

5. BOAT PREPARATIONS

This section will consider how to prepare the boat for the rally, including suggestions for equipment that may be bought specially for long-distance cruising. It also includes top tips for making the boat comfortable at sea.

Don't forget that Section 2, Safety, covers all of the mandatory and recommended safety equipment that the boat should carry. [See pages 11-30.](#)



Useful Boat Checklist

Questions	Notes
<i>Check and update your boat information on the Members Area. See page 7</i>	
<i>Add a boat description, photograph and links to your boat website See page 6</i>	
<i>Arrange for email capability at sea, via SSB and PACTOR modem or satellite phone See Communications Section for details</i>	
<i>Update your at-sea email address and sat-phone number (if onboard) on your boat information page See page 7</i>	
<i>Go through each area of the boat and think 'rolling' - what will make life easier and safer when the boat is heeled or rolling?</i> <ul style="list-style-type: none">• Galley• Heads/toilet• Main living cabin/saloon• Sleeping cabins	
<i>Will you need to protect against insects - for example mosquitoes and cockroaches?</i>	
<i>Do you need to consider the security of boat and equipment if you are leaving the boat for any period?</i>	
<i>Is your shore power the correct voltage for the countries you will be visiting? Do you need a transformer? Is your shore power cable long enough? More information on shore power on page 56</i>	
<i>Have you considered options for power generation at sea?</i> <ul style="list-style-type: none">• Alternator• Generator• Solar, wind or towed generators• Other? <i>More information on pages 57-59</i>	
<i>Have you got the right spares onboard? See page 61 for information</i>	
<i>Will you be able to get the right cooking gas (propane/butane) while cruising? See page 62 and the Local Information section for suppliers en route</i>	
<i>Do you need a holding tank (black water tank)? See page 63 for information</i>	
<i>Is your first aid kit adequate, and have you appointed a 'ship's medic'? See page 64 for information</i>	
<i>Do you need to schedule work on the boat with your boatyard or other specialist company? Don't leave this too late!</i>	

Think About...

Early in the planning phase of the rally, look critically at your boat and decide whether you need to make any modifications, or replace any of the gear. Don't forget that you will be cruising after the rally too! These are some suggestions:

Rigging:

If your mast and rigging is more than 10 years old, your insurance company may request replacement.

Whatever age the rig, get it checked by a rigger (see page 80)

Sails:

Are they up to a long passage, or are they well-worn and need replacement?

Do you have strong-wind sails?

Do you have downwind sails?

Do you have a robust reefing system?

(See page 87)

Steering system:

Check the rudder bearings and steering cables/chains for wear.

Test the emergency steering

Propeller:

Check the stern gland

Consider fitting a rope cutter



Communications:

If you are fitting SSB or sat phone, get it installed professionally well before the rally to ensure that it is working properly.

Safety:

Do you need extra safety equipment (see page 25-30) - where will it be stowed?

Create an equipment stowing plan

Water:

Do you have enough tank capacity (see page 70)

Consider separating water tanks to avoid water loss or contamination

Do you want to fit a watermaker?

Consider manual pumps in the galley and heads to save water

Consider a salt water pump in the galley (See page 63)

Anchor:

Do you have the right anchor, chain/rope and windlass for long term cruising?

Back-ups:

Doubling-up systems like bilge pumps and fuel filters provides a back-up in case of failure.

What would happen if you had no electricity - could you still reef, navigate, pump the bilge or have lights?

Consider your options in 'worst-case' scenarios.

Power:

Do a power audit (see page 57) - do you have enough battery capacity?

How will you generate power on passage?

Any shore power issues? (see page 56)

Tools and spares:

Do you have comprehensive spare parts for all the systems onboard?

Do you have manuals/handbooks onboard?

Do you have a good tool box, with lots of choices?

(See page 61)

Seacocks:

Check the through-hull fittings for corrosion.

Fit each seacock with a bung/plug.



...What Goes Wrong

Even after a comfortable season of cruising, an offshore passage can exert new demands on the boat, stressing parts not tested during short coastal cruises and day sailing, such as spinnakers and spars. It is a good idea to review some of the key equipment failures that may occur on extended passages prior to departure.

By considering potential problems now, in relation to your own boat, you will be able to judge if you are well prepared to avoid the most common problems at sea. Make sure you have the appropriate spare parts ([see page 61](#)).

On many rallies, problems experienced by boats include:

Rigging

On long downwind passages, damage to the spinnaker pole and its track is not unusual, when the forces of day after day poling out a foresail or spinnaker take their toll. Likewise, booms may break due to badly positioned preventers, or if the boom dips in the water when rolling down wind.

Total loss of the mast is very rare, but chainplate and rigging terminal failure is more common, and unless this is managed promptly the mast may come down.

Damage to running rigging like halyards is very common - all due to chafe.

See [pages 80-86](#) for tips on checking and repairing a rig at sea.

Sails

If your sails are several seasons old, get a sailmaker to check the stitching and cloth. Sail cloth is degraded by UV light as well as by general use, and weakened cloth can easily tear.

If you are planning trade wind sailing, then be prepared for squalls, which can bring a big increase in wind speed and direction, often leading to ripped sails.

Steering

Loss of steering through damage to the steering cables or chains, or by failure of the autopilot are relatively common. This can be caused by general wear and tear on old parts, under specified equipment or poor boat handling.

Less common is the loss of the rudder due to

weakened rudder bearings or collision, but it does happen. Check your steering system carefully, and consider what would happen if the rudder was broken or dropped out - apart from anything else, this would leave a large hole in the bottom of the boat!

