

RV Consumer e-Magazine

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Volume 2

Issue 9



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Inverter vs. Generator

Towing Tips 4-Wheels Down

Gas-Diesel-Torque-Horsepower

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Page 6



Page 22



Page 18

IN THIS ISSUE

6 Protect your RV Electrical System

Get some great tips & hints on how to protect your RV electrical system and appliances.

12 Gas-Diesel-Torque-Horsepower

Understanding torque and horsepower can be confusing. In this article Mark tries to clear up some of the confusion.

14 Trailer Sway Part 1

Read an informative article about what trailer sway is and how to control it.

22 Inverter vs. Generator

Which makes more sense, using an inverter or a generator? Read this article and decide for yourself.

28 Towing Tips 4-Wheels Down

Not sure what you can tow with 4-wheels down? Read this informative article for some great tips on towing with 4-wheels down.

DEPARTMENTS

4 Editor's Desk

18 Favorite RV Destination

Return to OBX one year after Hurricane Irene damages the barrier island chain.

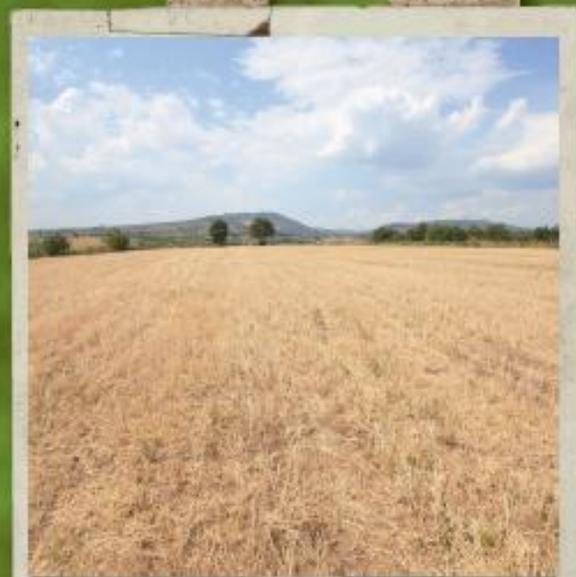
25 RV Product Spotlight

Tired of dealing with broken and corroded trailer plugs? Check out EZ Connector.

How will you
Remember
your travels?



*The laptop we would've used to
keep in touch with the kids.*



*Cook's Field, the week after we
missed the Bluegrass Festival.*



*The guy from Ed's Towing.
Spent three hours with him.*

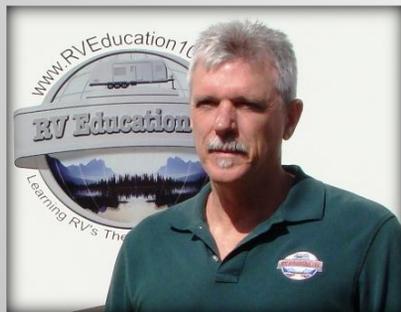
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Congratulations to all of our great Olympians!

Last July we went to the North Carolina Outer Banks for a 10 day vacation. Shortly after returning home from that trip Hurricane Irene hit the small chain of islands, causing devastating damage.

One year, almost to the date, we returned to OBX for some rest and relaxation and to survey the progress in rebuilding after Irene. The KOA we stayed at was destroyed by Irene, as were many other areas up and down the island chain, and folks are still in the process of rebuilding. The chain of barrier islands is still a beautiful destination spot from end to end, and if you ever get the opportunity I encourage you to visit OBX. Read the story on page 20.

Enjoy this edition of RV Consumer e-magazine.

Mark

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“As I travel by RV crisscrossing the manicured highways and byways I contemplate our forefathers rugged journey westward by horse and wagon. They truly were first generation American RVers.” ~ Mark Polk

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Protect your RV Electrical System

By Mark Polk



As campgrounds struggle to meet the taxing demand placed on the electrical system many of the patrons camping there are unaware of the potential problems this can create. Campground electricity can fluctuate a great deal, especially during the summer months when the demand for electricity is much greater. When AC voltage drops below 105 volts or goes above 130 volts you risk damaging thousands of dollars worth of electrical appliances and electronic equipment in your RV.

I have always been an advocate for monitoring the AC line voltage coming into your RV.

If you don't know what the voltage is coming into your RV you can't take the steps required to protect your RV.

A high demand for electricity is not the only problem you could encounter at a campground. Old or improper wiring can also present problems for your RV's electrical system.

So what can we do to prevent these problems? One thing you can do is purchase an inexpensive digital line monitor so you can monitor the AC line voltage coming into your RV throughout your camping trip.



You should always test the campground wiring for improperly wired circuits before you plug your RV in. Once this is done you can plug the line meter into any 120-volt outlet in the RV where it will be easy to monitor the AC voltage during your camping trip. Many of the digital meters available provide an audible alert in case of a hazardous electrical condition like reverse polarity, a bad ground or low voltage. Some will also function as a surge protector.

There are many other products available to assist you in protecting your RV's electrical system. There are different types of surge guards designed to protect the entire RV's electrical system from faulty campground wiring. Most of them will have a monitor to display the condition of the power coming into the RV and provide solid state surge protection with automatic over and under voltage protection.

Some surge guards are equipped with a transfer switch and will transfer to shore power or a generator automatically, protecting the entire RV's electrical system.

[Watch the Surge Guard video](#)

And then there are autoformers, autoformers provide the ultimate protection to your RV's electrical system.



[Hughes Autoformers](#)

An autoformer doesn't just monitor the power coming into the RV; it will boost campground voltage if the voltage coming in drops below 117 volts. In the event of low voltage an internal transformer increases the volts and lowers amps. Autoformers also provide spike and surge protection and polarity and ground testing capabilities.

So, make sure you take the proper precautions to protect your RV's electrical system, then turn the AC on, kick back, relax and have fun. **RV 101**

RV 101 Tip: Extension Cords and Electrical Adapters

If at all possible try to avoid using an extension cord when making electrical connections at the campground. The gauges of the wire used in standard household extension cords are not suitable for RV electrical hook-ups. If you do use an extension cord it's a good idea to purchase one that is compatible to the electrical system of your RV.



