Repower notes: Spring 2000 repower of Attitude Adjustment (1978 34 M1) with a Cummins 270 Diamond (270 hp at 2600rpm).

Cost of engine….$15,423

This included:

1) Hurth 630A gear at 1.56:1 with mounting brackets
2) 4 engine isolator mounts (Barry Controls)
3) Block heater (thermostatically controlled)
4) Engine oil drain hose
5) Deduction of $350 for "no factory exhaust elbow"
6) freight
7) "start up" This is an onsite inspection by a Cummins tech to certify the installation for warantee purposes He spent 1 ½ days on the boat and inspected /tested everything imaginable. Normally approx $400.
8) No gauge panel.
9) No wiring harness

** Current LIST price for either the 220 hp or 270 hp bobtail is $16,611

Changes I had to make:

1) change fuel feed lines to ½ inch
2) Build new fuel tank selection manifold with ½ inch valves
3) New pick-up tubes, 3/8 ID plastic
4) Add a second fuel return and manifold. (originally only returned to the port tank. Used 3/8 ID hose
5) Addition of custom exhaust riser/elbow ($575) (Marine Manifold Corp. Paul 631-694-0714). I also built a brace to support the weight. Also need to buy from Cummins the mounting gasket and 4 bolts.
6) Change to 5 inch exhaust hose and thru-hull
7) Installation of 2 inch raw water intake, strainer, etc
8) Addition of two cooling system vent lines to the expansion tank; 1 from the top of the turbo housing, 1 from the rear upper on the cylinder head.
9) Replacement of the factory temp and oil pressure sending units with the ones from the old engine. This is necessary because I wanted to use the existing gages and panels in the boat.
10) Installation of the old oil press and temp alarm sending units per above.
11) Addition of a special Cummins restrictor fitting and shut-off valves to run coolant to the domestic hot water heater heat exchanger.
12) Re-connection of the tranny shift cable (I had to build a mount from a different direction).
13) Replacement of the lower station throttle cable (original was 1 ft too short to fit the new engine).
14) Wire engine to existing Mainship harness: (via a junction box)

    1) Wire into 'R' terminal of alternator for tachometer signal

2) Run ‘hot’ lead from ignition switch to engine harness (to keep the fuel solenoid engaged.
3) Connect sending unit wires
4) Connect warning buzzer wires.

15) Calibration of oil dipstick
16) Alignment of engine to shaft.
17) I also replaced the angle iron engine mounts and bolts. Upgraded from ¼ inch thick to 3/8 inch thick.
18) Added one 4” x 6” vent into the engine room (not powered) to insure that I had enough air circulation
19) ** Change from bronze shaft to Aquamet 22 shaft…done the prior year and not included in the cost summary

Other notes:

Engine bed stringers SHOULD HAVE been made thicker by approx 1 ½ inches on the outside edge for the length of the engine compartment (bulkhead to bulkhead)

I mounted the Cummins supplied coolant overflow tank to the front of the expansion tank using plywood and 2 large hose clamps

The tachometers will need to be calibrated by using a hand held optical tach

Prop size should alloe engine to turn at 2650 (or a little more) at WOT for max longevity. The Cummins B series does not like to be overloaded, esp in warm waters.

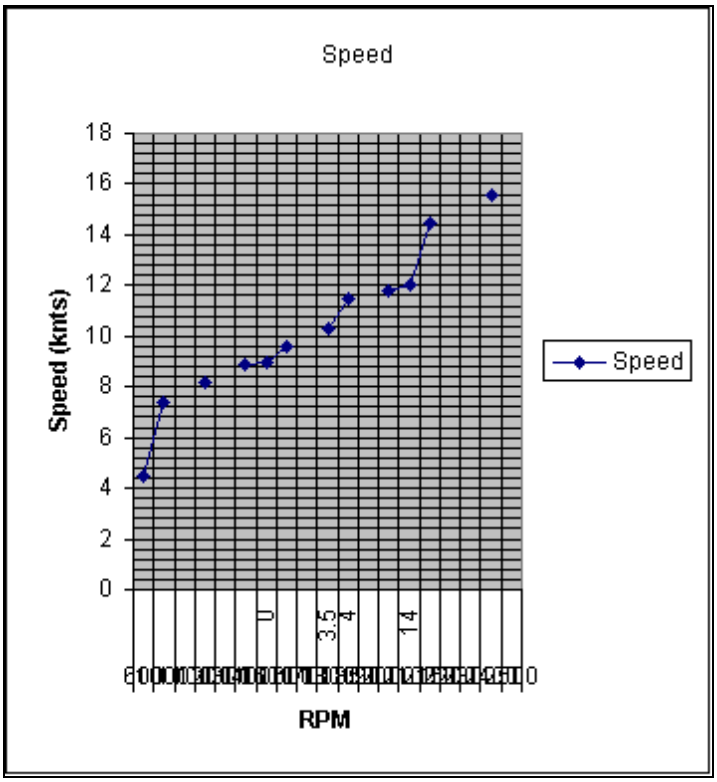
The change in shaft speed (because of the gear ratio change from 2.1 to the new 1.56) caused hull vibration directly above the prop. This was due to the fact that I have only 2 inches of prop to hull clearance. (10%) I reduced that vibration (to a very acceptable level) by thickening the hull on the inside between the rudder post and bulkhead forward of that. I also added re-inforcing ribs above the thickened hull. That eliminated approx 90+% of the vibration. The keel had been faired previously.
I choose the 1.56 ratio because I could not go larger in prop diameter, and I had the knowledge that another Mainship 34 repowered with a 220 Cummins and 2:1 ratio gear. His prop size ended up being 20 X 24. I knew I would need more pitch than that and was afraid to go to a 20 X 26 (or 27) because of prop dynamics of having too much pitch.
If you have the prop diameter to go square or just slightly more than square at 2:1 ratio, I would strongly recommend it in order to keep vibration to a minimum.

Results of sea trial for Attitude Adjustment May 2000

Cummins 270 B W/ 20 x 21 prop

1.56:1 reduction

RPM	Boost	Speed
600		**4.5**
1000		7.4
1100		
1200		8.2
1300		
1400		8.9
1500	0	9
1600		9.6
1700		
1800	3.5	10.3
1850	4	11.5
1900		
2000		11.8
2100	14	12
2150		14.5
2200		
2300		
2400		15.6
2500		
2600	30+	17.5
2630		18.3



Idle speed 597
Max noload 3041
max w/load 2630

Item	Cost	Comments
Engine +gear	15423	includes tax
riser	575	
Bayside's labor	1800	was quoted at 800
bolts,etc	57	
exhaust hose	350	
exhaust thru-hull	375	
angle iron mounts	20	
1 1/2 hose	40	
2 hose	50	
fuel fittings	130	
throttle cable	22	
junction block	9	
flex fuel hoses	50	

Item	Price
Engine + gear	2400
Parts	1000
old block	300
Total	**3700**
(Old Perk items sold)	

misc	35	clamps		
Throttle fitting	10			
boost gage	95			
oil	35			
vent hoses	50			
Anti frze	15			
	19141		**GT**	**15441**

Jay Leonard
11-8-01