Tear."

The sides of the drainage are steep and thickly covered with Douglas fir, but sprinkled with sagebrush openings. The road follows the creek and is a narrow, single-lane dirt trail that doesn't look friendly to low-slung vehicles.

The night before, we'd camped in Stanley Basin and had been pounded with rain. It was still drizzling in Slate Creek and waterdogs of fog hung on the White Cloud Mountains that formed the headwaters of the drainage. Mud spun off our rig's tires and onto the aluminum of our teardrops.





After about a mile of winding along the creek, the valley opened up. After studying the photograph, I felt a twitch in my bones. We'd found the sagebrush flat that three generations of my family had camped on.

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The flat was about a half mile long and two hundred yards wide. Here and there we could see parts of the old wagon road that George and his troop must have used to get to their campsite.

We picked a sheltered spot in the trees next to the creek, unhitched, and built a campfire. After dinner we snuggled next to the flames and studied the



photograph.

We wondered how they had executed the trip. We knew they had travelled nearly two hundred miles from Rigby, Idaho. Seven adults and two kids. They had to have at least two cars. How long had it taken on those old dirt roads? Was it one long day, or did they camp along the way? What had they brought to eat? Had they drank water straight from the creeks? What did their camp look like? What did they bring for bedding? How long did they stay? Had George spent half the summer camped along the creek? We managed to answer some of those questions, but most will remained locked away below the ten thousand foot peaks that rise above the drainage.



Epitome

Two teardrops and an old photograph that brought siblings back to a nearly century-old family campsite. Sometimes I think that every teardrop trip is better than the last. But how can the next one be finer than this one?

I think George was wrong. There is gold in Idaho. Lots of it.

About The Author

Tony Latham writes non-fiction and mystery/thrillers. He lives and plays in Salmon, Idaho. You may catch a glimpse of he and his wife's teardrop, Flash on a winding road some splendid summer day.



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BUILDING THE Camperartí

by Dave Moulton



The idea for building the Campenarti came about when we bought a '47 Ford pickup. We thought it would be able to tow a trailer that was a little heavier than our regular teardrop which is a 10x5 aluminum clad fully loaded teardrop.



Our camping habits have changed over the last few years and we find ourselves attending more shows than we used to. Most of the showgrounds do not have

electric hook ups or power available.

We decided to build a trailer that had all the things our regular trailer had but would work off propane gas or a 12 volt battery. A propane gas oven, the item we missed most, was going to be a real bonus, as we like to do our own cooking.

We have built a few teardrops over the last seven years, including two other trailers with trolley top roofs. The trolley tops were added to give a bit more height in the cabin and we shrunk the over all size of the teardrops to save weight. I really like the style they add, and thought it would be great to include one on a full sized 10x5. We prefer the larger size of trailer as it allows a king size bed in the cabin, and plenty of storage both in the cabin and in the galley.

I decided if we were going to build a trailer with shows in mind, it would be cool to do something a little different from the norm, which led us to create the teardrop with a steam punk style.

Steam Punk 101

by G. D. Falksen

What is steampunk?

In three short words, steampunk is Victorian science fiction. Here "Victorian" is not meant to indicate a specific culture, but rather references a time period and an aesthetic: the industrialized 19th century. Historically, this period saw the development of many key aspects of the modern world (mechanized manufacturing, extensive urbanization, telecommunications, office life and mass-transit), and steampunk uses this existing technology and structure to imagine an even more advanced 19th century, often complete with Victorian-inspired wonders like steam-powered aircraft and mechanical computers.

Where did steampunk come from?

In some sense, steampunk has existed since the 19th century. The Victorian period had its own science fiction, perhaps most famously embodied by the works of Jules Verne and H. G. Wells, and throughout the 20th century there have been later-day science fiction stories set in the Victorian period. However, the term "steampunk" was not coined until the late 1980s, when author K. W. Jeter used it humorously to describe a grouping of stories set in the Victorian period written during a time when near-future cyberpunk was the prevailing form of science fiction.

Read more by G.D. Falksen <http://www.gdfalksen.com/Steampunk>



Originally we were going to leave the outside really rough and have a really smart interior. To make it be something that would really stun anyone who dared to look inside. We have used oak face ply on the inside of a previous build and really liked the look.

We like recycling or repurposing things and are always on the look out for pieces that might come in handy. I saw

a pile of wooden floorboards and other timber, stripped out of a cottage that was being renovated, with a sign saying "Free firewood get it before it snows!"

I grabbed it up and that is where all the timber on the sides came from. It has been stored in my workshop for a couple of years until we were ready to use it.

The windows are mostly made from copper trays with

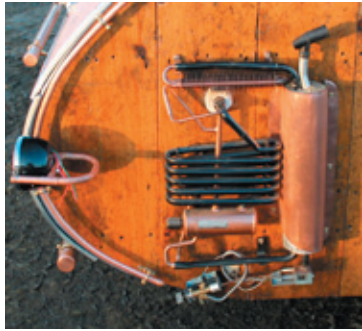
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the bottoms removed. The portholes in the trolley top were made from brass ashtrays and rice dishes with the bottoms removed. The front window was a silver tray picked up at a car boot sale. The entire copper sheeting came from old hot water cylinders that have been stripped and cleaned up. Most of the aluminum was leftover from a previous build.



thrown in too. When I was cutting the panels to be trimmed, I realized it would look great if the bottom half of the cabin was all done in leather. I then cut four more panels to complete the look. Chris put a day aside to do the work,

and I was eager to help out. I turned up at his workshop with all the leather from the sofa, and seven panels instead of the three that we'd talked about. We worked for a solid 12-hour shift to get it all done. The huge grin on my face as it was all coming together stayed for days.