Your emergency steering system will be checked during the safety equipment inspection.

Electricity

Inability to charge the batteries, leading to loss of power is relatively common. This is most often caused by a failure in the charging system. While a broken main engine is hard to fix at sea, taking preventative measures such as checking fuel filters and impellers, and having a spare alternator are common sense. Having an alternative generation system will allow the batteries to charge, even if the engine won't run ([see page 59](#)).

If you have a boat with original wiring, it would be worth having an electrician check the cabling, as damaged wiring can be a common cause of fire.

At first thought, a lack of electricity seems a minor inconvenience, but the reality means no GPS, no communications, no navigation or domestic lights, no powered winches, no autopilot, and on some boats, no way of getting water out of the tanks. On a 500NM+ passage these can have a serious impact on the crew and outcome of the voyage.

Take a critical look

Take a critical look at your boat, or ask a surveyor or a boating friend to take a look with you. Look at every part of the boat and every system and think "what is the worst that could happen?" and "how would I fix that problem?"

Don't forget that passage-making is equivalent to several years worth of 'normal' sailing: multiply the passage time by 24 (hours), then divide by 6 (hours) to work out how many 'normal' day sailing days the passage equates to - a 10 day passage equates to 40 days of 'normal' sailing at 6 hours per day.

This is probably equivalent to 2 or 3 years of weekend cruising for most boats and crews.

Now, ask yourself, is your boat and gear 'up to it'?

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Useful Additions

Even if you have been cruising for a long time or even living aboard, you will need to go over your boat carefully to ensure that it is ready to go offshore. Preparation is key, and there is no substitute for testing everything.

Down Below

Cupboard doors: install catches/locks so that doors stay shut when the boat is heeling over.

Galley: make a chopping board that fits snugly into the sink.

Cooking gas/Propane: if you are cruising outside your normal area for a period, check availability of your type of cooking gas – it may not be possible to buy butane or propane in some places. Consider fitting a dual-fuel system. Carry spring balance/scale for checking the weight of refilled bottles. Note that propane bottles older than 10 years old or in poor condition will not normally be refilled.

Handy items: put a knife, flashlight and white collision flares just inside the main companionway hatch. Use spring clips or a net bag.

Handholds: do you need to fit additional ones to make moving around down below easier and safer while on passage?

Heavy objects: secure batteries, floorboards, books etc properly - think rolling.

Holding tanks: if you are going to fit a black water or holding tank, fit one with a large capacity to avoid having to empty too often.

Insects: place bug/cockroach traps in bottom of lockers and bilges, and attach bug screens or mosquito nets to opening hatches.

Laptops: fit Velcro to laptop and the saloon table/nav area to secure when at sea.

Lee cloths: are they deep and strong enough for your largest crew member?

Non-slip/skid matting: cut to fit the saloon table and galley work top surfaces. Handy to have non-skid mats which can be used around the boat.

Night vision: put red lights in saloon, galley and toilet areas

Oven: make safe by putting a retainer inside to keep dishes in place when the oven is opened and heeling over. Put a crash bar across the

stove to avoid nasty accidents. Dig out those pot holders and invest in a pressure cooker (no spillages of hot food/liquid).

Radar: even in areas where fog is unusual, radar can be useful for picking up trade wind squalls on passage.

Storage: store pans with paper towel in-between to prevent rattling and damage to non-stick. Invest in a roll of non-slip/skid matting.

Upholstery: you may consider protecting your upholstery with removable, easy clean covers while on passage.

Ventilation: is there a good flow of air through the boat? Try a range of windscoops and consider fitting small 12v fans by bunks and in the galley.

Water: install a salt water pump in the galley and manually operated fresh water pumps in the heads/toilet and galley to save water.

Consider twin water tanks that can be isolated to avoid contamination.



On Deck

Anchor chain: extra-long chain 100m or 300'+ gives you more options when anchoring, and more security in rough weather.

Cart/trolley: a small collapsible cart is a must for gas bottles, diesel cans and provisions in port.

Deck shower: best way to shower when in hot temperatures and good for after swimming. Cheaper option is a solar shower, easy to store.

Dinghy: you may want to tow your dinghy on short passages. Make a strong bridle with permanent lines to your aft cleats so you don't lose it! If stowing your dinghy on davits during passages, raise the dinghy as high as possible and secure carefully to avoid chafing.

Drinks: put bottle holders (try bicycle water bottle clips) around cockpit for convenience.



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02. Rally Preparations



Gardening gloves: protect your hands when handling anchor warps, chains (and flares).

Heat/Sun: invest in a good bimini and sun awning that covers the cockpit and cabin roof. Keep a garden plant spray bottle with water in the fridge – lovely for spraying on your face to cool off.

Shore power: bring a selection of shore power electrical adaptors with you (e.g. splitters, doublers, 32 & 16 amp plugs). See later sections on Power Management and Shore Power.

Think 'easy': set your boat up so it can be sailed by the weakest crew member.

Water: an easily stowed flat packed reel of hose, dedicated to fresh water, with a selection of tap/faucet fittings will prove useful.



Security

Ashore: take sensible precautions ashore and beware pickpockets and petty thieves. Leave high value items on the boat, or securely on your person. Some people use money belts.

Dinghy: buy a heavy-duty combination lock and wire to padlock ashore and to boat. If you don't have davits, rig a three or four point lifting strap to hoist the dinghy up at night.

Main hatch: Install a lock that can be operated from below deck to secure at night when onboard.

Money: if keeping money on board, split it up and hide it in different places.

Motion detectors: consider a small battery-operated model with a noisy alarm.

