

# Understanding Low Power Troubleshooting

When dealing w/ low power or low RPM issues on a B or C series Cummins Marine Diesel (or any color engine of a similar design or class), this is how we look at it (applies in 99% of the low RPM issues that I have seen). Hopefully, this may save you going thru an expensive and time consuming learning curve.

- 1) If you are seeing any dark or black smoke, you are not experiencing a fuel restriction problem. You are either overloaded or not getting enough air.
- 2) If you are not getting RPM and you have NO dark/black smoke, then you are not getting enough fuel, or your throttle linkage is not reaching the full mechanical stop.

To break this down to the next level:

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## **Low Power / RPM & DARK smoke:**

- a) You are OVER PROPPED (overloaded or under powered in the vessel's current configuration (call it what you like) ----Overloaded can be prop, weight, vessel bottom condition, windage, or running gear issues/conditions, but all of these go back to the prop as they all make the engine work harder because these conditions slow the vessel down overloading the engine.
- b) Not getting enough air can be a dirty/collapsed air cleaner, a leaking turbo hose, a filthy aftercooler, a worn out or partially stuck turbo, or a poorly vented engine room..

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## **Low Power / RPM and NO DARK Smoke:**

- a) Not getting enough fuel -- can be from clogged fuel filters, clogged fuel lines and pick-ups, suction air leaks in the fuel supply, run solenoid not pulling up the fuel lever all the way, a broken return check valve causing low fuel pressure, bad fuel lift pump, lazy aneroid, bad fuel lift pump. All of these can contribute to not getting enough fuel and all are relatively easy to figure out and correct.
- b) Throttle linkage is super easy to figure out--Adjust the linkage or control until the lever hits the stop and goes slightly into the spring override.

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Hopefully these checks will help you diagnose the issue quicker and cheaper.. REMEMBER, that in just about every case if you have any dark smoke, it's not a fuel restriction issue or under fueled condition.

As to injectors which always seems to come up, that's just about never the issue unless you know water went thru the system.. And then, it's just about always tons of WHITE smoke.

As to the very popular Cummins 370 Diamond, IMO, 3100 RPM loaded for bear is the minimum you should see, but we prefer 3125-3150.. And, BTW, this same 100++ RPM overrated is a must for any engine in this class (60+ hp per liter)..

# Basic Cost Effective Steps in Low Power Troubleshooting

NOW, ask yourself----

Have you performed the most basic steps of “Low Power” troubleshooting?

- 1) Strobed your engine and certified tach accuracy;
- 2) Confirmed that the fuel stop lever is 100% into the stop;
- 3) Installed a boost gage;
- 4) Installed BOTH fuel vacuum and fuel pressure gages, and recorded results at speeds in gear and out of gear above 1600 RPM;
- 5) Installed a clear line with a loop in it just before the engine;
- 6) Measured exhaust back pressure;
- 7) Peeked at return flow to insure it generally matches the spec sheet as to flow;
- 8) Checked injection pump timing;

When an engine has low power complaint issues or symptoms and these steps are by-passed (but parts are changed/rebuilt before these most basic operating parameters are checked) it is not a smart or cost effective way to go about finding the problem.. The order in which I listed them would be close to how I would go about finding the issue, unless I saw something on a sea trial that appeared likely to be the problem

. Two typical operation parameters that I would look at (a visual look based upon 25+ years of looking at 1000's of engines) on the first run is how much crankcase by-pass you have at 1000 RPM in neutral and at 2000 RPM+ in gear so I could get a feel for the general condition of the engine, AND confirming the color of the exhaust smoke during any type of “performance lagging” condition.....