During the build, a friend, Chris at Retro Retrim, asked if we would like any leatherwork done. I thought door cards with pockets would be lovely as well as a headboard. So I asked what I needed to do to make this happen. He told me to look out for an old sofa, which would provide plenty of leather. We soon scored one locally for £15 (equivalent of \$22 USD) and got a really comfy chair

With all the space the trolley top roof has added, I felt a statement light would be a great addition. So we made one from an upturned coffee pot and some copper tubing. The wood for it was an old toilet seat lid made from nice wood.

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Organizing the galley was interesting as there was not enough height to fit a fridge. So I came up with the idea of mounting the workings on the outside, with the cold tube going into an insulated cupboard. It works wonderful and will produce ice in a short amount of time. The cupboards are deep enough to fit the oven sideways so we made a drawer that slides the oven in and out.

A deep drawer is a really handy storage solution as you can get to all the contents easily. I used the back of one of the cupboards to store the 12v battery. The front of it still has plenty of room for storing taller stuff and tins. The decorative drawer unit came from another car boot sale held at a festival a couple or three years ago.

The tiled back splash utilized some tiles that I took out of a customer's bathroom when we were modernizing it. The hatch handle was a grab handle from another bathroom refit. The lower hatch handle and bumper were waste pipes removed from a house when we were modernizing the plumbing.

A sink or basin is a really handy thing to have but with oak tops in the galley it wasn't practical to put one inside. I made a frame that can fold down and hold the copper sink. The sink came from a customer who wanted me to remove it and it worked great for our camper.

The water is delivered to the tap via the pipe that runs around the trailer. It is fed from a milk churn that has a submersible pump fitted and plugs into a 12v circuit wired through a pressure switch. When the tap is turned on the pump is activated and

when turned off the pressure switch turns it off.

The cupboard fronts are made from a solid brass radiator cover mesh. They are really expensive to buy new but we found one on eBay for only £20.

There is a drop down, slide away lower hatch that doubles up for pan storage. A reused copper water tank now holds the two gas bottles on the front. A repurposed brace is used on the jockey wheel. A fold down window is in the back of the trolley top.

The 5 meters of hidden color changing led up lights hang in the cabin, and remote color changing spot lights hang in the galley. The mudguards are made from old cylinders. Several friends have donated bits and pieces that help decorate the cabin and give it the unique feel it has today.

The camper has been a real joy to build, as have all my trailers, but this one especially so. Rosie and I have spent over 1,000 hours getting it to where it is and we still have work to do. We are quite involved with the Teardrop Club of Great Britain Facebook page and spend most of our free time in the summer camping with other tear droppers.

The Campenarti is a whole lot of fun bundled up into a very functional camping trailer.



m a n u f a c t u r e r

u p d a t e f r o m

OREGON TRAIL'R

teardrop
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by **Jon Christianson**

Oregon Trail'R has been VERY busy since we last checked in with Cool Tears a couple of years ago. We have been very fortunate to experience steady growth and ever-accelerating interest in our products. We have made several important changes and improvements recently to our product line and to our processes.

One of the most notable improvements made, has been to invest in our own CNC machine. We used to hire-out all of our CNC work to a local company. They did a good job, of course, but we were always at their mercy for scheduling. We also had a relatively large amount of rework necessary, just because they didn't always have the same people doing the work, or didn't fully grasp certain details of the results we desired. It eventually became clear to us that it would be much more efficient and effective to do all of this work in-house. We ended up buying a 5'x10' high quality CNC machine. Not only has it improved our efficiency, it has also greatly influenced our design process. We are able to achieve finer detail with increased accuracy and repeatability, which allows us to explore design elements that weren't previously attainable.

Another big change is that we have expanded our space dramatically. We basically doubled our floor space. This allowed us to separate our parts-production space from our assembly space. We moved all of our tools into the new space, leaving much more room to assemble teardrops in the original space. With increased

assembly space, we can tackle more simultaneous teardrop builds. We've also added a conference area, more office space, and a lounge area so that our families can comfortably spend more time with us at the shop - a big plus.



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Our website www.oregontrailer.net also received a massive facelift this year. We have added lots of information, pictures, and resources to enhance our clients experience online. Our website also includes a great, and growing, online store. We feature several original and proprietary items, as well as great prices on 3rd party teardrop-related products. Also find links to all of our social media outlets from our website. We are doing our best to keep everything well-updated so there is always something new and interesting to look at! Finally, we would like to reach out and crowd-source content for our "Teardrop Lifestyle" page. This is an area of our website where we want to feature pictures from all of you. We want to provide a cool place to show off pictures of you and your teardrop out in the wild, enjoying the Teardrop Lifestyle! If you'd like to share pictures with us for this purpose, please visit the "Teardrop Lifestyle" page of our site, and click the "submit a picture" button. We are happy to receive pics of all teardrops, they don't have to be Oregon Trail'R products!