Outboard: some suggest painting this funky bright colours to deter thieves. Use a strong outboard lock.

Paperwork

Ship's papers: Keep a photocopy of your

passport, boat registration, boat and personal insurance papers and your credit cards in your grab bag (abandon ship bag).

Equipment list: have a list of equipment on board with serial numbers.

ID: carry plenty of passport photos.

Boat stamp: getting an ink stamp designed and made for the boat is fun, and can be useful when completing some official forms.

Visiting cards: like business cards, these are a great way of reminding people of your name, your boat name, at-sea email address, website and call sign.

Miscellaneous Luxury Items

Breadmaker: nothing beats painless fresh bread!

BBQ/grill: keeps the smells out of the galley.

Cockpit beanbags: greatly increase comfort when on passage and protect the knees!

Communication: walkie-talkies are cheaper than handheld VHF's, smaller and easier to carry and use. Great if one crew member goes ashore for shopping and needs to call back to the boat.

Fishing rod and lures: always a fun pastime and saves visiting the local fish market.

Hard bottom dinghy: for extended cruising, particularly in areas requiring anchoring, an inflatable dinghy with 4hp motor just won't cope. Consider also the largest outboard you can handle and a good sized dinghy anchor.

Laundry: highly recommended is a hand wringer/mini washer for wet clothes. See www.lehmans.com.

Snorkelling gear: great for fun but also for checking the anchor, freeing nets off rudder, cleaning the waterline etc.

Visitors book: excellent memento of your trip.



Suggested Books

The pilot books and charts for the rally ports are included in the Local Information section. These books will help with planning for a cruise, and will provide information while onboard.

Don't forget that you can save 10% by ordering your pilot books and charts through our online shop at www.worldcruising.com/shop

Pilot Books

World Cruising Routes

ISBN 9780713687774 by Jimmy Cornell. 7th edition of Ocean Passages of the World, geared to cruising yachtsman released in 2014, plus French and German language releases due end of 2014.

Ocean Passages and Landfalls

ISBN 9781846231551 by Rod Heikell and Andy O'Grady. Cruising routes of the world with passage planning information and information on key harbours.

Medical and Provisioning

Ship Captain's Medical Guide

ISBN 9780115516580 by MCA. The medical 'bible' for all sailors, this is the standard book carried on all merchant ships.

First Aid at Sea

ISBN 9781408157039 by Douglas Justins and Colin Berry. Written by doctors with extensive sailing experience, this book is recommended by RORC and is easy to use.



Doctor On Board

ISBN 9781574092981 by Dr. Jurgen Hauert. Hands-on fully illustrated guide to handling first aid on board. Includes a useful list of suggestions for the first aid kit.

The Boat Galley Cookbook

ISBN 9780071782364 by Carolyn Shearlock and Jan Irons. Practical 'how to' advice on every aspect of food onboard, including recipes. Available from www.amazon.com

Care and Feeding of the Sailing

Crew ISBN 9781929214341 by Lin and Larry Pardey. Arranged as a provisioning and cooking programme for a 50-day voyage under different weather conditions.

The Voyager's Handbook

ISBN 9780713684773 by Beth Leonard. An inspirational and comprehensive handbook for all aspects of the cruiser's life.

Radio and Navigation

Celestial Navigation for Yachtsmen

ISBN 9781408132128 by Mary Blewitt. This classic guide to celestial navigation includes worked examples related to current tables. Also available as an ebook: ISBN 9781472906762

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ISBN 9781408193297 Annual publication of astro-navigation tables for yachtsmen.

List of Radio Signals

UKHO NP281 [1] - Europe, Africa & Asia

UKHO NP281 [2] - Oceania, Americas & Far East

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ISBN 9780971564015 by Marti Brown. HF radio email.

Weather and Sailing

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Heavy Weather Sailing

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WORLD CRUISING CLUB RALLY HANDBOOK

02. Rally Preparations



Handling Storms at Sea

ISBN 9781408113486 by Hal Roth. A five point gale strategy set out in a clear authoritative analysis.

Sea Survival Handbook

ISBN 9781905104314 by Keith Colwell.
Complete guide to survival at sea from the RYA, including using liferafts.

Boat Safety Handbook

ISBN 9781906435530 by Keith Colwell. Advice on all aspects of boat safety and safe boating from the RYA.

Maintenance

The Boat Data Book

ISBN 9781408105894 by Ian Nicholson. Contains invaluable information for anyone living aboard and maintaining their yacht. Available as an ebook: ISBN 9781472901538

The Boatowner's Mechanical and Electrical Manual

ISBN 9780713672268 by Nigel Calder. Includes minor and major repairs of electrical systems, engines, electronics, steering systems, pumps, cookers, spars and rigging.



Marine Electrical & Electronics Bible

ISBN 9780713682670 by John Payne.
Provides owners with all the information they need to select, install, maintain and troubleshoot any electrical or electronic system on a boat.

Skipper's Onboard Diesel

Guide ISBN 9780713676181 by Hans Donat.
In handy splash-proof format it is a reference to all types and sizes of marine diesel engine.

The RYA Book of Outboard Motors

ISBN 9780713675757 by Tim Bartlett. Covers both two and four stroke outboard engines. Includes a fault-finding section.

Safer Offshore: Crisis Management and Emergency Repairs at Sea

ISBN 9780939837908 by Ed Maples. How to deal with almost every possible emergency at sea.

