

Buying a secondhand vehicle engine and converting it with a special marinisation kit can save a thousand pounds or more over a new marine engine. And as Dick Johnson shows in this step-by-step description of the marinisation of a 120hp Ford diesel, the job is not a difficult one and can be completed in only a few hours

A MARINISATION kit is a collection of bits and pieces that can be simply bolted on to an automotive motor, instantly transforming it into a marine engine. Buy a second-hand engine from a breaker's yard, install the kit and motor off. It's not really quite so simple, but that is the basis of the idea. Such kits have served the small petrol engine market well for a number of years, but there

is an increasing need for diesel engines in cruisers as the cost of petrol climbs and the shortcomings of the high revving, car-type petrol engine are exposed.

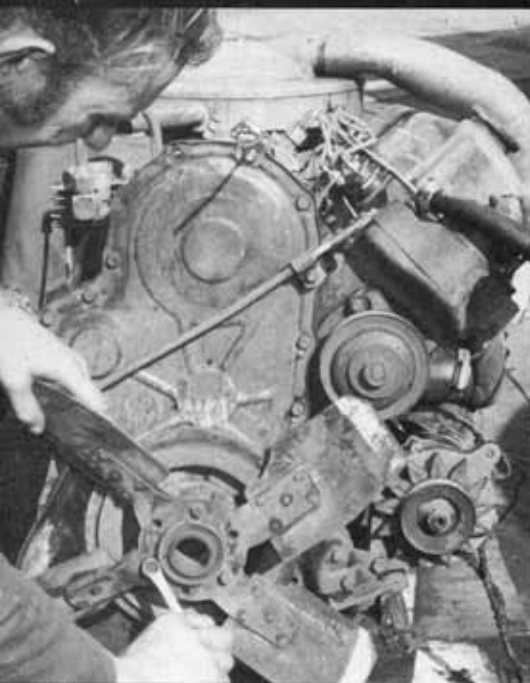
Heavier boats need power and push, not speed, and this is best found in the slow-revving diesel driving a big propeller, perhaps through a reduction gear. The problem has been that while petrol engine marinisation kits are readily available, their diesel counterparts are thin on the ground — at least in the larger sizes.

One of the few such kits comes from the do-it-yourself engine builders, Lancing Marine. It is suitable for all forms of the six-cylinder Ford 2700 engine but the one we built was a naturally-aspirated engine putting out about 120hp. Turbocharged versions can run to 180hp but they are a little more complicated.

A brand new marine engine of this type will probably set you back at least £2500, but building your own on a second-hand truck unit will save



Twenty-three steps



1. Block up the engine securely on the ground or on a platform so that it will be easy to work on and so that it will not fall on you when exerting pressure to loosen stubborn bolts. You are now ready to start the operation. The first step is to unbolt the fan from the front of the engine, a simple job requiring the removal of six bolts.



2. Next, the inlet and exhaust manifolds are removed. A socket set is essential for this job as the securing bolts are deep within the castings. The inlet manifold is retained for use on the marine engine, the exhaust manifold joins the scrap pile.



3. The air cleaner now comes off, but watch out for the oil inside. The fuel filter is usually bolted to the air cleaner bracket but don't disconnect the pipes, just remove the fastening bolts and let it hang on the pipes for the time being. The cleaner and piping are consigned to the scrap heap.

you between £1000 and £1500. Second-hand engines can be obtained from breakers' yards for between £100 and £200 according to our investigations, but the all-important question is the one of engine condition and the mileage that it has done in its original truck body. Engines that come from newer, crashed vehicles are the best, but if none are available try to get one from a fleet truck. They are likely to have had the best maintenance, unlike the one from a small firm which might have been saving a few pounds by delaying oil changes etc.

Mike Bellamy of Lancing Marine believes that there is a simple way of telling if the engine you have chosen is good enough to be considered for boat use. Get it on the floor in a clear space, couple a battery to it and start up with the exhaust manifold removed. What you hope you won't find is consistent white smoke from one or more of the exhaust ports which might show up damaged valves or pistons. If there is smoke from a port, squirt oil or upper

cylinder lubricant down the inlet. If that fails to stop it change the injector and see if the smoke stops. If it does, the engine is perfectly satisfactory for marine use. If it doesn't most reputable dealers will allow you to take the engine back within 14 days and exchange it for another.