The biggest news of all is that we have added new teardrop models to our lineup. When we did the original interview with Cool Tears Magazine, we were building only the FronTear model teardrop trailer. This is still our best seller, and our flagship "classic" teardrop model, but we now also build TerraDrop, DO-Drop, and have a new KIT trailer in the works.

FronTear - Our original design is our rendition of the classic airplane-wing shape teardrop. We designed FronTear with continual curves to really communicate the sleek, aerodynamic feel that we think epitomizes the teardrop concept. Through much R&D time, we have managed to find the ideal layout to accomplish all of our design criteria. Some of these important design criteria are: seamlessness, high-quality materials and workmanship, maximized and useful storage, visual beauty and symmetry, operational convenience, comfort, and durability.

TerraDrop is our offering to the growing off-road/overland market segment. TerraDrop is designed and built with the same high-quality materials, and using the same high-end construction/joinery techniques as FronTear, but is styled to compliment off-road capable tow vehicles. TerraDrop can be configured for heavy-duty off road capability through the implementation of purpose-built off road suspension, all-terrain tires, frame enhancements to critical areas, and a multi-axis coupler. Like our FronTear model, we offer a large variety of options and upgrades that allow our clients to really personalize their configuration. TerraDrop is already gaining a lot of momentum, and we are getting



new orders for them at an accelerating rate. TerraDrop really brings together Oregon Trail'R styling, attention to detail, and quality workmanship that you won't find elsewhere.

DO-Drop is simpler, lighter, and priced lower than FronTear and TerraDrop. We designed DO-Drop with simplicity at its core. There are a small list of available options, but we purposely leave out all the complex design elements that you find in our other teardrops. DO-Drop does come in a small variety of "flavors" though. We build it in both 42" and 48" body widths. The 42" version is primarily designed for single occupancy, with a bed slightly larger than a twin. This trailer is the perfect match to be towed behind a large quad, or side-by-side utility vehicle out into the wilderness. You could also conceivably tow this model behind a large motorcycle. The 48" version of the DO-Drop is large enough to comfortably allow dual occupancy. This is a perfect match for small passenger cars with very low towing capacities.

Both sizes of DO-Drop can be configured either for off-road capability or standard highway usage. Our

off-road models get all-terrain tires, higher ground clearance and a few frame enhancements in critical areas. DO-Drops intended for normal highway travel get regular trailer tires, and have a lower stance. DO-Drop enjoys the same high quality materials, methods, and workmanship you find in all Oregon Trail'R products, just fewer parts, pieces, options and details.

We also have a brand new kit package coming soon. Our new kit is based on an entirely new Oregon Trail'R original profile. Broadly speaking, our intent is to provide a very comprehensive package solving the major design and engineering problems that every DIY builder must face. The new profile is very attractive, it is a mix of our other three profiles. The new kit will be a 4 x 8 teardrop, which will go a long way toward keeping the price reasonable to the buyer. The Kit will include all of the major wooden components CNC cut to perfection, and ready for assembly into the primary teardrop "shell". We intend to sell the chassis in two flavors, either fully assembled and ready to roll, or as a component package that can be welded together by the client, or by a weld-shop local-to-them. We'll be pushing forward with the new kit program very soon, so check in often on our website for updates.

We are located in Eugene, Oregon, and are happy to schedule appointments to meet in person. We always keep at least one finished version of each of our models on hand to show off, and there are always a group of "in-progress" teardrops to look at as well. We can be reached by phone at 541-357-8895, or via email at info@oregontrailer.net



HOW TO:

SOLAR

Made Simple

by Patrick Pellowski

My wife and I just returned from camping in northern Minnesota with a bunch of Tear Jerkers. What made this trip different was that this was the first time we cut the power cord and boon-docked. Admittedly, I was nervous about running out of power, to the point I was ready to borrow an extra battery from my neighbor, who just happens to own and operate a battery wholesale business. Driving home, I was surprised by the liberated feeling of knowing we could camp for several days without being tied to an electrical outlet. This really opened up a world of camping opportunities.



Submitted photo: Joseph Nunes

The only downside to the trip was the fact we could not use our beloved refrigerator, which I just installed earlier this spring. We like keeping the perishables at a safe temperature in the refrigerator and away from the soggy mess of a cooler. So this got me seriously thinking about the use of solar power again. When I got our first teardrop several years ago, I thought about solar, but determined that we would never use it. Since our first camper, my wife and I are still learning how to camp and what's important to us.

Solar power can make camping in remote sites viable, while still enjoying some of the comforts of home. Investing in a solar array can be costly, but having the freedom to boon-dock anywhere you choose is (as one credit card company would say) priceless.

Choosing the correct solar system for your camper can be a fairly complex process and I would venture a guess that this is the main reason some individuals are discouraged from investigating solar power. When I started researching what I needed for my camper, it was a little overwhelming, especially when they started discussing sun hours, amp-hours, battery discharge rates... well, you get the picture. As most tiny campers are fairly simple and energy demands are limited to a few devices, it makes the process somewhat more manageable. I have broken down the process into a few basic steps:

1) Determine Your Minimum / Essential Energy Needs

2) Choose Your Battery Size

3) Choose Your Solar Panel Size and Controller

I am going to walk through the process I used to determine what size battery, solar panel and controller I would need for my 1984 U-Haul Camper. My camper already has an original roof mounted 10 watt solar panel. From what I have been told, U-Haul installed solar panels on all of the campers in their rental fleet, for the purpose of keeping the battery charged between rentals. But I am looking for more energy so I can camp the way I want to (with my beloved refrigerator) while boon-docking.