Electrical adapters are a necessity for RVers. Eventually you will be put in a situation where you need to use some type of electrical adapter to make a connection at a campground. It may be an outdated campground or isolated area that only provides 20 amp electrical service. There are adapters that will go from your RV type plug and size down to household type outlets, and there are adapters that go from household type outlets to campground RV connections. It's nice to have these adapters on hand when you need them, but you must exercise caution when you use them. If you place too much of a demand on electrical adapters, or use them for extended periods of time they can overheat and melt resulting in damage to the RV power cord or electrical system. **RV 101**

RV Solar & Inverter Quick Tips



Battery Tip

Batteries are rated in amp hours. The amp hour rating is basically how many amps the battery can deliver for how many hours before the battery is discharged and needs to be recharged.

How Solar Works

A typical solar system for an RV would consist of solar panels, batteries, some type of charge controller and an inverter. The solar panels capture the sun's energy and produce direct current or DC power. This captured power is stored in the RV's auxiliary batteries. A charge controller makes sure the RV batteries are fully charged, but not overcharged. The power inverter converts the DC power stored in the batteries to AC power to be used by the RV's appliances. Many of the inverters found in RVs today are inverter/chargers. What this means is they are inverters, battery chargers and a transfer switch all in one.

Proper Sizing

The size of the solar panels, batteries and inverter you will need depends on how much power you plan to use in your RV. The more electricity you plan to use not only requires a larger inverter, but a larger battery bank and solar panels too.

Inverter Ratings

Inverters are rated in watts and come in a variety of sizes and power ranges anywhere from 75 watts to 3000 watts. When you purchase an inverter the output capacity must be capable of operating the loads that will be placed on it. Inverters have two different capacity ratings, the continuous output rating and the surge capacity rating. Continuous output is the maximum wattage the inverter can output for a long time period. Surge capacity is the maximum wattage the inverter can output during initial start. Appliances require more power when they start.

Computing Amperages

Compute the amperages you plan to use and the amount of time you plan to use it to determine if your battery(s) are capable of providing enough stored power. The power, in watts, drawn from the batteries by your inverter is the same as the power, in watts, drawn by the 120-volt AC items, plus about 15% for losses in the inverter.

Q&A with Mark

Q: When I use my RV generator I notice pulsing at the microwave. The light goes dim and then bright again. Any thoughts?

A: This is quite common and can be caused by several reasons. Sometimes when a generator isn't run or exercised very often the fuel will begin to tarnish and when the unit is under a load it will pulse.

This can be caused by a dirty fuel filter, dirty air filter, the need for a tune up, bad gas and if it is low on oil. In most cases it is a fuel related problem that causes the pulsing.

As the load rating increases the generator engine needs to maintain constant speed for the governor to adjust to the load. The pulsing results in fluctuating voltage, which in turn would account for the light going dim to bright.

I would plug a digital line meter into one of the 120 volt AC outlets in the RV and run the generator with at least a 50% load. See what the voltage and frequency readings are under load. If it is pulsing and the voltage/frequency is fluctuating start checking the items I listed above. If all of the items check out the carburetor may need to be cleaned to solve the problem.



To stay current with what's happening in the world of RVs between magazine issues visit our [Blog](#). We post informative RV tips and information a couple times per week. There is also an option to follow the [Blog](#) via e-mail. Just look on the right sidebar and when you sign up you'll be notified each time we make a post.



RV Quick Tip

Always check and add air to the tires when they are cold, before traveling. When tires get hot the air expands and you get a higher-pressure reading. If you let some air out they will be under inflated when they are cold..

RV Education 101 Product of the Month



**\$19.95 offer
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Subscriber's Special

An RV is your living room, dining room, kitchen, bedroom and bathroom on wheels. Not to mention air conditioning, TV, and being able to take a hot shower when you want.

An RV offers you the freedom to roam America's back roads and the flexibility to go whenever and wherever you want.

If you are new to RVs and want to learn more let hosts, Mark & Dawn Polk, walk you through an introduction to RV's. Learn what an RV is, which type of RV is right for you and your family, and some important things to consider before you buy an RV in this information packed DVD by RV Education 101.

What's Inside the DVD?

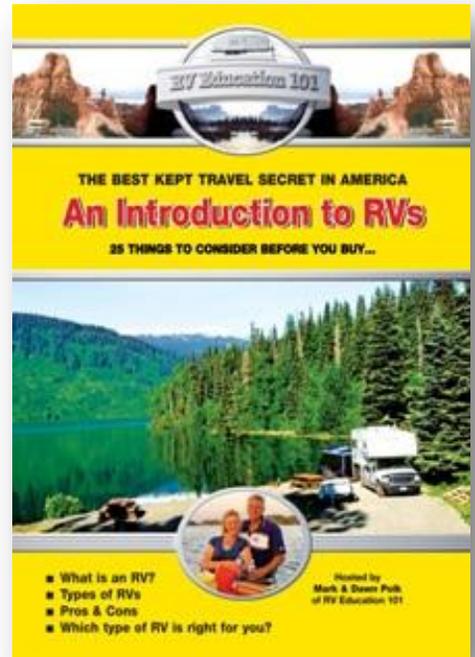
What is an RV?

Types of RV's

Pros & Cons

Which type RV is right for you?

25 things to consider before you buy



[More Info or buy now](#)



In the News

From: Boston.com

By Beth Teitell

Is Technology Ruining Family vacations?

Technology, having transformed the rest of life, is going after the family vacation. Parents and kids are

equally guilty of clinging to their mobile devices, though for anyone who has learned about the night sky from an app — or answered a work e-mail from the beach — technology can enhance a vacation, or make it possible for some adults to get away at all. But the benefits of vacationing as a family may be lessened if each person spends the holiday physically present but mentally elsewhere.