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Yachtsman's Ten Language Dictionary

ISBN 9780713684407 by Barbara Webb. This multilingual dictionary, specifically geared to yachtsmen, has now been expanded and now includes English, French, German, Dutch, Danish, Italian, Spanish, Portuguese, Turkish, Greek

Free Online Resources

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The US National Geospatial-Intelligence Agency has a wide range of free download information, including pilot charts for all sea areas, sailing directions worldwide, radio signals and sight reduction tables.

See <http://msi.nga.mil/NGAPortal/MSI.portal> and click on 'Publications'

Electric Shore Power

First of all, always remember that high voltage can kill! If you have the slightest doubts about what you are doing, call in an experienced marine electrical engineer.

Shore power supplies around the world will vary in voltage and reliability. Being able to “plug-in” when in a marina, or even stern to a dock, has become increasingly important for cruisers today such as the demands of domestic appliances fitted onboard modern cruising yachts. A reliable generator and good alternative energy sources will help avoid the constant need to “be connected”, which is also essential for remote cruising or self-sufficiency.

Where shore power is available it will come in different forms and through varying connectors. Having the ability to step up or down the voltage to that required onboard is useful.

Battery Charger

As a minimum the battery charger fitted should be one that can accept multiple voltages (110/120 or 220/240) and 50Hz or 60Hz; this will at least allow the batteries to be charged, and for low voltage (12/24v) appliances to be run while connected to shore power.

Inverter-Transformer

Fitting an inverter-transformer to either step up or down the shore power to your normal voltage will enable “ring-main” appliances to be run onboard; be aware that inverters do not change the cycles (Hz) and this will remain as supplied from the shore power (50 or 60 Hz). Not all appliances will run with the wrong cycles, and great care should be taken (microwaves are one such appliance).

Connectors

Around the world there seem to be as many different shore power electrical connectors as countries visited! The best way to cope with this is to have a short “necklace” of about 1m in length that has a female socket for your standard shore power cable at one end, and bare wires at the other, thus enabling different plugs to be wired as required. Some marinas will have plugs available for rent, but in others they will have to be bought. It is a good idea to have as full a selection of plugs available as possible, with some conversion necklaces already made up.

Shore Power FAQs

What are the different types of voltage used around the world?

European style 220/240AC is NOT THE SAME as US 220/240AC.

European voltage is 220-240v 50Hz single phase or 380-400v 50Hz 3 phase.

US voltage is 110v 60Hz, or 220-240v 60Hz twin phase (2 x 110-120v).

Never attempt to plug a US wired boat directly into European style dock outlets, or European wired boats into US style outlets. Always check the supply first.

Do I need a transformer?

Whilst not essential it is a good idea to have one to enable standard voltage appliances to be run onboard while connected to shore power. Transformers can change 220v AC to 110v AC, or vice versa, but it must be an ISOLATION TRANSFORMER. Marinas sometimes rent transformers.

Transformers cannot change 50Hz to 60Hz. They will deliver Hz as supplied from the shore power. Some equipment is sensitive to a change in the frequency (Hz), so it is always a good idea to check the handbook of AC equipment to see if it can run on both 50 and 60 Hz.

Any other problems I should know about?

Some US boats can have problems with electrolysis due to the common practice in the States of bonding the neutral and ground wires together. If you are unsure about this and don't want your prop to fall off, get the system checked.

What should I carry to help me to connect to shore power when available?

- The primary shore power lead should be at least as long as the boat plus 5m (15'). This will enable you to connect when bow or stern to the dock.
- An extension cable of 15m (50') or more – for those difficult to reach power supplies.
- Short connection necklace, with female socket on one end, bare cable for alternative plugs on the other end.
- For European yachts: European 16A to 32A (or 32A to 16A), and 16A or 32A to 63A.
- For US yachts: standard female socket to: European 32A, European 63A, USA sockets.



Power Management on Long Passages

Prepared with assistance from Marlec Engineering, experts in renewable energy www.marlec.co.uk

Managing your electrical power when sailing offshore is important, never more so than on modern yachts equipped with all the luxuries which make life more comfortable at sea – autopilots, refrigeration, watermakers and electronic navigation.

Generating power for an extended period during an ocean crossing, or cruising away from marinas will require a different attitude than coastal cruising where a fresh supply of diesel fuel is close-by. Managing your battery power, and generating the electricity needed to recharge them will be more of a challenge than simply turning on the engine.

Therefore your power management on board has to be approached systematically. You should start by calculating the power consumption of your yacht's systems. In this example, we have looked at a typical cruising yacht, at 13.4m (44') LOA, with a crew of four.

Power Audit: energy consumed in 24 hours

Consider all electrical items, and calculate their daily usage to find the daily power requirement.

$$A = \text{Amps} \quad \text{Ah} = \text{Ampere Hours} \quad W = \text{Watts}$$

Navigation Equipment

Computer	5A
Chart plotter	0.5-3A
Instruments	0.5-1.5A
GPS	1A
Radar	4-8A
Autopilot	0.5-30A

To reduce power consumption, use night or power-save mode on chart plotters and dim the lights of instruments. You can also just turn on plotters and computers when needed.

Autopilot power consumption varies depending upon load on the system – balance your sails to help the autopilot, and hand steer when possible.

Navigation assumed daily use: 112 Ah

Communications

SSB receive	1.5-2A
SSB transmit	25-35A
VHF receive	0.7-1.5A

VHF transmit	5A
Satellite phone	0.1-2A

Communications assumed daily use: 18 Ah

Domestic Electricals

Tri-colour light (1 x 25W)	1-1.7A
Separate lights (3 x 25W)	3A
Spreader lights	8A
Domestic incandescent light	1.5-3.5A
Domestic fluorescent light	0.7-1.8A
Refrigerator	5-7A
Pumps - freshwater and bilge	5A
Watermaker	10A
CD player/stereo	1A
Cabin fan	0.2-1A

To reduce fridge power consumption, increase the insulation and use a water-cooled heat exchanger - this can limit the duty cycle of the refrigerator compressor to 25% and of the freezer compressor to 50%.