Determine Your Minimum / Essential Energy Needs

This step is important and will make you take a critical look at how you camp or how you want to camp. If you typically only camp for one night or only camp when electric sites are available, then obviously there is

no need to invest in solar. However, if you intend to frequently camp multiple days where electricity is not available, then solar may be a viable option for you.

It's time to take inventory of your camper's electrical devices and the energy they consume. Make a list of the electrical devices you're going to use or would like to use. This is a good point to think about which devices are energy hogs and if there is an alternative that would be a more efficient use of your battery's energy. For example, there are certain electrical devices that are just not practical to use when using solar, such as your camper's electric air conditioner, electric heater, electric coffee maker, electric toaster, and electric cooktop/hot plate. These items are typically considered "energy hogs." You can still enjoy your coffee, but you will need to brew it over a propane cooktop.

Next you must estimate how many hours or minutes these devices will actually be used in a day; and figure out how much energy these devices actually consume. You may have to get out the manuals/spec sheets or do some research on the internet for this information.



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There are two ways to measure electrical consumption: watt-hours or amp-hours. When I completed my Energy Usage Worksheet, I used amp-hours. I found that it was quite easy converting watt hours to amp-hours, which made it simpler for me to size my battery. If information on your 12 volt devices are in Watts, the formula used to convert it to amp-hours is: Amp-hours = watts / 12 (volts)

As you complete the Energy Usage Worksheet, remember to keep the DC (12 volt) and AC (120 volt) devices separate, as the calculation for AC devices is slightly different. The AC amp-hours must be multiplied by 10 to show DC amp-hours (5 amp AC = 50 amp DC 12 volt). To run your AC devices off of DC power you will need to install an inverter that converts DC to AC. These are readily available and come in a variety of sizes.

Now that you have taken inventory of the devices you use or would like to use while boon-docking, it's important to review your energy usage and look for other opportunities to reduce your energy consumption. First identify any device(s) that uses large amounts of energy and try to eliminate them or replace them with more energy efficient models. In my case, the three devices that consume the most energy are the DC refrigerator, vent fan and the color TV. I have also reduced my energy usage by replacing all of my lighting fixtures with LED fixtures, which consume less energy than your conventional incandescent or fluorescent fixtures.

Energy Usage Worksheet			
DC Devices	Approx Current in Amps 12 Volt	Hours per Day	Amp-hours Used
LED Lights (4)	0.63	4	2.5
Water Pump (est 10 minutes daily)	7.5	0.2 (10/60=.16 hrs)	1.5
Vent Fan (max draw is 4 amp, but we typically run the fan on low - est. 1.5 amp)	1.5	12	18.0
DC Compressor Refrigerator (Once cooled, it is est that the actual run time is 15 minutes per hour)	3.75	6 (15/60=.25 hr) x 24	22.5
Est. Amp-hours Used for DC Devices			44.5
AC Devices			
19" LED Color TV	2.4 (converted to DC)	3	7.2
Est. Amp-hours Used for AC Devices			7.2
Est. Amp-hours Used for All Devices			51.7
Total Amp-hours Used in our U-Haul			51.7
Total Amp-hours Used (minus the DC Refrigerator and Color TV)			22.0

Choose Your Battery Size

Of the three steps, this is probably the most complicated. Before researching this topic, I truly didn't fully understand how critical it is to have the correct size battery. You must make sure your battery is of sufficient size to meet your energy demands.

Before figuring out what size battery you need, some basic battery knowledge is required.

Battery Type: For the purpose of this article, we will focus on the deep cycle type, as they have greater long-term energy delivery, which is perfect for a camping situation and especially as part of a solar application. Due to the materials used in its construction, a deep cycle battery can withstand a number of discharge cycles, which we will discuss shortly.

Battery Construction / Technology: There are different construction methods used for deep cycle batteries, but the most popular are lead-acid (sealed maintenance free and serviceable), Gel cell and AGM (absorbed glass mats). Lead-acid batteries are probably the most common type of battery used today. In fact, this technology is well over 100 years old. Gel cell and AGM batteries are considered specialty batteries, but store energy very well and do not degrade as easily as the common lead-acid battery. AGM batteries are becoming more common and are considered to be the best choice by many for applications such as marine, RV and solar.

Depth of Discharge: Depth of discharge is the percentage of a rated battery capacity that is used from the battery. The more you use the battery without charging the deeper the discharge. For example, if you use 80 amp-hours of a battery rated for 100 amp-hours before recharging, the depth of discharge is 80%.

Discharge Cycle: Discharge cycle is basically the number of cycles a battery can be discharged and then recharged before its ability to maintain a charge is diminished.

A relationship exists between the average depth of discharge and discharge cycle. Generally speaking, batteries will last longer if you never discharge them below 50% capacity, even though deep cycle batteries can withstand daily discharge to 80% of their rated capacity, but at a cost of a shorter life span.

Deep cycle batteries are rated in amp-hours, with a standard hour reference specified. OK... what does this mean? As an example, we have a group 27 deep cycle battery in our U-Haul which is rated at 100 amp-hours with a 20 hour reference specified. This means that if the battery is fully

charged, the draw from this battery will last 20 hours and will provide a total of 100 amp-hours. Another way to say it is it will deliver a current of 5 amps for 20 hours.