[Read More](#)

From Billings Gazette

By Jan Falstad

SACRAMENTO, Calif.— **KOA, the nation's king of camping** is celebrating its 50th anniversary this summer, marking the growth from a handful of campsites north of the Yellowstone River to 458 franchises, plus 26 company-owned campgrounds. Sporting 1,000 employees, with 73 based in Billings, in some years KOA flies more people out of Billings Logan International Airport than any other local company.

[Read More](#)

From The Sydney Morning Herald

By Kelly Cauthorn

Read an Australian's take on a family RV trip from Los Angeles to Los Vegas and the ten motorhome lessons he learned the hard way.

American horror has many faces. *The Exorcist*. *The Thing*. The Kardashians. None, however, is as terrifying as the Orange Crush. It looms overhead, howling, waving its arms, drawing us into its spinning vortex. Thirty-four roads and ramps - the world's largest intersection - all bisecting and splicing overhead, on stilts.

[Read More](#)

Gas-Diesel-Torque-Horsepower

By Mark Polk



Explaining torque and horsepower can get extremely technical, and I want to keep this simple and easy to understand. With that said, torque is basically the force or energy required to move something. Torque is the measurement of force, and force is measured in reference to a twisting or rotating shaft. In English terms torque is measured in pounds-feet, but is more commonly referred to as foot-pounds. So in keeping it simple let's just say that torque can be thought of as the amount of turning force it takes to move one **pound** of weight the distance of one **foot**.

Torque can be multiplied through gear ratios. You have probably heard the higher the rear axle ratio the better the truck will tow. The axle ratio is the number of times the driveshaft must rotate to turn the rear wheels one revolution. If you have a 3.73:1 axle ratio the drive shaft turns 3.73 times for each full turn of the axle. So in a sense torque really equals towing capacity.

Horsepower on the other hand is torque X RPM's. Torque is how much work is being done, and horsepower is how fast you get the actual work done. What's interesting is, an engine rated at 350 horsepower only produces that horsepower at a rated peak power RPM. This RPM range, for a gasoline engine, is often between 5,000 and 6,000 RPM's. When an engine is idling the horsepower is significantly lower, and as the RPMs increase so does the horsepower. When you are towing a trailer the engine speed is more likely to be in a lower RPM range, which means you are only using slightly more than half of the engines rated horsepower. Horsepower is measured by a dynamometer. A dynamometer puts a load on the engine and measures the amount of power the engine produces against the load at various speeds. In reality it is measuring torque in pound-feet and converting it to horsepower. Even at the rated peak power RPM you really won't get the rated horsepower, because a percentage is lost through auxiliary equipment on the engine and the process of getting it back to the wheels.

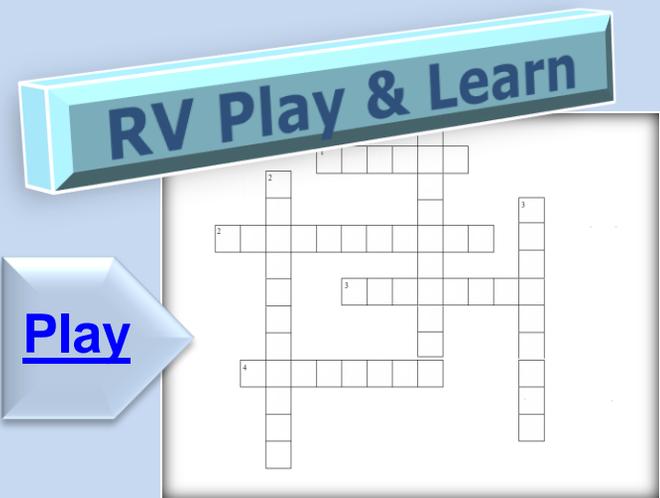
In a diesel engine the horsepower peaks at a lower RPM, and there is more torque at a lower RPM compared to a gasoline engine.

This results in a diesel engine having much more power at a lower RPM, around the RPM range you will be towing at. This higher torque and higher horsepower at a lower RPM equates to better towing.

There are many other factors involved in the question of gas versus diesel that you will need to consider. What are the maintenance costs involved, cost difference between fuel types, fuel economy, your budget, and the resale value? Whether it's for a tow vehicle or a motorhome, take your time and make a well informed decision when comparing gas to diesel.

If the question is simply which truck will tow more or which motorhome has more torque the diesel will win hands down, but I honestly have no complaints with our gas powered motorhome either. Especially when considering the price!

RV 101



A graphic titled "RV Play & Learn" featuring a crossword puzzle grid with several words starting with numbers 1 through 5. A blue arrow with the word "Play" in white text points towards the puzzle.

[Avoiding RV Insurance Claims](#)

RV Insurance Tip



Buying a new or used RV is a major investment. To help protect your investment you need the proper type of insurance coverage. There are several major insurance companies that specialize in RV insurance and I strongly recommend that you use one that does specialize in RV's. You might have a great insurance company for your home and automobiles, but an auto policy can't begin to cover the complexities of an RV. You need specialty coverage like vacation liability, total loss replacement, personal effects and much more.

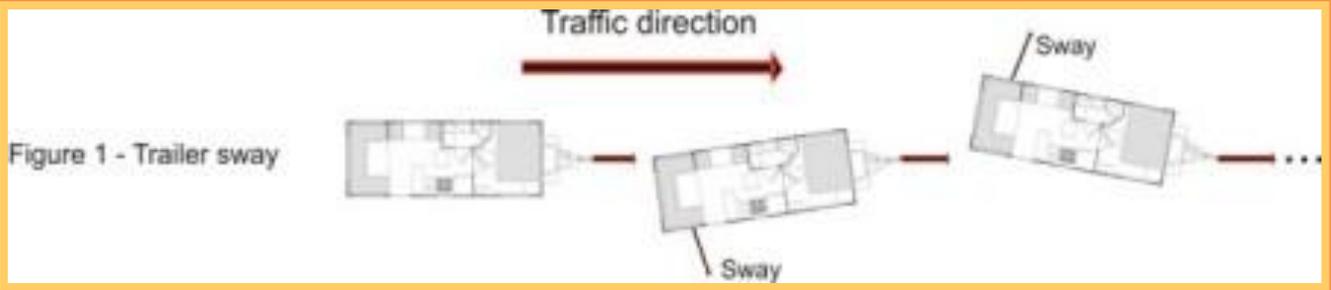
There are a number of specialty coverage's available, designed to protect you and your property. Specialty RV coverage's are what differentiates RV policies from auto policies. Adding your RV to your auto policy is inadequate because it fails to cover many of the provisions included in a specialty RV policy. For example, most RV insurance provides coverage for awnings, furniture, permanently installed items and fixtures, and plumbing and electrical systems unique to RVs.