Ensure incandescent lights are turned off, and consider switching to low-power LED lights.

Domestic assumed daily use: 70 Ah

Luxury Equipment

Also consider high-usage equipment such as air conditioning and freezers – these haven't been included in this calculation.

Energy consumed in 24 hours

According to our example, the equipment would take:

Navigation	112
Communications	18
Domestics	70
Total daily requirement:	200 Ah

Thus 200 Ah out of the battery in a 24 hour period. This energy has to be fed into the battery again to avoid a deeply discharged battery.

Battery Capacity

If we were to discharge the batteries to 30% of capacity before recharging, we would require 500Ah (12V) battery capacity.

If we were to discharge the batteries to 75% of capacity before recharging, we would require 750Ah (12V) battery capacity.

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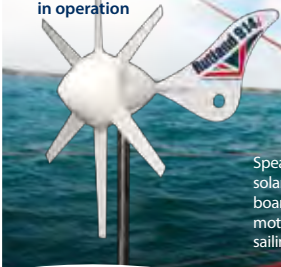
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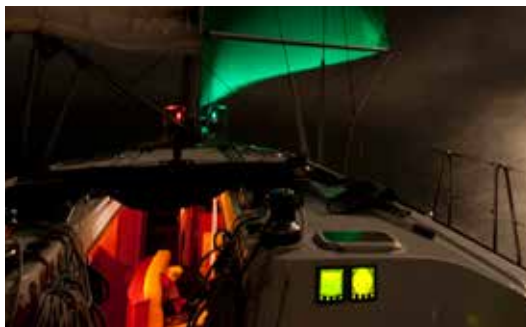
With the main engine

An engine will normally have a 14V 60A alternator fitted. This means that the alternator will deliver 60A maximum at 6000 rpm. Suppose that the diameter ratio between the engine pulley and the alternator pulley is 2:1, then the main engine would have to run at 3000 rpm to attain 60A charging current. In practice this is a little high, producing too much noise. For generating current an engine is generally regulated to 1000 to 1500 rpm. The charging current will then be 40% to 80% of the rated values, i.e. 30 to 50A. This would then mean 4 hours of engine generating per day. Not an attractive proposition!

Making engine charging more efficient

Here several immediate complications arise. The charging current might now become so high that parallel connection of the service battery and the starter battery using the familiar Bosch relay or equivalent is no longer possible, because the relay contacts could fuse together. Therefore, a charging current isolator would need to be used, and the alternator or the alternator regulator would need modifying.

By installing a second equally sized alternator you can reduce the daily engine running time to 2 hours. If you still think that's too long or if you cannot install a second alternator, alternative energy sources may be looked at.



Alternative Electricity Generation

Diesel Generators

For larger yachts these are the most efficient way to generate electricity. They use much less fuel

than a main engine, are quieter and can be set to automatically come on when required. The units come in a range of power outputs to suit most needs. However, like all mechanical equipment, they do require regular servicing. It is only too easy to forget this, when the unit is tucked away out of sight in an enclosed sound proof cabinet.

Popular brands of installed diesel generators include Fischer Panda, Onan, Westerbeake and Matervolt. Some yachts use small petrol/gas generators. Although cheap to buy, these are not recommended for offshore cruising due to dangerous exhaust gases and the combustible nature of the fuel, which for safety should be carried on deck.

While generators are reliable, they are often the most common high value item to fail during a passage. Therefore, don't forget the alternate power sources if you do not want to go without your home comforts.

Solar Panels

These can provide a useful boost to your charging capacity, however, when judging the output of solar cells you have to consider in what area and under what conditions you are sailing. For example, in the Mediterranean summer you can expect approx. 20Ah per day from a 50W panel. In the UK summertime, you can expect approx. 12Ah per day from the same sized panel.

It is important to mount the panels facing the sun however when sailing, mounted flat on the deck will give best all round performance. Be aware, some solar panels are made using glass which will break if walked on. Specialist non-glass marine panels are available, recommended for on deck use

Wind Generators

A wind generator will produce 40 to 80Ah per 24-hour period. Traditionally, they could be noisy but modern designs are much quieter. They work best with strong apparent winds, for example, lying at anchor in an open marina. Where current consumption on board is low, solar cells and a wind generator can make a considerable contribution and drastically reduce the necessity for using the engine to generate power. Even on somewhat bigger yachts, solar cells and/or wind generators are also very suitable for charging up the batteries and keeping them charged.



Water Alternator (propshaft or outboard)

Under sail extra current can be generated using a propshaft alternator (disadvantage: increased water resistance and wear and tear), or using a small water alternator, transom-hung or towed. This enables about 12W, or 1A to be generated per knot of speed through the water, i.e. 40 to 100Ah in a 12V battery per 24-hour period. However the reduction of speed and the noise have to be considered as well.

The Watt&Sea cruising generator has performed well in the ARC and World ARC and comes recommended by several past participants.

Rope Towed Alternator

The rope towed alternator is a clever idea for power generation, as the above-mentioned rule applies here as well: 1A per knot of speed through water. Unfortunately it is not always so easy to handle the towing line, especially when the wind increases. It can be as hard as retrieving a towed bucket on a long rope back into the cockpit, so some towed generators are sold with a snubbing cone which covers the rotating impellor, making it easier to retrieve. The drag reduces the boat speed by up to half a knot. On a 2,700nm passage with a normal speed of 5 knots, losing a constant knot, means adding another two days to your passage!