Now let's calculate the size battery that is needed, using the following worksheet:

Battery Sizing Worksheet	With DC Refrigerator and Color TV	Without DC Refrigerator and Color TV
1) Enter Your Daily Est. Amp-Hour Requirement (From Energy Use Worksheet)	51.7	22.0
2) Enter Number of Consecutive Days of Inclement Weather or Number of Days You Want Your Battery To Meet Your Energy Needs.	1-2 (Average of 1.5 days)	1-2 (Average of 1.5 days)
3) Multiply Line 1 by Line 2	77.6	33.0
4) Enter Depth of Discharge for Your Battery (to avoid over discharging your battery) <u>50%</u> enter as .5	0.5	0.5
5) Amp-hours Needed (Divide line 3 by Line 4)	155.1	66.0

The Battery Sizing Worksheet indicates that I would need a 155.1 amp-hour battery(s) to camp an average of two days using all of my devices or a 66.0 amp-hour battery to camp with all of my devices except the DC Refrigerator and color TV. Remember, the above calculations do not factor in system inefficiencies or other factors that can affect your battery's performance such as temperature and maintenance.

From this point forward, I am going to focus on the scenario where I use all of my devices, since our recent boondocking experience showed that we could make do with our current battery and no solar array for at least two days.

Batteries used in small campers are typically categorized as group 24, group 27, or multiple 6 volt batteries wired in series. By connecting batteries in series, you are doubling the voltage while maintaining the same capacity or amp-hours. Small campers just by their nature have certain limitations that have to be considered including: placement, weight and physical size. In my U-Haul the battery is placed under the rear dinette seat in a very small compartment. As the battery is inside the camper it must also be vented. This is a very important point. In general, when a battery is being charged it releases hydrogen gas, which is extremely flammable.

To meet my energy demands of 155.1 amp-hours, I would need one HUGE battery like an 8D. However, the cost, physical size and weight are not practical for my camper. Therefore, it appears

that multiple batteries, forming what is referred to as a battery bank, would be a better choice for me. I could have two group 31 batteries wired in parallel, which means the voltage would remain at 12 volts, but the amp-hours would increase. Another option, which many believe is the better choice, is the use of two 6 volt golf cart batteries wired in series. It really is a balancing act between cost, physical size and meeting your demands.

You should also invest in some sort of voltage monitoring device. It is the easiest way to monitor your battery capacity.

Battery Size Deep Cycle	Volts	Amp-Hours	Physical Size	Weight
24	12	70-85	11x7x9	56 lbs
27	12	85-105	12x7x9	62 lbs
31	12	95-125	13x7x9	64 lbs
8-D	12	225-255	21x11x11	156 lbs
6 Volt Golf Cart Battery T-105	6	180-225	10x7x11	62 lbs
Battery Ratings, Size and Weight are Approximates				



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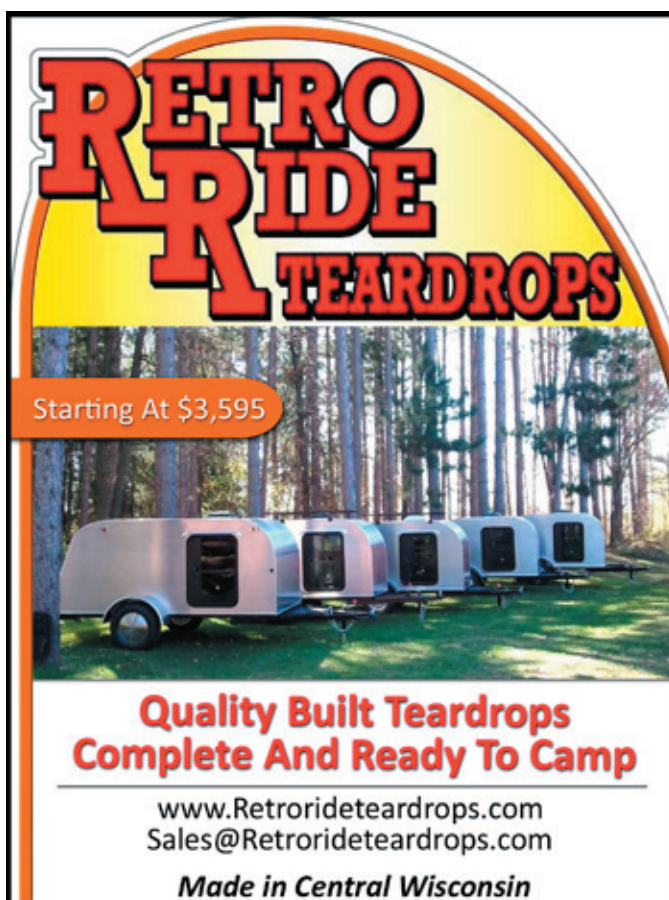
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Solar Panel Size Watts	Max Amps Output per Hour	Optimum Daily Output Summer (6-7 Hrs Peak Sunlight)	Optimum Daily Output Winter (4-5 Hrs Peak Sunlight)
40	2.3 Amps	13.8 - 16.1	9.2 - 11.5
50	2.7 Amps	16.2 - 18.9	10.8 - 13.5
80	4.6 Amps	27.6 - 32.2	18.4 - 23.0
100	5.3 amps	31.8 - 37.1	21.2 - 26.5
120	6.8 amps	40.8 - 47.6	27.2 - 34.0
150	8.2 amps	49.2 - 57.5	32.8 - 41.0

Choose Your Solar Panel Size and Controller

The solar panel size should accommodate current energy demand and still be able to charge the battery.