Typical RV policies also provide unlimited towing and roadside labor coverage. Auto policy towing coverage is often inadequate for RV expenses.

RV 101

Trailer Sway Part 1 of 2

Part 2 of this article will be published in the October RV Consumer edition.



Trailer sway, that side-to-side fishtail movement, (**Figure 1**) occurs when there is a force perpendicular to the tow vehicle and trailer trajectory, applied to the hitch ball. An important factor in controlling sway is the amount of tongue weight applied to the hitch ball, and how that weight is distributed to the tires on the tow vehicle. A general rule is trailer tongue weight should be 10 to 15% of the fully loaded trailer weight, for trailers weighing over 2,000 pounds. If the tongue weight (what generates friction to the tow vehicle rear tires) is properly distributed to the rear tires of the tow vehicle most lateral forces encountered will not be sufficient to start sway. If the lateral forces do overcome the tire friction trailer sway will start.

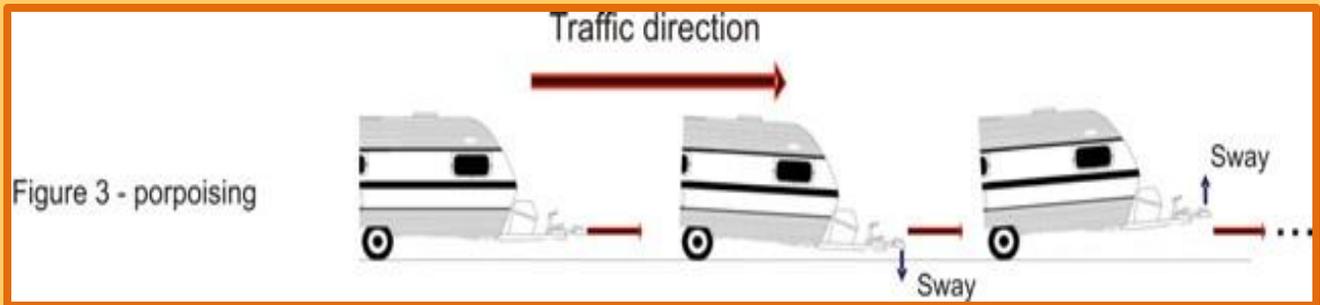
This would be a good time to include an analysis on tow vehicle and trailer traffic speed. As speed increases, tire traction decreases with a corresponding increase in the possibility of trailer sway. At 60 mph, and under wet road conditions, a weak lateral wind may start a lateral trailer displacement.



Natural trailer balance, when travelling, may be understood as a vertical pendulum, but in the opposite direction (**Figure 2**). The trailer sway is similar, but the displacement is horizontal, over the road, with the trailer (and the tow vehicle by consequence) going from one side to the other many times. If the trailers vertical stabilization, associated with the suspension, is working properly it helps in preventing small sways. Weight distribution bars reduce vertical displacements (swings) and transfers the hitch weight to the vehicle and trailer tires.

This results in the rear tires gripping the road better, and may avoid these sideslips. So, it is important, before leaving on a trip, that we complete a checklist of all items associated with the tow vehicle and trailer stabilization. These checks would include inspecting items like tires, weight distributing bars, proper hitch adjustments, the trailer and tow vehicle suspension systems, and that all cargo is distributed evenly. If these items are not in a good shape, it will decrease the speed that we can safely travel at.

The bigger the trailer is (taller and longer) increases the chance for sway. There are two reasons for this, an increase in weight and an increase in mass (the area that will receive lateral winds). Weight increase will augment the forces applied to the hitch ball, especially when traveling downhill, due to the gravity, acceleration and also in case of any vehicle brake activation. If there is any unbalanced item in the towing system, it may become sufficient to start sway. If the trailers lateral area is larger, the amount of forces due to lateral winds is also increased. These forces may destabilize the tow vehicle and trailer motion, increasing the chance for sway.



There is another very important item associated with sways, and that is the number of trailer axles. Compared to one axle, two trailer axles increases the number of wheels 100% over the ground, and by consequence the increased tires gripping the road decreases the chance for sway. Another peculiarity associated with one axle is the vertical motion (front-back direction, referred to as porpoising) associated with vehicle brake activation (**Figure 3**). In this situation the trailers front end will tend to push downward. This vertical downward motion enhances the tow vehicles back wheel traction, but decreases the front wheel traction, and the forces applied in the opposite direction (up) will reduce the tow vehicles rear wheels traction. Depending upon total weight balance, the tow vehicle and trailer may start a back or front sway and the tow vehicles front motion control will be compromised. It is well known that for both single and dual axle trailers, the larger the trailer is the more unstable it is when talking about porpoising. Proper hitch work can mitigate some of this from occurring.



Statistics prove that 5th wheel trailers are more stable and sways associated with them are seldom reported. Why? It is mainly because a more stable condition is obtained due to the 5th wheel hitch being positioned over and close to the towing vehicle rear axle. In the case of a 5th wheel, lateral forces do not affect it like a trailer that is hitched at the rear of the tow vehicle. The weight at the hitch position of a 5th wheel trailer is higher and over the axle, enhancing the tow vehicle traction on the road surface. But, when towing a 5a wheel, the driver must be more careful in descending an incline because the natural tendency will be for the weight of the trailer to push the towing vehicle.

Always keep in mind the towing vehicle has a maximum tow capacity and that you must compute total RV weights including, passengers, cargo, and fluids and fuel. Also keep in mind that any weight added to the tow vehicle takes the same amount of weight from the towing capacity.

