Technical Seminars at the WBCCI 2015 International Rally.

1. THE CARE AND FEEDING OF YOUR RV The purpose of this Seminar is to help you be prepared with spare parts, special tools and the knowledge to minimize any unhappy experiences the next time you use your RV. Even if you are a klutz and have no ability to do any repairs you can usually find several helpers who will be happy to assist you. However, you are responsible for having the spare parts and unusual supplies that are necessary for your RV. A little education can go a long way to minimizing repair costs and providing extra funds to buy that new gadget.
I will address both Trailers and Motor Homes that overlap in many of our most important appliances. I will also examine some of the unique aspects of these two RV types.
It is called Preventive Maintenance and it works. If you always wait until something fails before you repair it, you are doomed to breakdowns, usually at the most inopportune times. If it ain't broke, don't fix it. The Service Shops just love these people. Try fixing things before they break for a change. If wheel bearings last 100,000 miles than lets change them at 95,000 miles. I remember a Caravan where one of the tow vehicles lost an entire wheel while traveling on a side trip. The bearing just fell apart. Of course, it was a front tire. The Air Streamer did not understand how this could have happened since he had faithfully repacked the bearings at the recommended intervals for the last 125,000 miles. I tried to explain that this did not insure that the bearing would last forever. Wheel bearings are a constant wear item and will eventually die of old age. I strongly suggested that he have both of the front bearings changed but he was from the "if it ain't broke" school. I hope I am not around when the other wheel falls off since that surely will elicit an "I told you so".

2. BATTERIES, CHARGERS, INVERTERS AND SOLAR SYSTEMS
Batteries We use two basic battery types in our RV's:
1. Engine start in a Motor Home or Tow Vehicle (Starter Battery)
2. Coach unit for running 12-volt appliances, lights and various electronic boards (Deep Cycle Battery).
To obtain the best performance and optimum life each of these battery types represents a completely different design. In small boat applications, where there is only room for a single battery, manufacturers have made a compromise design to serve both functions. In our RV's we have both types. Obviously, the best cost/highest performance batteries will be those optimized for the two separate RV functions.
Chargers The best chargers provide four stages of computer chip controlled charge current. This type of charger will provide the best battery performance and the longest useful life. They usually have switches and sensors to optimize charge parameters for different types of deep cell batteries and the ambient temperature. This allows you to keep the batteries on continuous charge. If you have a source of shore power your batteries can be left in the RV during the winter months with no danger of freezing. Once I changed to a computer chip controller, I have kept my batteries on charge, continuously, since 1989 . They are always charged and ready to go on one of my winter camping trips.
Inverters The Converters (chargers) described in the last section essentially convert 120 VAC to 12 plus volts DC. An inverter is just the opposite it converts, 12 volts DC from a battery to 120 VAC to run appliances in your RV. It draws amp/hours from the battery system to power the things we would like when we do not have shore power. Some of our appliances work directly from the batteries i.e. water heater, furnace, refrigerator, lights, radio, etc. (some of them with a little help from the propane). Things we would like to have that cannot be run from DC include, hair dryer, coffee maker, toaster, microwave, TV, Hi-fi stereo, computer, vacuum cleaner, satellite TV, small battery chargers for phones and I-pods. Large motor homes usually include combination Converter/Inverter units that provide several kilowatts of AC power as well as a computer-controlled charger. Some of these include multiple large 4D or 8D batteries that can easily power large microwave units. These are built in with all the needed wiring and control circuits available. Several of the appliances are already connected to the Inverter through multiple use receptacles that are also shore powered, when it is available. Adding this capability to a

trailer or motor home, after the fact, would be an extremely difficult and expensive undertaking which I do not usually recommend.

Solar Power When we withdraw amp/hours from our battery vault we have to return them as soon as we have a source available. This could be shore-power, an alternator (from the tow vehicle or motor-home), a generator or a solar panel system. Solar energy is free, however, collecting and processing it is fairly expensive. Let's examine a typical system and determine the costs, efficiency, system configuration and effectiveness for our individual camping choices.

3. TROUBLESHOOTING AND REPAIR OF WATER HEATERS FURNACES & REFRIGERATORS

One of the key secrets to troubleshooting a piece of equipment is to have some idea about how it works. We usually know what the input and output are supposed to be but have no idea how we get from here to there. A water heater takes cold water and delivers hot water using propane; a furnace provides hot air using propane; an air conditioner provides cool air using 120 VAC; a refrigerator provides cool and frozen food using propane or 120 VAC or sometimes 12 VDC; a generator provides 120 VAC from either gas, diesel or propane; a charger keeps our batteries working properly using 120 VAC or an alternator; an inverter changes our 12 VDC into 120 VAC; a solar panel helps keep our batteries charged using sunlight; etc., etc.