Conclusion

Solar cells (1m²) and a wind generator (1m diameter) together or a towed generator - if you can live with the disadvantages - (say 60W at 5 knots speed through the water) deliver almost 1.4 kWh = 100Ah per 24-hour period. The contribution of this energy is therefore insufficient for total requirements, but it can reduce engine generation to a very acceptable 2 hours per 24-hour period when under sail (assuming the smart use of navigation equipment).

A good book, such as the [Boatowner's Mechanical & Electrical Manual](#) by Nigel Calder (ISBN 0713672269) or [Marine Electrical & Electronics Bible](#) by John Payne (ISBN 9780713682670) will help you to manage and understand power onboard. See [pages 54-55 for more book ideas](#).

Power Management Top Tips

- **Always start with a full battery.** Start charging the batteries by running the engine the day of your departure even if you haven't used much energy yet.
- Always start the engine for charging the batteries in the evening to support the power consumption during the night-time hours.
- Try to avoid running the engine to charge batteries while crew is sleeping. But if further battery charging is needed during the night, run the engine during watch changes.
- Always **fill up the fridge to its maximum**, even if it means packing with bottles of water.
- Turn the fridge thermostat down low when the engine is running, and up afterwards.
- Charge laptops and electrical items like the sat phone when the engine is running.
- **Balance the boat to reduce strain on the autopilot** or hand steer to reduce power consumption, particularly at night.

Low voltage troubleshooting

- How many hours has it been since you last charged the batteries?
- Is anything running that shouldn't be?
 - Water pump or bilge pump
 - Inverter - TV/stereo
 - Lights left on
 - Autopilot working too hard
- Look at the Amp meter; is there a high current draw?
- What's the charge voltage?
 - If it is 14 Volts:
 - Likely the alternator/charger is OK
 - Check for loose connections
 - Check water in the batteries
 - If it is less than 14 Volts
 - Likely problem - alternator/regulator/charger
 - Check belt – broken or slipping
 - Check alternator and regulator
 - Make sure charger is ON
 - Check circuit breakers on charger

Spares and Useful Parts

This section was first written by round-the-world skipper Julian Wilson, and has been updated by Bill King of professional yacht delivery company PYD www.pydwww.co.uk

Most boat systems have items designed to wear down, corrode or break. Smaller parts will self-sacrifice in the name of saving the whole. These are generally the 'serviceable' parts.

What spare parts to carry?

Both budget and available space can significantly constrain quantities of spare parts stowed aboard a cruising yacht. In an ideal situation, if something breaks it is replaced with a new one rather than repaired. This is often impractical for many reasons, but it also somehow defies the cruisers' ethos of being self-sufficient at sea and recycling. The spares you carry can be the difference between a good trip and a bad one.

It's well worth considering keeping a few major items in your spare parts locker. For instance, how much easier is it to replace an entire water pump whilst on passage than to strip down the broken one and mess about with impellers or diaphragms? However, this is often far from practical and can be expensive. Repairs are nearly always best done in harbour where there is less motion.

There are three main categories of spares:

- 1. Safety:** Items that allow your yacht to float and go in the direction you want it to go in, therefore parts for the maintenance and repair of sails, engines and bilge pumps.
- 2. Comfort:** Spares for maintenance of onboard cooking facilities, fresh water pumps and toiletry needs.
- 3. Luxury:** Parts for non-essential items that make for a more pleasant cruise, such as fishing tackle spares.

Many spares will fall into more than one category, but you have to decide necessity over cost - spare autopilot or just a spare drive?

If there is the budget and space then you may like to consider the list of 'essential' spares below. This has to include a complete toilet pump. Nobody likes to dismantle a toilet pump at sea.

Easier to unbolt the old one and install a new one - only ten minutes of unpleasantness. Put the broken pump into a couple of plastic bags and store it for servicing ashore, where it can be stripped, sanitised, repaired and made ready for the next occasion. Well worth the investment!

Extended cruising spare parts list:

- Toilet pump complete.
- Toilet pump service kit.
- Fresh water pump complete.
- Fresh water pump service kit.
- Engine and generator spares: impellers, fan belts, anodes, filters (air, oil and fuel).
- Engine and generator oil (for 2 complete oil changes each). Hydraulic fluid.
- Autopilot spares, belts, motors etc.
- 2 large snatch blocks and 2 large snap shackles. Other assorted spare shackles in sizes used aboard, eg. for mainsheet and kicker/vang tackle.
- Sail repair: sticky backed Dacron/polyester (large sheet), 3 rolls spinnaker tape and sail repair kit, including plenty of needles, waxed thread, a sailor's palm and whipping twine.
- Spare ropes of various lengths for use as sheets, halyards, mooring lines etc.
- Watermaker service kit with chemicals and oil.
- Spare gas regulator and 1m gas hose.
- Spare lifejacket gas cylinders (minimum one per life jacket) plus spare lights.
- General: good handful of hose clips, nuts, bolts, washers, screws, cotter pins, split pins, contact and epoxy glue, cable grips (size suitable for repairing steering cable) and shackles, gasket glue, tubes of silicone, gaffer tape and self-amalgamating PTFE tape.
- Electrical spares: fuses, bulbs (for navigation lights), wire, connectors and multimeter. Spare batteries for flashlights, handheld GPS. Soldering iron and solder wire. Can of WD40.
- Diesel biocide.
- Gas powered hot knife, for sealing rope ends, tears in synthetic fabric etc.
- High capacity manual pump with long hose.
- Sta-Lok emergency rigging kit.
- Spare winch handles and keys for tank caps.