The most important items associated with trailer sways are:

- a) underinflated tires
- b) improper weight distribution
- c) improper hitch adjustments
- d) no sway control
- e) air pressure from transfer trucks passing
- f) long downhill (descent)
- g) lateral wind
- h) towing speed
- i) inadequate towing vehicle
- j) overload conditions
- k) hitch to tow vehicle rear axle distance
- l) poor trailer design
- m) Mismatched tow vehicle & trailer
- n) Not completing trailer/tow vehicle checklist

This article was written by Mark Polk & Jose A dauto de Souza

Adauto is a Petroleum Geologist/Geophysicist close to being retired. Since 1978 he has been a camping enthusiast, starting with tents, then a pop-up, travel trailers and now has a Class A motorhome. (I have been through the same RV progression, and around the same time frame as Adauto). He is a member of a regional RVing group in Rio de Janeiro State called "Amigos do Rio RV Group (Rio's Friends) (Brazil)". Adauto has been researching and compiling free RV information for other RV enthusiasts in Brazil, since they do not have a bibliography about RVing in Brazil. He was working on a trailer sway article when he contacted me, to help educate some of the RVers in his group on sway issues. He wanted to know if I would be interested in working together with him on the article. At times it was a bit difficult to translate what each of us were saying, but I think we figured it out. Stay tuned for part 2!

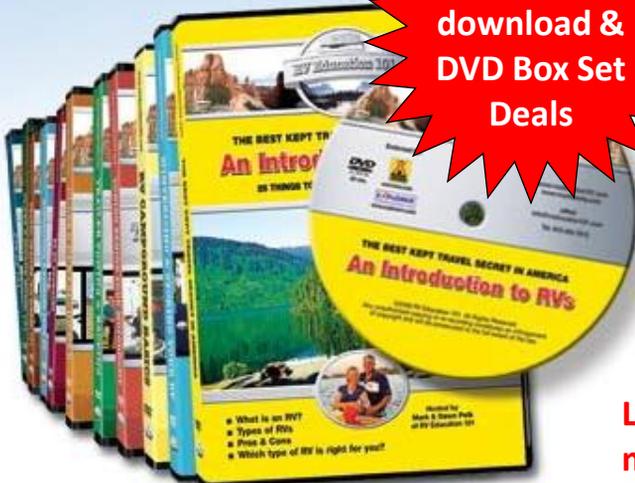


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Favorite RV Destinations



by *Mark Polk*

Return to OBX

Last year when we visited the North Carolina Outer banks we only explored the northern portion of the barrier island chain. This year the plan was to return to OBX and check out more of the southern end.

About one month after returning home from last year's trip Hurricane Irene damaged the hurricane-prone chain of islands. In Irene's wake several sections of N.C. Highway 12 were breached and it opened new inlets on Hatteras Island.

The KOA we were staying at was devastated by Irene, but the progress in rebuilding was evident everywhere we went. You could still see remnants of Irene, but this wasn't the first hurricane to hit OBX and these folks are familiar with digging out after a storm and restoring order.

Even with the temporary bridge and leftover hurricane debris scattered throughout the area the Outer Banks are absolutely beautiful and all one can do is hope this national treasure will continue to withstand what Mother Nature dishes out.



Hurricane Irene
flood line at the
KOA office.



Hurricane Irene
Flood Line 2011



Remnants of Hurricane Irene



Our campsite was literally a few steps from the beach so it was difficult to decide whether to just stay there and relax or go out and explore the islands.

Ultimately we decided to spend some time checking out the sites to the north. I enjoy visiting lighthouses so our first stop was the Bodie Island lighthouse. In 2009 they began a full restoration on the lighthouse. Funding for the project increased so the restoration project was in full swing when we stopped to visit. This was the third location and final resting place for the Bodie Island lighthouse. The first location proved to be unstable ground to support the heavy weight so it was moved. The

second location would be destroyed by confederate soldiers to keep it out of the hands of the union forces during the Civil War. Time began to take its toll on the lighthouse and a full restoration began so it will remain for generations to come.



Next we were off to see if we could find some of the famous Spanish Mustangs strolling on the banks of Corolla.



As you get closer to Corolla you start to see numerous wild horse tour businesses. We had the old CJ7 along with use on the trip and decided it would be fun to try and find the wild horses on our own. **(note to self: keep a tow chain in the Jeep at all times just in case)** When we got to the end of the road it was time to lock in the hubs and do a little 4-wheelin on the beach. Not knowing exactly where we were going we opted to just follow the crowd.



Along the way we spotted some dolphins in the surf just off the beach.



After driving on the beach for several miles we decided to stop and ask an insider (lifeguard) where the best chance of spotting some Spanish Mustangs would be. He told us where to go, and low & behold we came right up on a few . The story goes that these Spanish Mustangs, also

referred to as Banker Horses, are the descendents of Spanish Mustangs that were brought to the United States on Spanish galleons in the 16th century. They learned how to adapt to the Carolina coastline and have survived here for the last 400 years. Sadly what was once thought to have numbered over 5,000 horses is now down to about 300. Thanks to the Corolla Wild Horse Fund (CWHF) these beautiful horses are now protected.

After making our way back down the beach we enjoyed the drive to our next stop, the Wright Brothers National Memorial in Kill Devil Hills. The National Park Service runs the memorial so it is only a few dollars to get in, and there is lots to see and learn.

A 60-foot granite monument was erected on top of Kill Devil Hill to commemorate the achievement of the Wright brothers.

There is a Visitor Center and museum onsite that features all of the history behind the Wright brothers. The brothers owned and operated a bicycle shop to fund their dream of one day flying an airplane. Kill Devil Hills was selected by the two brothers from Dayton Ohio as the best area to support their testing. After 3 years of testing and gliding experiments they achieved the first successful airplane flight in 1903. ***RV 101***



The remainder of this year's short trip to OBX was spent fishing and relaxing in the sun and surf. One thing is quite certain, we will be back to visit again.

Inverter vs. Generator

By Don Wilson



The Ultimate Grudge Match!

