

Electric Junk Cruising

by Kurt Jon Ulmer

In January 2010, we turned the key on *mehitabel's* first electric auxiliary motor system. She has her second one now, and only a little smoke separated the two. All is well.

I've been impressed with the way an electric motor and junk rig suit each other. They have some features in common, so I might have known...

Junk sails are no trouble to carry raised, and they can be turned down or turned off at will; an electric auxiliary is no trouble to keep ready, and can be turned on to any degree, anytime. Junk sails get their energy from the natural wind; our electric motor from the same wind, and sunshine. Junk sails are agile at getting in and out of anchorages; for precise manoeuvering, an electric throttle gives vastly better control than does a diesel one.

The combination is one of those lucky ones that seems too good, but is true. Last summer in two months of very active cruising, we burned 0L of fuel, excepting cooking gas. This spring, moving quite a lot, 0L so far and none planned. The motorised generator I had set up, sits idle in the workshop. *mehitabel* sits at anchor 'soaking up diesel' from solar panels and a wind generator.

I didn't know how it would turn out.

Our engine room was big and now it's huge. There is no diesel, there are no tanks, no oil, no plumbing. It is clean. *Oh*, it is clean. The weight removed (tanks 300kg empty - ridiculous! fuel usually ~200kg, 'Bukhums' herself 200kg, plus her assorted attachments plus spares...) was greater than the weight of batteries, mount, motor and electronics that we installed. The exhaust came out of the transom. The transom came out of the water.

I realised one day, surprising myself, that now we could ventilate through all compartments, throughout the boat, since nothing pollutes the air. A spin-off, not trivial on a wooden boat. I got out the hole-saw.

Together with the cruising synergy I'm describing, it seems all bonus.

Practicalities

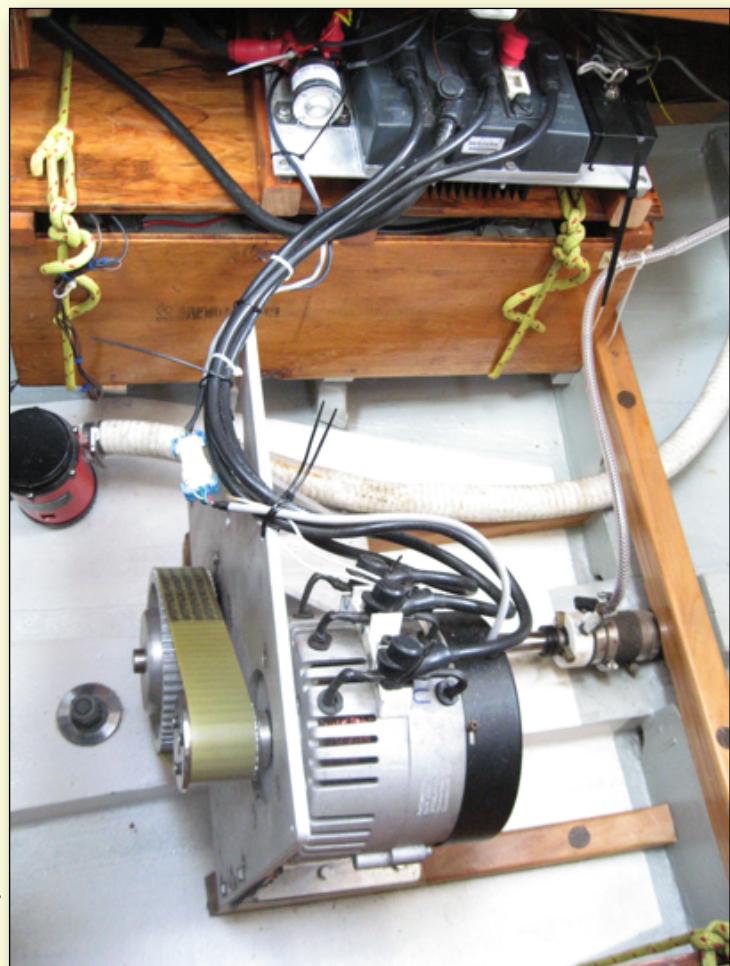
But our range under power is limited. We need to sail, and to consider the tide. If we lose the wind just off the coast, we have to budget battery capacity with rock avoidance taking precedence over 'getting there in time.' We electro-cruise at around 3 knots, often less. We can go 5, but not far. Many cruising folk would consider the limitations I accept, unsafe. I'm enjoying it, in spite of courting certain and imminent destruction on a dangerous lee shore.

Yesterday we used the motor a little, the sails more. This morning's sun will put all the

energy we used, back into the batteries. Besides that, it will fuel the sea breeze for today's sailing. That makes it sound so poetic and so green! At least I pointed out the dark side first.

Technical Details

None here. I won't bury you under numbers. Numbers do come into it, if you build your own system as I did. Someone who wants to buy a system will have the benefit of whichever company's engineers. I'm happy to correspond on anything related, though my knowledge isn't really comprehensive and my research is getting out of date. Our present motor and controller, for example, weren't even available when I



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"*mehitabel's* motor system, batteries not included."

installed the first set. There's more going on now than there was in 2008 to 10.

Principles

Only a few that I feel matter most.

Going more slowly takes immensely less power. The wisdom about using the biggest propeller that fits, is true, and so is the wisdom about turning it slowly. A feathering propeller improves sailing, even slow sailing, and aids handling under sail as well as speed under sail.

Amps create heat. Volts relate to RPM. Thinking in kilowatts and kilowatt-hours is useful. Smoke is unacceptable. Any colour of smoke.

Motor-Sailing

If we can't lay the headland on this tack, we can tack again, or we can turn on just a touch of throttle, and squeak by. The sound is barely audible on low, never anything like a diesel's dominating thrum. Once the propeller isn't needed, we're back to silence. There is no idling. (Also, ahem, there is no alternator.)

Sailing onto a mooring last evening, we needed the electric drive for 10 seconds to correct my mistaken aim. With a diesel, we'd probably have warmed it up for 10 minutes to be safe, and not sailed in amongst the moored boats at all. Without any motor, I'd be better at it, most likely...

The need to motor-sail can be decided moment by moment, if the motor's ready (key on, seal valve open) and the sails are up. Like reefing a junk, propelling an electric junk doesn't take forethought. Of course, one should know the state of the batteries, and check the weather and tides.

Suitable Boats

The boat should be one that wants to sail.

Our *mehitabel* is 12 metres long and displaces up to 12 tonnes. If she were 9 and 7, I might have tried no

motor and a yuloh before tackling this electric adventure. But a boat in that size range would be a sweet project to electrify, compared to ours. It'd be good fun to put a system into a *Vertue* or similar.

It was important to us in the conversion, to fit solar panels and a wind generator to *mehitabel* without their being too obtrusive. Smaller boats need somewhat less of all that, but they look even worse when they're overly geared-up.

There is potential for regenerating power with the propeller turning while sailing, but I can't get it to happen at all, so far. A fast catamaran with big propellers might have a chance. Nice thought.

Conclusion

Why not?

Most cruising boats have working motors, and don't need to change. Many boating people wouldn't accept the compromises. The Yellow Pages don't have electric boat specialists as a category. Resale might be an issue. There's the effort and expense, after getting through the junk rig one, of yet another conversion...

But if your diesel is due for a serious rebuild, or you'd rather not continue with your outboard, or the boat is new or engineless, electric propulsion is worth a look, I think.

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