Mike also believes that the engine won't need a full overhaul and reconditioning for most boat uses. Unlike a petrol engine, the diesel is not overstressed by continuous running in a boat and provided that it runs without too much mechanical noise and the oil pressure is correct, it will be good enough for marine use.

The engine should be removed from its old home in the truck with the rubber mountings attached, and the wiring and hoses cut off. The gearbox should also be removed before you buy the unit as it is not needed and will add to the price.

Get it home and give it a good clean up with a degreaser and plenty of scrubbing.

SOME MARINISATION KIT SUPPLIERS

C-Power (Marine) Ltd, Corringham Road Industrial Estate, Gainsborough, Lincs. Tel: Gainsborough 5356.
Ford and British Leyland.

C/T Marine Ltd, Unit 1130, 41 Norwood Road, London SE24. Tel: 01 771 3715.
Ford and British Leyland.

Chingford Boat Centre, Lea Valley Road, Chingford, London E4. Tel: 01 524 5414.
Ford and British Leyland.

Diesel Conversion Products, Swingfield Street, Selsted, Nr Dover, Kent. Tel: Selsted 632.
Ford, British Leyland and Perkins.

Diesel Power, Refa Works, Wood Lane, Rothwell, Leeds. Tel: Leeds 823258.
British Leyland.

E. H. Hewitt and Co Ltd, Viaduct Works, East Dock, Cardiff. Tel: Cardiff 394624.
GM, Ford and British Leyland.

J.G.M., The Boat Centre, Marlow, Bucks. Tel: Marlow 6911.
Ford and British Leyland.

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to cheap power



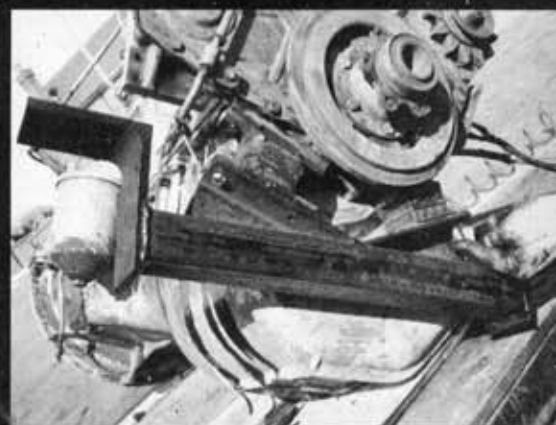
4. Round to the back of the engine now, and before starting to remove the bell housing make sure that the engine is blocked up on the sump, clear of the flanges and mounting feet. Unbolt the bell housing but keep all the bolts. The housing and clutch cylinder which is attached to it should join the scrap.



5. With the housing off, unbolt the clutch and dump it.

6. The rubber sump vent pipe is next to go, just a simple slackening of the pipe clip and then it can be pulled clear.

7. The air brake compressor is next. Three bolts here but the compressor is gear driven and might take some prising off the block. Don't however force anything between the two flanges as this is a gasket face to keep the timing case oil tight. As with all the bolts you undo, screw them back into their old holes finger tight, so that they won't get lost.



8. Moving to the top front of the engine, take off the thermostat housing and thermostat. The housing goes on to the scrap pile but the thermostat is kept if it is in good condition. It might be best to replace it however.

9. Directly under the thermostat at the bottom of the engine are the rubber mountings that located it in the truck. Usually they are in the angled position but as we are going to use the engine upright one mount has to be moved from the side to the bottom so that the new mounting bracket will allow the engine to be installed upright. If the mountings are in good condition — not torn or severely softened by oil — they can be re-used. With the rubbers properly in place, bolt on the front engine mount supplied with the kit.