When talking about mobile power solutions while attending mobile power-esque parties (oh, yeah, we're a lively bunch), someone always tries to make the correlation between an inverter and a generator. When chatting with the average lay-person, even I am guilty of explaining an inverter as "a generator that uses the battery as its fuel tank". This is a bit inaccurate since they have very different roles and benefits.

But which is better?

In this corner...the heavyweight Generator!

Generators are AC power supplies that use fossil fuels as their main source of consumptive energy. In other words, they use fuel (diesel, propane, gasoline) to run an engine. That engine spins a rotating shaft which uses magnets and electrical windings to create electrical AC current. Generators are really good at one thing: taking a relatively light weight and easily acquired energy source (fuel) and creating lots of kilowatt hours of electrical power.

One of the major drawbacks of a generator is they can be terribly inefficient and waste a lot of fuel if they're not used at full (or at least heavy) load for a long period of time. Generators can unnecessarily pollute the environment for a small benefit. For example, if you have a 7kW generator powering your 700W TV/DVD/Surround system, you waste fuel running that big engine for little benefit.

On the other end of the spectrum, if you start your generator for the 10 minutes it takes to microwave last night's leftovers, the generator barely gets lukewarm before you've shut it down. This can cause carbon buildup on the critical engine components, shortening the life of your generator's engine. Lastly, generators are heavy and don't surge very well. And they are often oversized to meet load demands. The larger, heavier generators are used so a large in-rush of electrical demand (like an electric motor) doesn't cause the generator to bog down.

In this corner...the lightweight Inverter!!

Inverters are also AC power supplies, but they use stored DC electrical

energy in a battery (or a battery bank). They use high-speed electrical switches and transformers to modify the DC to AC, and then change the voltage to create 120V. On the plus side inverters are extremely efficient, compared to generators, and only consume DC power in direct relation to the amount of power they put out. Another major benefit is that they are virtually silent compared to generators.

However, inverters are not a perfect supply since their energy supplies (batteries) are permanently mounted, hard to replenish, and limited. This means that short-term heavy loads (like a microwave), or long-term lighter loads (like an entertainment center) are just right for an inverter with the right battery bank. Lastly, inverters are comparatively light weight compared to generators. Also, for their weight, inverters tend to surge very well (typically twice their rated constant power output) compared to their fuel-based nemesis.

And the winner is?

Everybody loves a winner. However, in the classic Generator/Inverter battle, there is no clear-cut champ. I know, I know, where's the chair-slapping, pile-driving finale that conclusively denotes the winner? Sure if there was a significant investment in solar panels, an inverter could easily take the place of a generator.

This would require a huge initial cost, but the long-term cost of ownership would be less with a solar/battery/inverter system than a generator. While sunshine is free when it's available, you can't purchase it from a friendly neighborhood convenience store like fossil fuels. Personally, I like the win-win scenario that favors both options in their respective corners of strength. Use the inverter to power anything it can, minus the 'monster loads' like air conditioners. Then when the batteries are depleted, or you need the monster loads to turn on, run that macho generator for a long time (at least an hour) to power the heavier loads, and let the battery charger then give the inverter its efficient power once you're ready to shut the generator down. This one-two punch allows the most efficient use of fuel (only using a pollutant when you're getting the most effectiveness out of your fuel), fewer noisy generator runs so you can enjoy your environment more, and equally important, greater cost efficiency since you'll use less fuel for the same used kilowatt hours.

Wait! There's no tie in a grudge match!!

Ultimately, your system becomes the winner if you do it right. Generators are available from the small 1000W gas/electric to 15kW diesels (sure they get bigger, but the huge units are part of a completely different discussion).



Inverters come from 100W “pocket” inverters to 600W in the portable scope, and 600W to 3000W in hard-wired configurations.

With some models you can even stack similar inverters to get up to 6000W. If you do your homework right including a lot of math and planning, you can partner a good inverter with a small generator and reap the benefits of a light-weight, highly efficient, usable system that makes you, your chassis, and mother earth very happy.

Everybody wins!



TECH DOCTOR DON WILSON

has worked in technical capacities in the automotive, RV and marine fields and for the military since 1989 and has extensive experience in designing and troubleshooting onboard electrical systems. A former customer service manager dealing with electronic issues, Wilson currently serves as a technical instructor for the RV industry's RVIA Trouble Shooter Clinics and is a full-time sales application specialist for Xantrex Technology USA Inc.

For more information on inverters and mobile power visit [Xantrex](http://www.xantrex.com)

When using generators and inverters the primary measurement is the total wattage you plan to use.

Electrical motors require more power to start the motor than is needed to run the motor. You can add the total number of watts you plan to use at any given time to determine if the generator or inverter is properly sized for the load.

The generator or inverter needs to be capable of producing equal to, or higher wattage than the total combined wattage you plan to use at the same time.

In RVs this may equate to managing the loads you put on the generator or inverter. For example, it may be necessary to turn the AC unit off when you want to use the microwave.

RV 101

RV Product Spotlight

by Mark Polk

THE SOLUTION



THE PROBLEM



EZ Connector

I can't tell you how many times I have had to repair or rewire broken and corroded trailer and tow vehicle plugs before heading out on a trip. So I was glad to see this month's product hit the RV marketplace.

Take a look at the last trailer plug you will ever need to buy, the EZ Connector. Watch the video to discover all the features and benefits the EZ Connector plug has to offer.



RV Education 101
presents...