A high quality 150 watt solar panel will roughly provide 8 amps of charging power per hour under ideal or peak sun conditions. Of course the performance of the panel is dependent on several factors including weather conditions, where you are camping and what time of year you are camping, thereby determining the number of hours of peak sunlight available. Using an average of 6-7 hours for the summer months and 4-5 hours for the winter months, a 150 watt solar panel will produce 49-58 amps daily in the summer and 32-41 amps daily in the winter.



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As my wife and I only camp during the summer months and our peak energy demand is typically during the evening, a 150 watt solar panel should be sufficient to meet our energy demands and still charge the battery.



Solar Controllers

A solar controller is basically a voltage/current regulator to keep the battery from being overcharged and to block reverse current (current from the battery to the solar panel). Solar controllers come in all sizes, features and price range. There are two types of controllers suited for our application: Pulse Width Modulation (PWM) and Maximum Power Point Tracking (MPPT).

PWM controllers are considered the industry standard as they are relatively inexpensive and readily available, but are less efficient.

MPPT controllers are considered the ultimate controller with higher efficiencies in colder temperatures. However, they are more expensive.

Once again, it's a personal choice. For my application and budget, a PWM controller is adequate. However, I know several individuals who have purchased MPPT controllers and it was the correct choice for their application.

As the 150 watt solar panel generates 8.2 amps, a 10 amp controller is sufficient for us.

Other Considerations

So you have figured everything out except where you are going to mount your solar panel(s). There really are only two options: 1) attach the solar panels directly to the camper or 2) purchase a portable system, which can then be moved around the campsite. Personally, I am in the latter camp as mounting the solar panel(s) to your trailer is not always optimal because the panel will likely not be at best sun-angle. With a portable system, you have the ability to move the panel(s) as needed to keep them in the sun. However, the most important reason for me in choosing a portable system over a fixed mount system is that I usually want to park my trailer in the shade.

I am not aware of any solar sizing "rule of thumb". If you are serious about a solar system for your teardrop or tiny camper, you need to measure and calculate your energy requirements, size your battery and then find the right solar panel and controller. You will be glad you took the time and effort to do it right the first time.





by **Sarah Tucker**

As an innovator, Pat Freetly started tinkering with the idea that there had to be a better design for a small trailer that has all the amenities of the teardrop trailer, but with more space. Something that can be towed by practically any vehicle and stored in a garage or small area.

A trailer that will get you to your favorite fishing, hunting or hiking spot and have the security that keep you safe at night. Also room for all your camping gear and a closet to your hang clothes. S.M.I.L.E. makes it possible to have more storage space without having to share it with the sleeping area. More adventure by being able to tow it to your existing vehicle and not having to purchase a tow vehicle. More style than any other trailer of its size.

So how do you get sleeping space inside without sharing it with the rear kitchen area? By adding a rear slide, Pat incorporated inside storage cabinets and closet plus an outside storage and kitchen area into one unit that slides out when in use it and slides in when towing it or storing it.

S.M.I.L.E.

**Small
Mobile
Independent
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Element**

It includes a rear cover that provides a place out of the sun or rain and is 7 feet tall. Each trailer has two rear support friction jacks so you don't get movement when set up. The rear cover can be closed and locked at night or when not using it without compromising the sleeping area.

The trailers are built on a heavy duty steel frame with three leaf springs and complies with all DOT standards. The trailer weighs less than 1000 lbs. and has a capacity of 1,720 lbs. The overall dimensions are: length is 11' 6" and width is 5' 6", height is 6" (without the rear cover opened up.)

A 2 inch ball receiver comes standard as well as 5.3 X 12 inch tires five lug (can be upgraded to 13 inch wheel / tire), length is 11' 6" and width is 5' 6".

The interior boasts of two twelve-volt lights, a ceiling vent (optional three speed/two way fan and a smoke detector). A tong cargo box holds the batteries and optional 4000 watt inverter which is capable of running small appliances, T.V., radio and charging phones and computers. Two rear tail lams and side running lights also come standard.

Four low voltage lights are in the kitchen area and hooks for hanging utensils. A sink with hand pump is available as an extra add-on. Any portable stove can be stored and used with the trailers. The rear area has plenty of room for canned and dry food storage and even your sleeping bag(s).

*The future holds more people
S.M.I.L.E.ing!*





Dual Purpose 'Drop

by **Mark K. Hatcher**

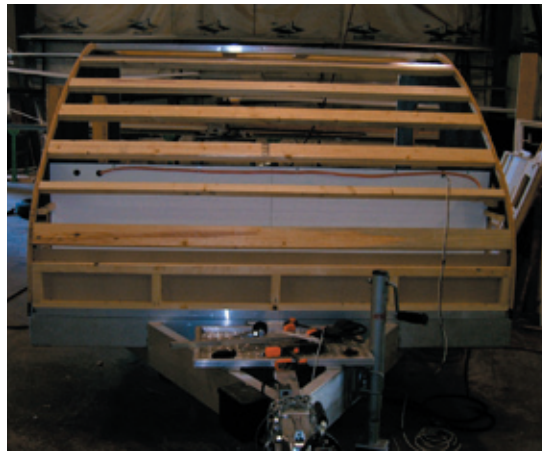
My wife and I both come from avid camping families. We both had various experiences with different types of camping styles, from tents, pop-ups to full size camping trailers. It was only natural that we would continue to camp with our family as it grew over the years. We even added backpack style camping with canoeing in the Boundary Waters.