We take all of this equipment, stick it into a box, leave it outside all year long and subject it to extremely hot and cold temperatures. We dump water and dirt all over it and then periodically shake the heck out of it. No wonder our RV appliances and equipment constantly need care and feeding. Lots of little critters like the smell of propane so they build nests in the equipment that can block the flow of air or gas. Exposure to the weather and dirt can cause short circuits on printed circuit boards. Occasionally, manufacturers may have done a poor design or used an unreliable component, which will eventually cause a failure. I know it’s hard to believe but some of us might actually not take care of our expensive RV systems (sometimes referred to as MAINTENANCE) resulting in failures at the most inopportune times.

In this Seminar we are going to cover Water Heaters, Furnaces and Refrigerators. This is not intended to be a detailed step-by-step troubleshooting manual for a technician. We will provide a basic outline of how the equipment works, maintenance you should be doing on a routine basis and an outline of what usually goes bad. Many of you should be able to do the simpler repairs yourselves and gain some knowledge in order to make the decision when you need to visit a professional repair shop.

4. TROUBLESHOOTING AND REPAIR OF YOUR AIR CONDITIONING SYSTEM

To cool your RV you must remove the heat from inside the vehicle and release it to the outside air. This process is essentially the same for your RV, automobile or house air conditioning system. The components may be somewhat different but the functions performed are identical. You require some refrigerant that can be pressurized and then converted to a liquid (usually Freon). Getting the cool air inside the RV and the heated air outside is accomplished by circulating the Freon through two sets of coils (similar to your water based automobile radiator). By blowing on the coils with two fans, the cool inside air can be circulated in the vehicle while the heat removed from the RV is discharged to the outside. Figure (1), illustrates the basic components of a home air conditioning system. Since we are constantly discharging the warm air (externally) and circulating the cold air (internally), we only need one motor to drive both fans. A squirrel-cage fan blade is used to circulate the high airflow inside (cool air) and a conventional fan blade for the outside (hot air) discharge. The compressor does the main work by circulating the refrigerant in order to provide the heat transfer. The evaporator, condenser and refrigerant are all part of an inter-connected sealed system that is usually not serviceable. The compressor itself is also a sealed unit with no serviceable parts. An internal failure usually means replacement of the complete unit. After about 15 to 20 years if your compressor has failed, it is time to replace the entire A-C unit.

5. SETTING UP A TYPICAL TOWING SYSTEM This seminar will provide guides for selecting the hitch, determining the correct ball mount height, selecting the weight distribution bar and determining the gross trailer tow weight (GTW) and the tongue weight (TW). Selecting a proper

tow vehicle and hooking it up correctly will be discussed. Wiring running and turn signal lights, trailer charge lines and brake lines will be presented. Minimizing sway and how anti sway systems can help. How brake controllers work and how to select them. How to adjust an Equalizer Hitch. Making sure your tow vehicle chains, electrical cable and safety brake are set up correctly.

6. HOW TO RUN AN OLD FASHIONED MAINTENANCE RALLY & WHY YOU SHOULD EVERY YEAR

This Seminar will describe, in detail, how to run a maintenance rally. Forms and check off lists will be provided with descriptions as needed. Required tools and chemicals will be detailed as well as the needed methodology. This is set up for a Friday to Sunday Rally with lots of time to provide demonstrations and discuss individual member's special problems. Each member does his own maintenance with the guidance, special tools and fluids provided by the Rally Master. Besides de-winterizing, every participant goes home with a rig that is ready for the coming years Camping events. This Rally is usually run in April.

Open the Rally and invite anyone with an Airstream to attend, meet your Unit members and learn how to effectively use their RV's. They will quickly understand the value of joining WBCCI.

7. TRAILER AND MOTOR HOME ROUND TABLE This is an open discussion of any topic of concern to the members. Recent discussions have included:

1. Major safety concerns of refrigerator recalls
2. Propane safety and quick-release connections
3. Fire, Propane and Carbon Monoxide safety sensors
4. How to determine the Proper RV tire pressure
5. How to test your breakaway switch
6. Proper hook-up of a Motor Home towed vehicle
7. Repair of the primary tow vehicle electrical cable
8. Selection of Motor Home brake controllers
9. Deciding when you need a professional repair technician
10. How to control trailer sway.