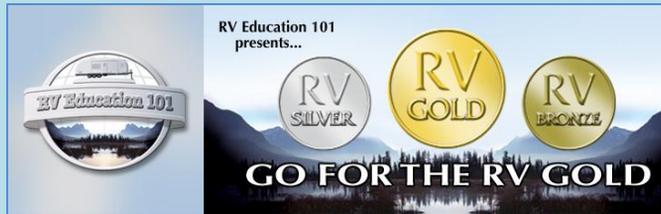
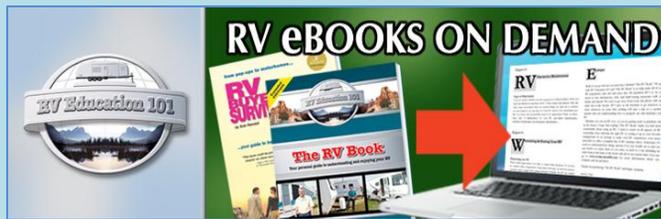
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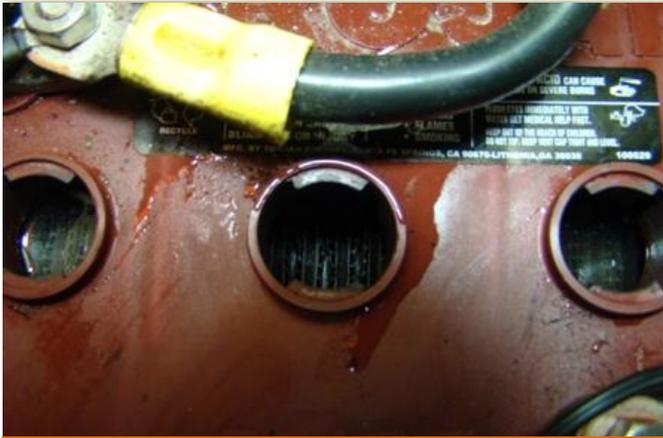
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Where did all the Water Go?



Checking the electrolyte level on a regular basis can save your flooded lead acid batteries. Check the water level monthly and if you leave your RV plugged in with the batteries being charged by the converter battery charger check it bi-monthly.

If your converter doesn't have a three stage battery charger the battery is getting a constant charge of 13.5 volts. When the batteries are topped off this voltage is too high for a float charge and it can boil off the electrolyte.

When you add water only use mineral free water. Distilled water is best and only fill the cell to 1/8 inch below the fill well. Overfilling cells will cause battery acid to overflow. When this happens the battery will lose some of its capacity and corrosion will build-up on and around the battery. Water should only be added after fully charging the battery unless the water level is below the plates.

Steps for watering the battery

Remove the vent caps and look inside the fill wells. Check the electrolyte levels. The minimum level required for charging the battery is at the top of the plates. If the water level is below the plates add enough distilled water to cover the plates before you charge the battery.

Fully charge the battery before adding more water. When the battery is charged remove the vent caps and check the electrolyte levels. Add distilled water until the electrolyte level is 1/8 inch below the fill well. Replace and tighten all vent caps. Never add battery acid to a battery.

Caution: Lead acid batteries contain sulfuric acid which is extremely corrosive and can cause severe burns or even blindness. And the hydrogen gas that batteries produce when they're charging is very explosive. When you work around batteries you need to wear goggles and gloves, remove all jewelry and do not smoke or use any open flames.

If you don't feel comfortable working around lead acid batteries have the maintenance performed by an authorized repair facility. **RV 101**



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Tips for Towing with 4-Wheels Down

I get asked lots of questions about towing a vehicle behind a motorhome, but perhaps the most common is “How do you know what vehicles can be towed with 4-wheels on the ground?” It’s not that complicated, but it does require some research. Today I am offering some tips on towing with 4-wheels on the ground.



You basically have three options when it comes to towing a vehicle behind your motor home. You can tow the vehicle with all four-wheels up using a car trailer, with two-wheels up using a tow dolly, or with all four-wheels down which is what we will be discussing in this article.

In recent years towing with all four-wheels down, using a tow bar, has become more and more popular. Some of the reasons for its growing popularity are the ease of hitching and unhitching, not having to deal with a

trailer and the fact that more automobile manufacturers are building vehicles that can be towed with four-wheels on the ground without modifications.

Note: It’s important that you understand all of the options available to you and that you take the time to research what method is best suited for you. There are many things to consider like the overall cost involved with the method you choose, weights, aesthetics, supplemental brakes, difficulty in hooking up and unhooking, vehicle modifications, warranty and more.

What Vehicles Can I Tow With Four-Wheels Down?

Before you make the decision to tow a vehicle with all four-wheels down you need to do your homework. There are some manufacturer approved vehicles that can be towed without any modifications to the drive-train or transmission, but there are a lot more that will require some type of modification to tow it with all four-wheels on the ground. There are many factors involved such as automatic transmissions, two-wheel drive vehicles, four-wheel drive vehicles, the type of transfer case and more.

Many vehicles with automatic transmission cannot be towed with all four-wheels down unless it is four-wheel

drive, and even then it requires a transfer case that can be shifted into neutral. Front wheel drive vehicles with manual transmissions and most four-wheel drive vehicles with a manual transfer case are among the best choices for towing with all four-wheels down. Even if you have a vehicle that can be towed with all four-wheels down it's quite possible that it will have towing speed and/or mileage restrictions. So where do we start?

Start by reading your vehicle owner's manual to determine if the vehicle can be towed without any drive-train modifications. If the vehicle is approved by the manufacturer to be towed with all four-wheels down the owner's manual will provide specific instructions on the proper procedures to use when towing. If the manual does not provide **specific instructions** on whether or not it can be towed with all four-wheels down, or if you're unclear about any towing restrictions check with the vehicle manufacturer. Don't hesitate to contact the vehicle manufacturer to get specific information about towing a vehicle. Your vehicle warranty could be voided from damage caused by towing a vehicle and not following the manufacturer's guidelines.

Do not rely on what a vehicle salesperson tells you. Almost all vehicles approved to be towed with all four-wheels down will include this information in the vehicle owner's manual.

If you don't already have a vehicle to tow a good place to start is Dinghy Towing Guides available on the Internet. Keep in mind they are only a guide and it is **your responsibility** to make absolutely sure the vehicle you are considering towing can be towed with all four-wheels down, with no drive-train modifications, before you make a purchase or actually attempt to tow a vehicle.

