Converting the 'Tank' Engine

It has been common practice for many years to convert and fit a series E engine (USHM1) or even a series MM Minor engine (USHM2 or 3) into an 8 to replace the UB engine. Indeed, the Morris Motors engine reconditioning service also used later "short blocks" modified to fit earlier cars for their engine exchange scheme. This brings benefits in terms of the increased power and flexibility of the E engine, with its higher compression ratio, counterbalanced crankshaft with shell bearings, better tappets; the performance benefits over the UB engine can be maximized by using the Series E manifold and carburettor, giving improved porting and gas flow. In more recent years, a considerable number of "tank" engines have been released into military surplus. These bring similar performance benefits, together with an improved oil seal at the rear of the crankshaft, and the ability to fit an oil filter. These tank engines may also be converted to fit the Series E.

The conversion to use as a UB replacement is straightforward, but if in any doubt, the owner should entrust this work to an engine reconditioning specialist. A "donor" UB engine will be needed to provide: timing cover, front engine bearer, distributor, and in the case of a tank engine, a crankshaft pulley, water inlet elbow, flywheel (optional), gearbox drive shaft bush (new), water outlet (new), cylinder head studs (new), sump drain plug, tappet cover, dipstick, and oil pressure pipe union. Whilst the UB manifold and carburettor can be used, the manifold and carburettor from a Series E are recommended to take advantage of improved porting and therefore performance: a matching two-stud exhaust pipe flange will be needed, and the front exhaust pipe bent to fit. This also results in a very tight fit between the carburettor flange and the wing, so the air silencer (if fitted) cannot be used.

Dismantle the replacement engine and thoroughly check its condition, cleaning and overhauling as necessary. New cylinder head studs of the correct length will be needed. The oil filler aperture on the right of the engine can be blocked off by a suitable core plug or similar, so that the oil filler on the UB timing cover can be used. The dipstick hole on the right side of the engine may still be used, or a new hole drilled in the casting in the usual position on the left side. Some tank engines already use the dipstick hole on the left side of the engine, and already have the oil filler on the right side blanked off. The oil pump on the USHM3 and tank engine is not directly interchangeable with the pump on the UB or USHM1 and 2 engines. The oil filter take-off (on USHM3 and tank engines) can be blanked off, in which case either the oil pump from the UB or USHM1 or 2 engines must be fitted, or the blanking plate to be used must be machined out to allow oil to flow from the oil outlet to the oil inlet holes. Alternatively, an adaptor can be obtained to take a modern screw-on filter – this is the easiest and best option, and in which case the tank engine oil pump can be retained, but note that it will give oil pressures of about 100 psi. To protect the oil gauge and pipe in case of failure, an in-line tap can be included in the pipe to the gauge. Sump capacity of the USHM and tank engines is 6½ pints; the donor dipstick may need to be re-calibrated.

For use in Morris 8 1935 – 38, the donor UB cylinder head can be easily used on the USHM1 and 2 blocks, but with the USHM3 and tank engine blocks, the dome nut under the front of the head, which holds down the water outlet, will foul on the front of the block. It is better to use the tank engine cylinder head, which is virtually identical to the UB head, except that the water outlet is held down by a stud in the head rather than a stud in the water outlet. Use the water outlet from the donor UB engine, or preferably get a new one (available from the Club Spares) as the old one from the donor engine is likely to be very rusty. Remove the stud provided with the new water outlet, and drill out its hole so that the new outlet is a clearance fit over the existing stud in the head. The thread on the stud may need turning down lower, so that a new nut (preferably brass or stainless steel) can be fitted. Use a new gasket between the outlet and the cylinder head. Also note that the spark plug thread reach is ½" (same as early UB heads for which 3/8" reach plugs were specified). However, ½" reach plugs are fine but must not be the projected-nose type. When using the UB or the tank engine head, the cylinder head gasket must be the type used for the UB Series 1 and 2 Eights NOT the type used for the Series E. If fitting a tank engine to a Series E, use the cylinder head and distributor from the donor Series E engine. When using the Series E head, use the Series E gasket.

The ½" UNF air bleed point at the rear of the tank engine head has to be plugged – a Morris Minor 1000 sump drain plug will fit, and another such plug is needed to blank off a hole in the side of the tank engine block, just to the left of the oil filter. As this hole goes into the oil gallery, make sure that the new plug has a good fibre washer and is tight.

The distributor from the UB donor engine may be used, but either use the smaller driving dog from a Series E distributor or machine the dog down to about 21 mm diameter. Alternatively, use a complete Series E distributor. The ignition timing will probably have to be re-set.

The flywheel on the tank engine usually has a ring gear fitted, which will not have been used (the engine was started by its generator). This has the right number of teeth for Morris 8 (but not for MM Minor). The clutch surface will be rough machined, and will need to be planed smooth by a specialist engineer. If the engine is to be mated with a 3-speed gearbox, fit a new bearing into the flywheel for the spigot of the gearbox drive gear shaft. Alternatively, use the flywheel from the donor engine. If the engine is to be mated with a 4-speed gearbox, fit a new bush (Oilite AI1012-20) into the end of the crankshaft for the gearbox drive gear shaft.

These notes are for guidance only, and represent the experiences of members of the Morris Register. Anyone undertaking the overhaul of an engine must seek the advice of a suitably qualified professional. 15/3/2014