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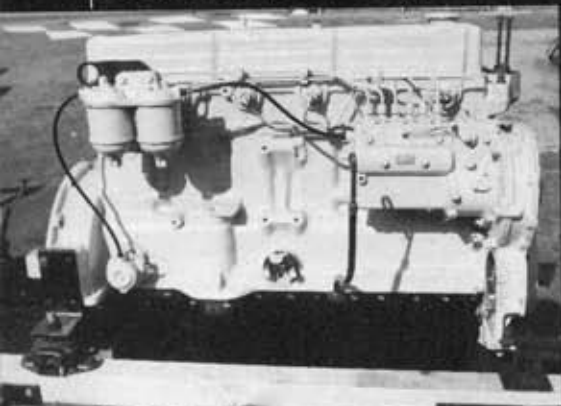
Twenty-three steps to cheap power

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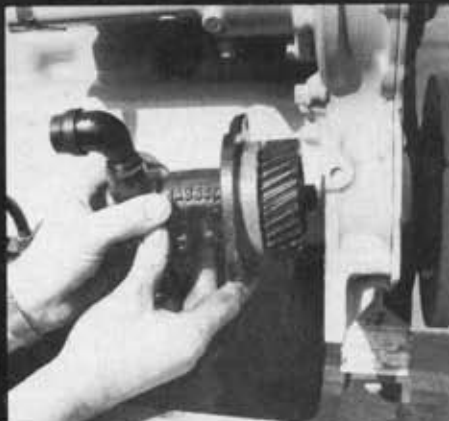
10. The rear engine mounts are simple angles with marine flexible mounts attached. They bolt to the side of the flywheel housing with four bolts, in holes already cast into the engine block.

11. The engine can now be supported on its mountings on a simple cradle made from pieces of 4in by 2in timber. Make your support high enough to get the bottom of the sump well off the ground as the next job entails getting underneath.

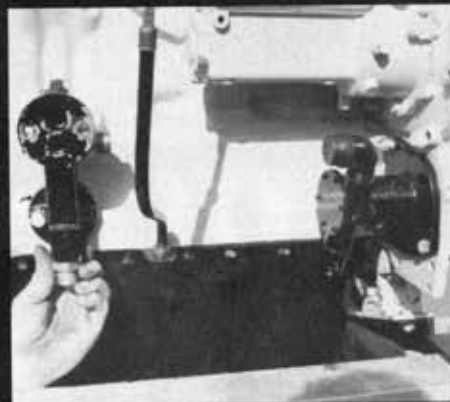
12. Remove the angled sump of the truck engine and replace with the upright sump for the marine unit. These are available from Lancing Marine or you might be able to swap with the scrapyards, or buy your own new sump from a Ford truck dealer. While the sump is off, check the condition of the big end and main bearings and clean off any sludge and muck that might be lurking in the innards. Make sure that everything is scrupulously clean before installing the new sump on a new gasket.



13. Thoroughly clean off the outside of the engine and paint to suit the colour scheme of your boat. It is just as well to use a light colour as it will show up all oil and fuel leaks and makes the best use of the available light in the engine compartment. Use a proper fuel and heat proof paint — available from dealers in car paint finishes — and give enough coats to achieve a good surface. The smoother it is, the easier it will be to clean. Don't forget to mask off all the gasket faces that will be taking new parts.



14. With your gleaming motor looking like new on its stand, start assembling the marine bits. First to go on is the water pump. This is a Jabsco gear-driven unit that fits into the space left where the air brake compressor came out. It bolts in with the old bolts.



15. Next thing to go on is the oil interrupter. This diverts the oil flow through the filter, passing it first through a cooler. The oil filter — complete with bracket — is removed, two bolts, and the interrupter bolted on. The filter then bolts on to the top. While you are about it you might as well replace the filter element.



16. After the interrupter, the cooler. This small unit is connected to the water pump and to the interrupter. Oil passes through it one way, and water the other. The cooler can hang from its pipes or you could make up a supporting bracket that bolts to a couple of sump bolts.

SOME MARINISATION KIT SUPPLIERS

continued

Highpower Marine Ltd, Riverside Estate, Brundall, Norwich, Norfolk. Tel: Norwich 714556.

Ford and British Leyland.

Lancing Marine, 28 Brighton Road, Lancing, Sussex. Tel: Lancing 3247.

Ford, British Leyland, GM and Gardner.

M.I.T., Queenborough Shipyard, Queenborough, Kent. Tel: Sheerness 61255.

Ford.