Cooking Gas

Propane is the cooking fuel for most American-made marine appliances.

In Europe, butane (blue bottles) is the fuel normally used for marine appliances. Butane bottles can be exchanged one for one, or refills can be arranged.



Dual-fuel stoves

Butane has different burning characteristics from propane. Check with your stove manufacturer to find out if you can use either gas and if adjustments are necessary. Having a system that can handle both types of gas is a good idea if sailing for long periods beyond home waters.

Refills

Butane bottles/tanks should never be refilled with the same amount of propane as propane is at a

higher pressure.

Filling gas bottles in different countries can be problematic, and the easiest solution in certain areas of the world may be to buy a local bottle.

If you are considering extended cruising, or know you will be visiting an area with a different gas system than that onboard, leave home with new gas bottles of both types (propane and butane), as once cruising it is likely to be your own bottles that will be refilled, rather than exchanged. Have a good selection of regulators and fittings for your bottles on board, as having the right fitting may make the difference between getting gas and not. In some ports either butane or propane can be refilled, but not both, hence the importance of running a dual system.

Gas bottles can usually be filled just about anywhere, but any older than 10 years old will not normally be accepted for refill. For this reason it is important to keep bottles in good condition, and to treat any surface rust when it appears.

Plastic/Fiberglass bottles canisters are lighter and rust-free.

For information on refilling options during the rally, see the [Local Information](#) section.

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Water Management

Water is undoubtedly one of the vital things to plan for. **As a minimum you should allow 2 litres (2 quarts) of drinking water per person per day, and up to 3.5 litres in warm weather.**

In a survey of round the world yachts, the average water consumption worked out at 14 litres (3.7 US gallon) per person per day. However on the boats that did not have watermakers, the average consumption was only 7 litres (1.8 US gallon) per person per day. It was also clear that boats with pressurized water systems used much more water.

Watermakers



Watermakers have made a great difference to water consumption and have brought in a

whole new era of water management. The latest generation of reverse osmosis watermakers are very effective and reliable, but if you have one you should still plan to start with full tanks and use the watermaker to top up at regular intervals - just in case of failure.

Have your watermaker installed professionally, and talk to the manufacturer about how to maximise output. Watermakers work better in warm water than in cold, so you should find output increasing just when you need it.

Water Onboard

See [page 69](#) for a water planning guide.

Plan to start the passage with full tanks, but it is sensible to carry a reasonable amount of water in additional containers - ideally plastic containers - both to extend the supply and to act as a reserve in the event that something contaminates the main tanks or they leak. The large plastic bottles of drinking water available in most places are preferred by many as the water has a better taste. When carrying water in additional containers, don't fill them completely full, as they will then float if thrown overboard in the event of an emergency.

You can reduce water consumption by fitting a salt-water pump in the galley and using it for the initial washing of crockery, pots and pans, but you may want to rinse with fresh water. Seawater

should be diluted if it is used for cooking as it is saltier than the general requirement for cooking.

Boats with more than one tank should have their tanks on separate systems so that the tanks can be isolated from each other. Use one tank at a time so that a leak in the system won't lose all your water.

It is also a good idea to turn off pressurized water systems and rely on manual pumping fresh water. This has two benefits: firstly it reduces consumption; and secondly, in the event of a leak, it prevents all your fresh water being automatically pumped straight into the bilge.

If you don't like the taste of tank water, fit a charcoal filter before the cold water tap - these are easily bought from hardware stores.

Educate your crew in simple water saving techniques, such as not running the shower or tap continuously when washing or cleaning teeth. Using a mug for teeth cleaning and a face cloth can cut down water consumption dramatically!

Holding Tanks

Some countries require that boats are fitted with a holding tank for black water (or sewerage). Where possible, a good capacity tank should be fitted, to give crews more time between pump-outs. Having to leave a pleasant and secure anchorage just so the holding tank can be emptied is annoying! Grey water (sink and shower waste water) tanks can also be fitted.

Please ensure that your crew are aware of the need to use shore-side facilities for toilets, showers and clothes washing wherever possible. Recycled toilet paper will break down more quickly than 'luxury' toilet paper, and consider using ecologically-friendly cleaning and washing soaps.

Many countries have laws stating that the discharge of sewage within the 12nm territorial limit is an offence, and some also regulate the discharge of grey water. If in doubt, use pump-out stations where these are available, or discharge more than 5nm offshore. Never discharge black or grey water over the side in sheltered waters, close to land, in non-tidal waters, or within protected or restricted zones.

For details on different country regulations, please see www.noonsite.com



Medical

Prepared with the assistance of Ian Hardy B.Pharm M.R.Pharm.S, the 'First Aid Pharmacist'
www.blueswatersupplies.com/seamedic

The skipper/owner has a legal duty of care for the crew, and is ultimately accountable. It is highly recommended that the boat has a copy of **The Ship's Captain's Medical Guide** (ISBN 9780115516580) or an international equivalent. Remember that medical advice can be sought from Radio Medical Advice via MRCC/coastguard.