Note: Information in these guides are subject to change at any time! Always check the vehicle by year model too. Just because you could tow a certain model with all four-wheels down one year doesn't mean every year model for that vehicle can be towed with all four wheels down. **The vehicle manufacturer is the final authority.**

These Dinghy Towing Guides normally include manufacturer approved vehicles for towing without modifications that can be towed at speeds of at least 55 MPH and for distances of at least 200 miles without any special procedures. Pay particular attention to any speed or distance restrictions that could ultimately affect your vehicle warranty. Also pay attention to the restrictions and special instructions listed in the footnotes. These guides list other valuable information like vehicle curb weights, fuel economy and base retail prices. Keep in mind the lighter the

vehicle the better it is. It is easy to exceed a motorhomes receiver weight rating and the Gross Combined Weight Rating (GCWR). Note also that some models listed in their four-wheel drive version can be towed without modifications, but their two-wheel drive version of the same model cannot be towed with four-wheels on the ground.

Be sure and follow any special towing instructions or procedures found in the vehicle owner's manual. You might be required to remove a certain fuse before you tow the vehicle, or to stop towing after so many miles and start the vehicle to allow drive train components to be lubricated.

Following any and all special instructions can save you money and protect the vehicle warranty.

There are many reasons why some vehicles are not approved by the manufacturer to be towed with all four-wheels down. It may be that the vehicle will not track or follow the motorhome properly, or maybe a component in the drive-train could be damaged, and sometimes it is because of liability and warranty concerns. Another reason is the expense involved for a manufacturer to test and approve vehicles for towing with all four-wheels down.

The good news is, in many cases where vehicles are not approved by the manufacturer to be towed with all

four-wheels down they can still be towed in this method by adding some type of aftermarket accessory. The most common problem is when the engine is not running components in the drive-train that require lubrication are not being lubricated. Towing a vehicle like this can result in thousands of dollars worth of damage, and/or possibly overheat and catch on fire.

There are specialty aftermarket products and modifications available such as drive shaft disconnects and/or transmission lube pumps that can be added so a vehicle is mechanically capable of being towed without damaging the drive-train.

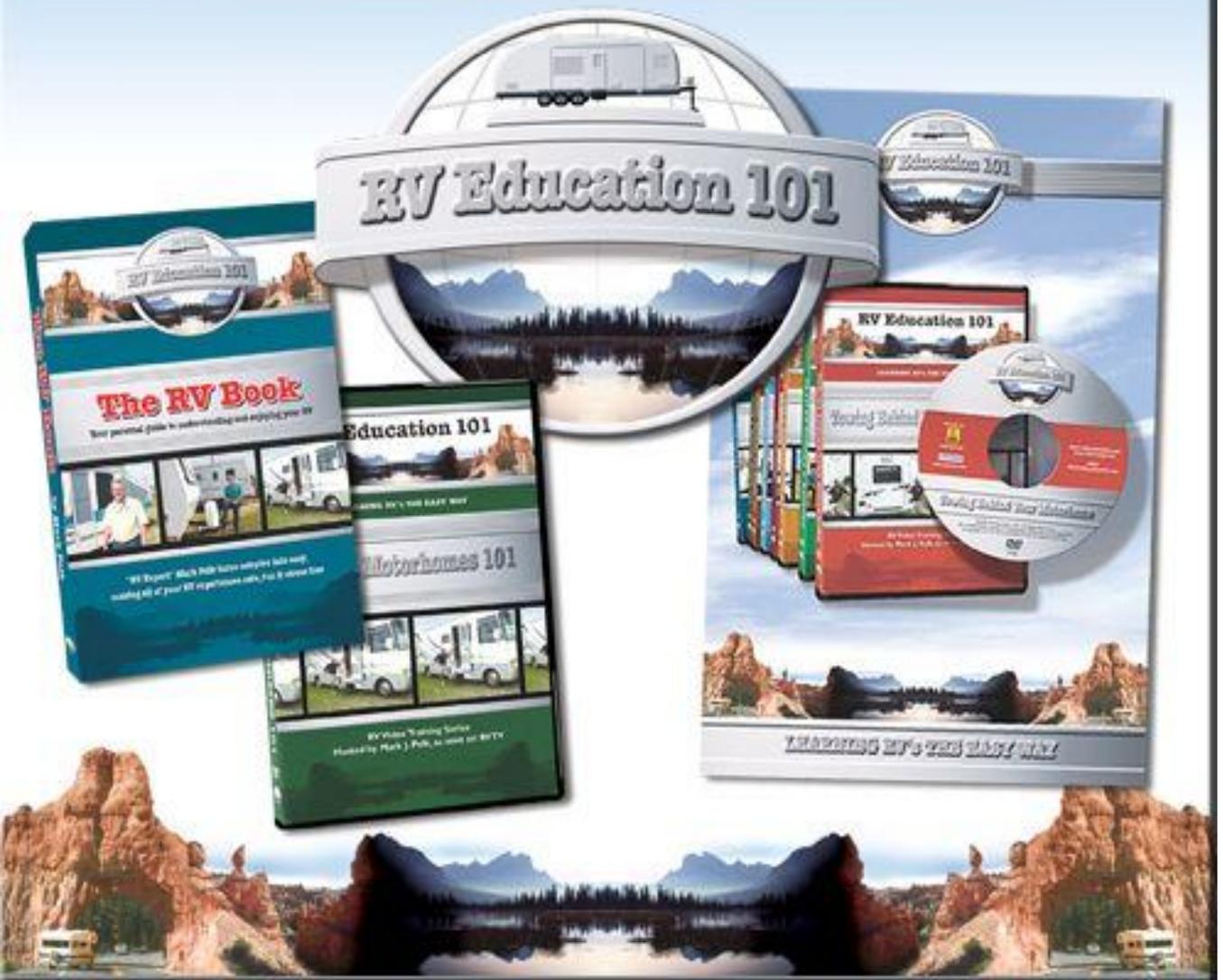
[Remco, the towing experts](#), offer a product line that adapts to approximately 80% of the vehicles in today's market.

If for some reason the vehicle you want to tow falls in the 20% that cannot be modified for towing, for whatever reason, you still have the option of possibly using a tow dolly or a car trailer. All vehicles can be towed on a car trailer, as long as you don't exceed weight ratings, and most front wheel drive vehicles can be towed with a tow dolly. **RV 101**



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