T. Norris (Industries) Ltd, 6 Wood Lane, Isleworth, Middlesex. Tel: 01 560 3453.

Ford and British Leyland.

Powamarine Engines Ltd, 46 Bohemia Road, St Leonards, Sussex. Tel: Hastings 437594.

Ford.

Watermota Ltd, Abbotskerswell, Newton Abbot, South Devon. Tel: Newton Abbot 68444.

Ford and British Leyland.

Worham Blake and Co Ltd, The Forum, High Street, Edgware, Middlesex. Tel: 01 952 6666.

Ford and British Leyland.

17. While working on this side of the engine, it is as well to fit the throttle cable bracket. It bolts to a couple of the timing cover bolts and provides an anchor for the outer cable. It will be necessary to change the throttle arm on the injector metering pump from the inside to the outside in order for it to line up with the cable. Newer engines have the arm fitted to a shaft that is splined on each end so it is a simple change-over. Older engines need a circlip removed and the shaft pushed out and replaced the other way round.



18. Round to the other side now, and the exhaust and inlet manifolds go on. The inlet is the old one from the truck engine, the exhaust is a special water-cooled Bowman unit. Fitting is a bit tricky. The exhaust goes on first and is held in place by the two end nuts run on finger tight. The inlet is then offered up and the other bolts put in and tightened up. Don't forget to use new gaskets. On the outlet end of the manifold goes a suitable adapter to connect to the rubber pipe that leads the gases and water away. Various bends and angles are available. The cooling water is injected into the bend to cool and silence the exhaust.



Twenty-three steps to cheap power

continued



19. Two studs are now screwed into the bolt holes exposed when you removed the thermostat housing. The studs locate the fresh water heat exchanger and header tank. The thermostat we referred to earlier goes in under the header tank, and don't forget a new gasket. A blanking plug or a sender for a temperature gauge should be screwed into the thermostat bleed hole.



20. The end caps of the header tank can be turned by slackening the central bolt. The manifold end should have its pipe horizontal, the other side should point downwards. The pipes are now connected. The horizontal one has a pipe attached, running to the fitting on the far end of the exhaust manifold. The front end fitting on the manifold is connected to the point where the cooling water is injected into the exhaust stream. This prevents air

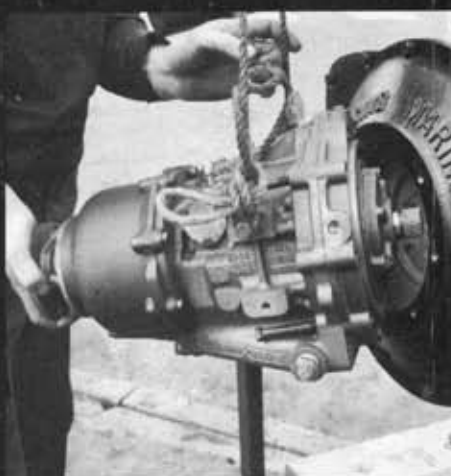


locks in the manifold. The other pipe on the header tank connects to the Jabsco water pump by a flexible hose and an angled coupling. The long lengths of pipe in our photographs can be replaced with short pieces, with copper tube between.

21. Round at the back of the engine, the flywheel is next to receive attention. A shock absorbing drive plate has to be bolted on, but you may find that the dowels that normally drive the clutch get in the way. If they do, either pull them out or break them off with a sharp blow from a hammer. New bolts should be used for this item.

22. To cover the flywheel and drive plate, there is a special bell housing that is made to adapt a marine gearbox to the engine. This bolts on with the same bolts that held the old one. The bell housing will take any gearbox with the standard bolt spacing. Borg Warner or Paragon boxes were two that we tried.

23. The bell housing will also adapt straight to a Stern Power outdrive coupling. The smaller units connect straight to the engine, the bigger ones have a hydraulic gearbox between engine and drive.



This engine can be built up in a remarkably short time. Under ten hours working time should see the job finished, and allowing some £550 for the marination kit, plus £580 for the gearbox and about £200 for a good second-hand engine, the total cost will come to well under £1500 complete and ready to install in your boat. The Stern Power outdrive unit will cost about another £750 complete with its own hydraulic gearbox. □