We started with an Appleby tent camper, which we pulled with a diesel pickup. During inclement weather the Appleby turned into tight spaces with two small boys. It seemed necessary to then purchase my parent's 21ft Starcraft Popup when it became available. Within a few years it was parked and we were deep into backpacking and Boy Scouts. The boys were then off to college and we purchased a touring motorcycle, but wanted to incorporate camping as a means to keep cost down and still enjoy our love for camping.

We teamed up with another couple and trailered the motorcycles to Grand Rapids followed by a 1200 mile loop through the Black Hills, Yellow Stone, and Teton Mountains. We reserved a string of cabins at KOA Campgrounds and would be off the next day to a new destination. We were hooked; motorcycle touring and camping was what we set our sights on as means of relaxation and escape.

We started out with a dual Kenton Motorcycle Trailer and two motorcycles; one for the back gravel roads of National Parks and one for touring. Once again we reserved KOA Cabins. We found advantages and disadvantages to the cabins. In short the beds were not always comfortable and they were not always located in the area of our destination. We wanted something really small in conjunction with a



means to haul our motorcycles. It didn't take a lot of investigating to realize what we wanted, didn't seem to be in the market place at the time.

During the fall of 2008, I was transferred to an overnight shift with plenty of time to research the market place, via the internet. I became totally fascinated with the teardrop trailer concept. I read every do-it-yourself site and begin looking at different manufactures across the country for something that would work for our needs. We created a list of what we wanted and what we didn't require. The most important component of our new camping unit was a comfortable bed at the end of a full day of exploring. High on the priority list was also a place to stay dry during inclement weather. These two requirements in conjunction with the ability to carry our two motorcycles made up the core of our top requirements in

a camping unit. I quickly became convinced the teardrop was the answer with a deck area incorporated to carry two motorcycles.

The only company at the time to come close was the Little Guy Trailer Company. On their webpage was a FiveWide Teardrop with a front deck area, suitable for a lightweight dirt bike. The photo of a FiveWide with a dirt bike strapped to a small deck area would become the launching for our project. After pouring over numerous other sites "Little

Guy" seemed to be the only site which approached the thought of carrying a motorcycle. While I realized it was not suited for our needs they had already approached the concept. I felt they may have explored other options or possibly open to another concept.

The first full week in January of 2009, I called the 1-800 number for "Little Guy". I explained my question might seem a little odd, but I was wondering about the ability to have a teardrop trailer with a deck area big enough for





Locate/purchase adaptable motorcycle chocks and attach to trailer

What was the projected cost of the additional needs?

How much would the completed

two motorcycles and had this ever been considered? I then suggested utilizing the RT Teardrop Design with a deck area to the rear of the camper. The answering party explained they had just completed a similar. He asked me for an email address and he stated he would immediately send me photos to prove out what he was attempting to explain.

I was able to download the photos of what were titled "prototype". It was an RT "Sport" teardrop (fivewide) with a steal mesh deck area directly behind the camper, including ramps. The photos showed an ATV loaded on the rear deck area. I received a return phone call and I fired question after question regarding the trailers capabilities, specifications and design. Naturally, I inquired regarding the cost of the trailer. It was a new design and the cost had not been established. I was told they would crunch the numbers. I was satisfied that I had quite possibly found a means of purchasing a trailer that would fit our specifications.

I received an email, from Chris Baum, (then) Executive VP/ COO of Little Guy. He priced out the trailer which seemed reasonable, but who purchases a trailer sight unseen? Prior to the email, I had phoned and spoken several times with Dave Reynolds, co-founder of Little Guy Trailers. I inquired if it was possible to see the trailer in person? Dave stated sure, but the trailer was located at the factory in Elkhart, Indiana. The only time available for us to see the trailer in the coming months was going to be Saturday, two days later. With impending snow showers through the Midwest and possibly a snow event in the Chicago area we borrowed my brother's Land Rover and planned a trip to Elkhart, Indiana the following evening.

We headed toward Elkhart, Indiana to see the "RT Sport Prototype" and met Dave and his brother at the factory. We spent the next couple hours plus pouring over the "RT Sport" prototype. I had a list of questions. It was great to see the trailer in person and really enjoyed meeting Dave and his brother. We headed home with the available information. "Little Guy" was hesitant to add any of the deck extensions or adaptations. This didn't discourage me, but I was encouraged it could be done if we just could expand our understanding of what was going to be required. On the return trip we established the following primary list of challenges and concerns.

What would be the design of the hinging platform?

How would the hinging design effect the operation of the trailer (weight and balance)?

trailer weigh?

Who would perform the work if it was possible?