First Aid Kits

These are some general suggestions for the boat's first aid kit:

- Alcohol-free moist wipes
- Gauze sterile swabs
- Pocket face mask for mouth-to-mouth
- Assorted sticking plasters, including knuckle/finger plasters
- Surgical tape
- Large adhesive wound dressings
- Medium (120x120mm) sterile dressings
- Large (180x180mm) sterile dressings
- Adhesive suture strips (steri-strips)
- Sterile eye pads
- Eye wash - 0.9% saline solution
- Finger bandages
- Triangular bandages
- Elasticated crepe bandages
- Gel burn dressings
- Non-latex gloves
- Scissors, tweezers, safety pins etc
- Foil blanket
- Thermometer
- Instant ice and heating packs
- Splints (such as SAM Splints)
- Emergency dentistry kit
- Pre-threaded suture kit

In addition to the main first aid kit, it is worth having an extra small daily kit for use on deck and for taking ashore. In more remote countries, take a sterile treatment kit ashore in case emergency medical care is required and you are unsure of local hygiene. This should include sterile syringes, intravenous cannula and suture kit.

Complete kits can be purchased from specialist suppliers in Europe:

- www.blueswatersupplies.com
- www.seadoc.de
- www.le-west.co.uk

In USA: www.adventuremedicalkits.com
www.e-firstaidsupplies.com

Medicines

You should seek advice from your Doctor before deciding which drugs and preparations to carry onboard. As an aide memoire, the following types of medicines are useful:

- Painkillers of different strengths (suppositories are more effective than oral pain killers)
- At least two different types of broad-spectrum antibiotic - check penicillin allergies
- Laxatives (glycerine suppositories)
- Diarrhoea relief
- Antacids if required
- Rehydration salts - electrolyte balanced
- Sea sickness preparations
- Muscle relaxants
- Fast acting oral antihistamines
- Pre-loaded adrenaline syringe for anaphylaxis
- Anti-malarials (if required for cruising area)
- Common cold remedies
- Preparations for thrush/vaginal infections

External Preparations

- Antiseptic preparations
- Antibiotic ointment
- Hydrocortisone ointment
- Eye drops (antibiotic and anti-inflammatory)
- Ear drops (hydrogen peroxide type)
- Anti-inflammatory gel
- Local anaesthetic gel
- Anti-fungal preparation

Buying Medicines

The best practice for obtaining medicines for the boat's stores is direct from a pharmacy. The skipper/owner has authority to purchase drugs for the boat. Write a letter with full contact details, boat details and the drugs required, and take it to a pharmacy with the boat's registration papers and skipper/owner's passport. Local laws may vary, but this will be the best starting point.

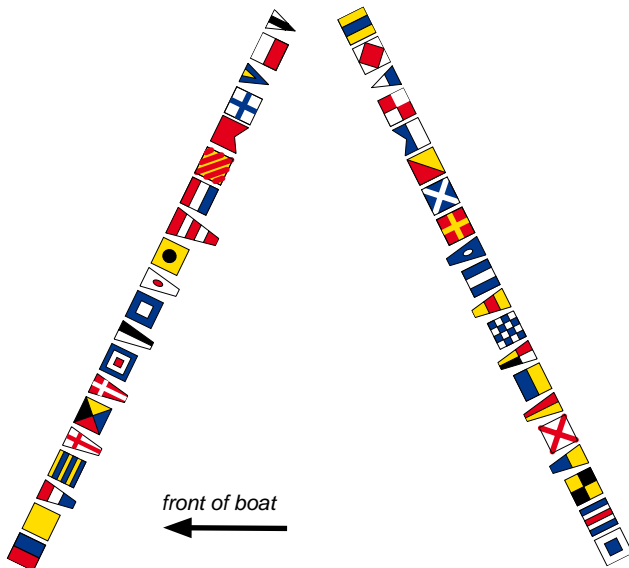
Dressing Overall

All rally yachts are asked to dress overall (decorate the boat with signal flags) while in port to create a festive atmosphere and to show respect to our hosts.

You will need at least one full set of international signal/code flags to dress your boat. The correct sequence of flags for dressing overall is below, and it is also usually listed in manuals of seamanship or nautical almanacs. When putting your flags together, remember that they should all be the correct way up, so you need to work from the top of the mast downwards. Rigging downhails is a good idea.

From forward to aft:

E, Q, p3, G, p8, Z, p4, W, p6, P, p1, I, Code/AP, T, Y, B, X, 1st Sub, H, 3rd Sub, D, F, 2nd Sub, U, A, O, M, R, p2, J, p0, N, p9, K, p7, V, p5, L, C, S



Pets Onboard

It is possible to cruise with pets, but entry requirements and quarantine laws vary around the world, and it will require significant forward planning. Local officials may not be used to yachts arriving with pets, and obtaining the necessary health certificates en route can require forward planning. Some remote places will have no official able to process entry for a pet, and so the animal will not be allowed ashore.

Vaccination and treatment certificates from a vet are usually required to obtain a health certificate and import permit/license, and treatment often has to be proven within a fixed period of time. Import licenses are usually required to be lodged in advance of arrival.

We recommend that you seek advice from officials in the countries you intend to visit as soon as possible. There is information on the rally ports in the [Local Information](#) section, or visit www.noonsite.com for information on regulations for individual countries.



Firearms (Guns)

It is strongly recommended that yachts do not carry firearms on board. A daily radio net will be run on all legs and local Coastguards will be informed of our route. Therefore the organisers feel that the need for firearms is minimal, especially as in the majority of countries that the rally visits, firearms have to be delivered ashore to be bonded by customs or police.

Skippers will be responsible themselves for seeing that the firearm regulations in various countries are complied with. This matter will not be dealt with by World Cruising Club staff.

For information on local regulations, see www.noonsite.com



Lagoon supports the ARC Rally

Only a few offshore sailing events in the world offer the spirit that we like to refer to as the Lagoon attitude: A great ambiance and an unforgettable experience, with the benefits of a first class organization in terms of preparation and safety. Lagoon is proud to be a partner of the ARC Rally!

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