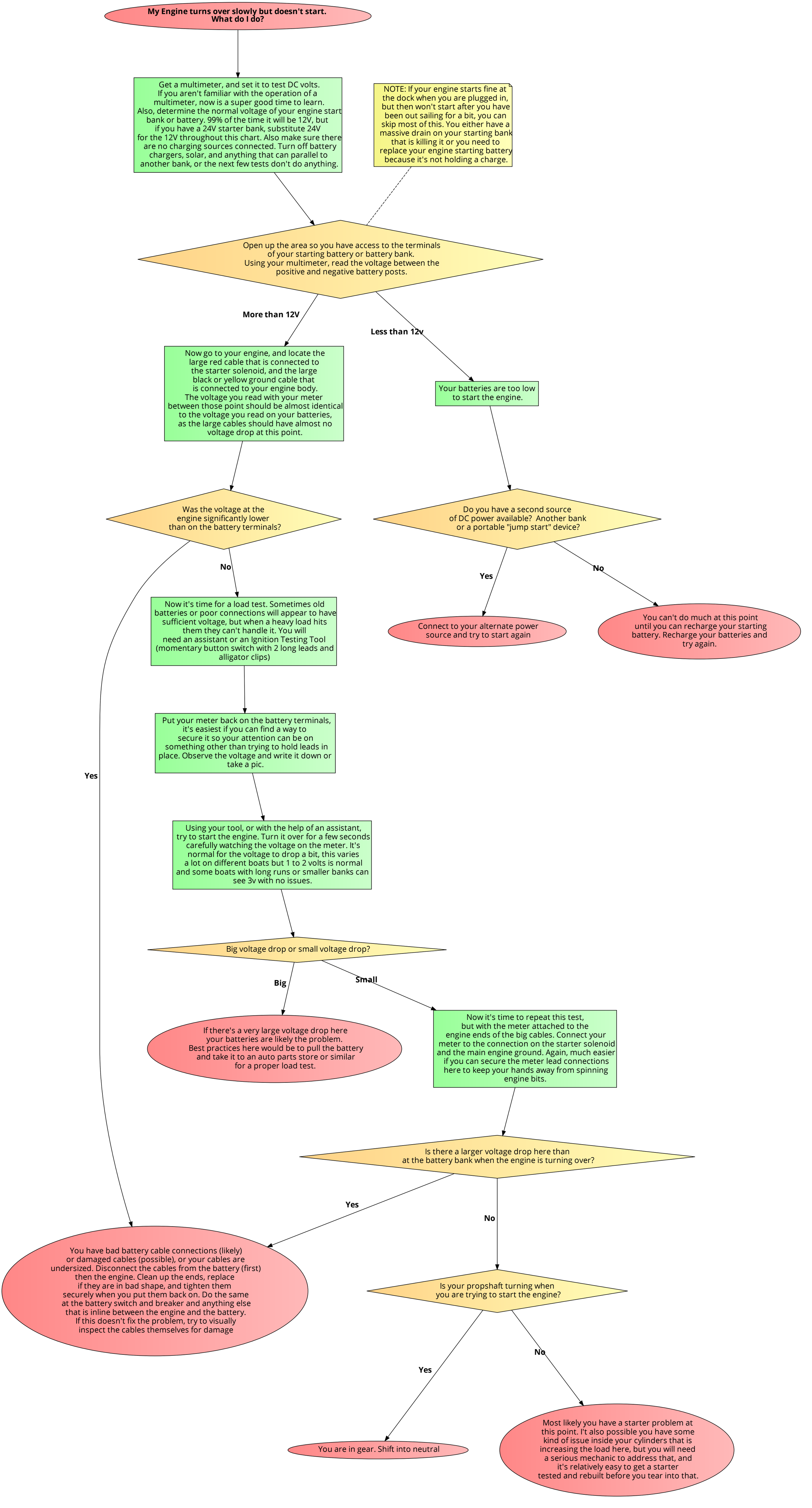
My Engine turns over slowly but doesn't start.
What do I do?
Get a multimeter, and set it to test DC volts.
If you aren't familiar with the operation of a multimeter, now is a super good time to learn.
Also, determine the normal voltage of your engine start bank or battery. 99% of the time it will be 12V, but if you have a 24V starter bank, substitute 24V for the 12V throughout this chart. Also make sure there are no charging sources connected. Turn off battery chargers, solar, and anything that can parallel to another bank, or the next few tests don't do anything.
NOTE: If your engine starts fine at the dock when you are plugged in, but then won't start after you have been out sailing for a bit, you can skip most of this. You either have a massive drain on your starting bank that is killing it or you need to replace your engine starting battery because it's not holding a charge.
Open up the area so you have access to the terminals of your starting battery or battery bank.
Using your multimeter, read the voltage between the positive and negative battery posts.
More than 12V
Less than 12v
Now go to your engine, and locate the large red cable that is connected to the starter solenoid, and the large black or yellow ground cable that is connected to your engine body.
The voltage you read with your meter between those point should be almost identical to the voltage you read on your batteries, as the large cables should have almost no voltage drop at this point.
Your batteries are too low to start the engine.
Was the voltage at the engine significantly lower than on the battery terminals?
Do you have a second source of DC power available? Another bank or a portable "jump start" device?
No
Yes
No
Now it's time for a load test. Sometimes old batteries or poor connections will appear to have sufficient voltage, but when a heavy load hits them they can't handle it. You will need an assistant or an Ignition Testing Tool (momentary button switch with 2 long leads and alligator clips)
Connect to your alternate power source and try to start again
You can't do much at this point until you can recharge your starting battery. Recharge your batteries and try again.
Put your meter back on the battery terminals, it's easiest if you can find a way to secure it so your attention can be on something other than trying to hold leads in place. Observe the voltage and write it down or take a pic.
Yes
Using your tool, or with the help of an assistant, try to start the engine. Turn it over for a few seconds carefully watching the voltage on the meter. It's normal for the voltage to drop a bit, this varies a lot on different boats but 1 to 2 volts is normal and some boats with long runs or smaller banks can see 3v with no issues.
Big voltage drop or small voltage drop?
Big
Small
If there's a very large voltage drop here your batteries are likely the problem.
Best practices here would be to pull the battery and take it to an auto parts store or similar for a proper load test.
Now it's time to repeat this test, but with the meter attached to the engine ends of the big cables. Connect your meter to the connection on the starter solenoid and the main engine ground. Again, much easier if you can secure the meter lead connections here to keep your hands away from spinning engine bits.
Is there a larger voltage drop here than at the battery bank when the engine is turning over?
Yes
No
You have bad battery cable connections (likely) or damaged cables (possible), or your cables are undersized. Disconnect the cables from the battery (first) then the engine. Clean up the ends, replace if they are in bad shape, and tighten them securely when you put them back on. Do the same at the battery switch and breaker and anything else that is inline between the engine and the battery.
If this doesn't fix the problem, try to visually inspect the cables themselves for damage
Is your propshaft turning when you are trying to start the engine?
Yes
No
You are in gear. Shift into neutral
Most likely you have a starter problem at this point. I't also possible you have some kind of issue inside your cylinders that is increasing the load here, but you will need a serious mechanic to address that, and it's relatively easy to get a starter tested and rebuilt before you tear into that.