Unfortunately, within the week we were fairly certain the "RT Sport Prototype" could not be easily adapted to fill our requirements, but it were really close in the design concept. We decided to look at building a new "RT Sport Prototype" from the ground up. This would allow us to make a few more design changes and take into consideration the overall weight of the trailer. The number one weight issue was the current steel construction. Building the trailer on an aluminum trailer could reduce the overall weight by up to 40%, depending on the weight capacity you were attempting to accommodate (weight of motorcycles or other conveyances). After expressing my desire to build on an aluminum trailer, I was advised by Little Guy they did not have the capability to build the trailer portion of the project. However, in theory they would be willing to build a "RT Sport Prototype" on an aluminum trailer, if I could deliver it to their factory in Elkhart, Indiana.

It didn't take much time to connect, with Dean Maschoff, Product Engineer, Aluma Trailer Company. I submitted several designs to be incorporated into either the 7800 model or the MC2F model trailer, both aluminum trailers. An issue we faced was the desire to tow the trailer without the motorcycles. This would require the need for movable axles. We jumped up to a tandem 8220 model (aluminum trailer) which already had moveable axles and fender covers. Next would be where to locate the recessed tie down rings and what motorcycle chock could be incorporated. I adopted the Kendon Trailer tie-down pattern, allowing for structural conflict in the 8220 model. Then I located the Lock 'N Load (BK100) Orange/Black Deluxe Motorcycle Wheel Chock, which was a perfect fit for our needs. We took delivery of the trailer at the factory in Bancroft, Iowa, but actually purchase it from Funk Trailers in Morris, Illinois. We then delivered the trailer to Elkhart, Indiana.

As we worked through the trailer design process with Aluma Trailer Company, I kept in contact with Little Guy. When we made the decision to use the 8220 model this allowed us to go from a five wide to a six wide. The big plus was a king size bed! We then focused our attention on the interior of the "RT Sport". We kept many of the original plans but, as most tear droppers do, we changed up a few things to our personal preferences.

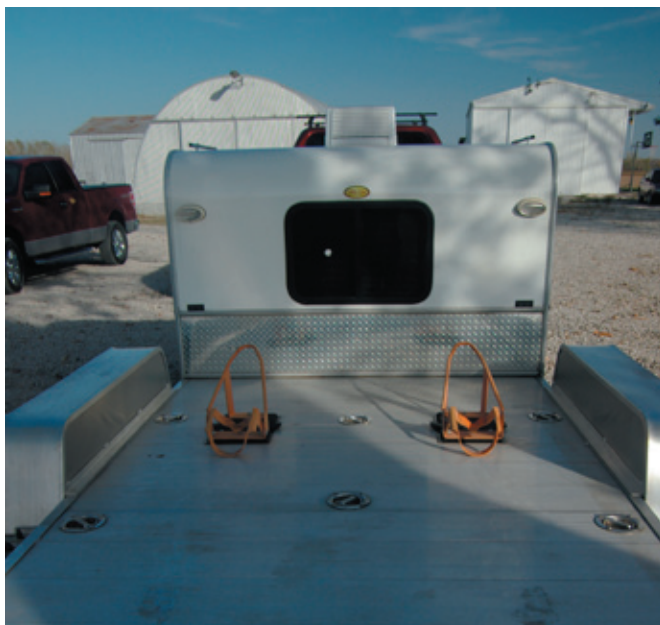
Delivering the trailer to "Little Guy" as a blank slate and realizing I would be adding approximately 800 lbs of material in the form of a "RT Sport", plus two motorcycles (870 lbs), we turned our attention to weight and balance issues. We located several on-line sites giving detailed equations of how to calculate the weight and balance of both a tandem and single axle trailer. After reviewing all the information we came to the conclusion that the axles wouldn't require any movement until we loaded the motorcycles. The overall problem was the actual tongue weight, after loading or packing for any given trip once we had picked up our completed trailer. The solution is a "Sherline Trailer Tongue" weight scale. The Sherline is simply placed on a floor jack and lofted up inside the ball area of a trailer. The readout on the scale immediately displays the tongue weight.

We took delivery of our custom "RT Sport" prototype, constructed on a 20ft, Aluma #8220 Tandem Trailer in July 2009. It had been seven months since the first phone call. The camper's dry weight was 2280 lbs. We moved the tandem axles forward for the combined towing weight (two motorcycles) of 3440 lbs. The tongue weight of the camper was 360 lbs. with overall weight we were just below the range of a Class III hitch of 3,500-5,000 lbs fully loaded. We had met our goal to be able to pull the camper anywhere with a half ton truck or medium size SUV. We added a Kelty Carport Deluxe to one side of the teardrop, which offered shelter entering and exiting the camper. We have constantly looked for ways to improve our teardrops serviceability including storage in temperature and climate controlled environment.

We have not looked back on the decision to build a very unique teardrop with any regrets. We were fortunate to find great companies which built very superior products with great customer service. It was a match made in heaven. We have traveled specifically to the Smokey Mountains, Yellow Stone, Glacier Park, Teton Mountains, Canada, to include the Lake Superior Loop, and throughout the Midwest and Southwest. It has truly been a great rig.

We are approaching the retirement years and with the hope of much longer trips, we are sadly selling our teardrop and moving into a pop-up off-road truck camper. Our teardrop and the wonderful trips we were able to experience are permanently etched in our memories. We will also fondly remember the people we met and places we traveled in our very unique teardrop toy hauler.

Note from the editor: If you would like more information about purchasing this teardrop please email sarah@cooltears.com and I will put you in contact with the owner.



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