16mm-egroup Handbook notes on Mamod loco operation

Compiled by Rob Guinness March 2001

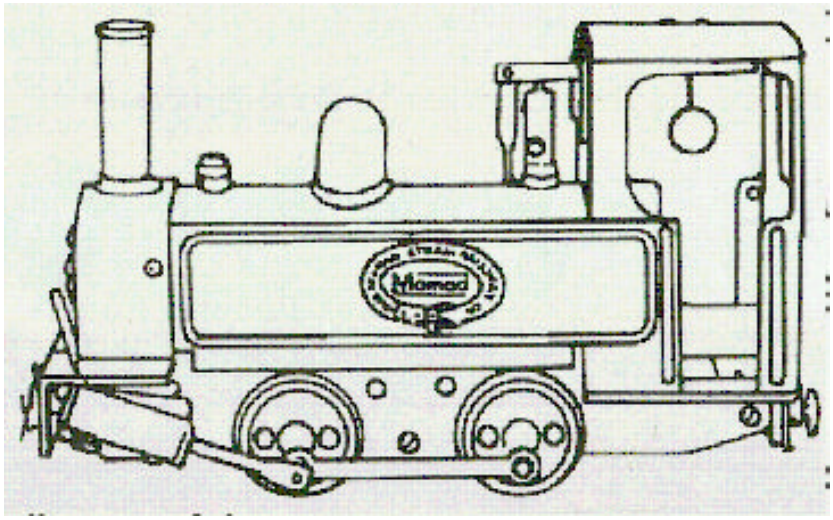
Introduction

Despite being out of production for several years, the Mamod locomotive continues to be a popular if troublesome introduction to model steam railways. This has been evident from the number of questions passed to the 16mm NG modellers' e-mail group. A suggestion was made to collate the various questions, problems and solutions for use in a 16mm Modellers' Handbook.

Since the loco is being produced again, and a number of variants are available, this seems a good time to set down the condensed wisdom of 20 years of "Mamodology".

Topics:-

Overview, Boiler/Firing, Cylinders/Valve, Lubrication, Wheels, Running/Balance, Cosmetic, Other versions, Useful Firms



OVERVIEW

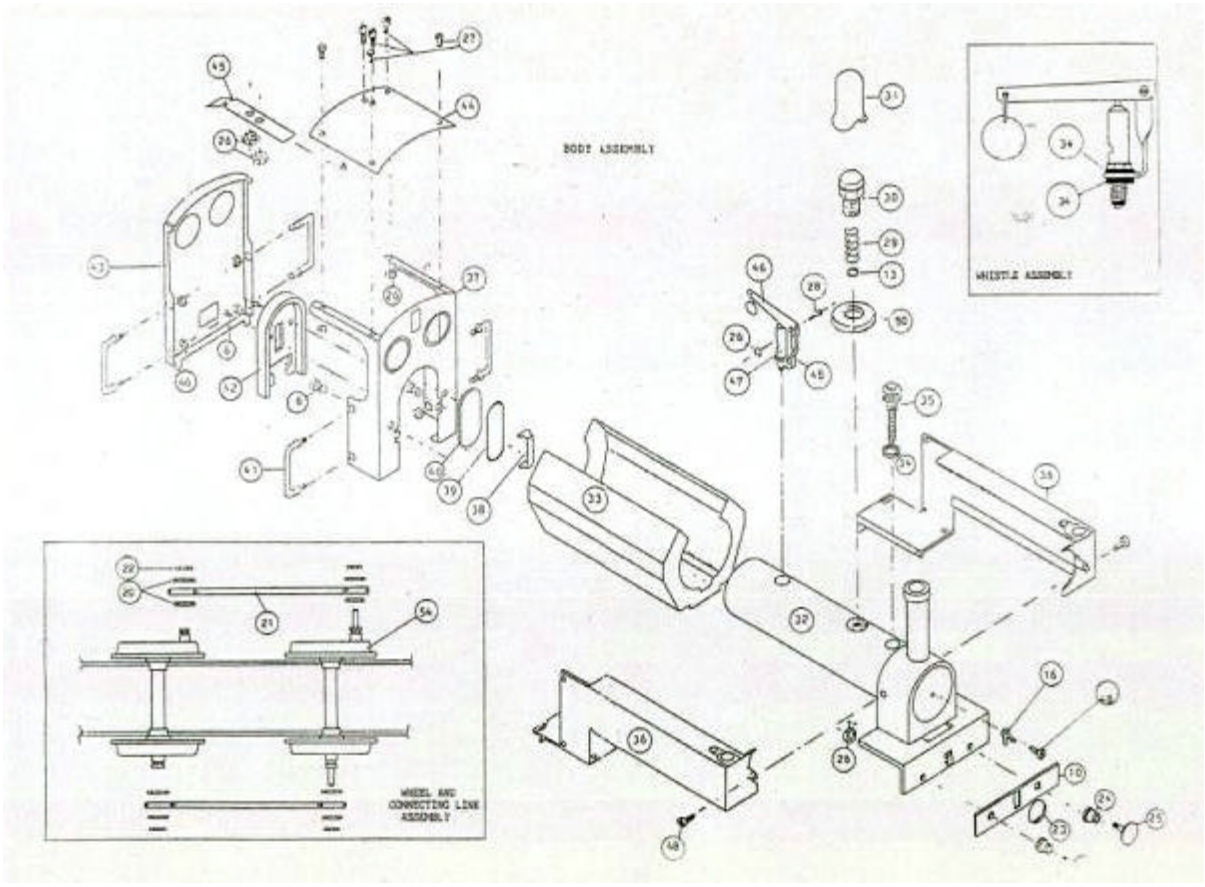
Introduced in 1980, the Mamod steam railway was aimed at the "sophisticated" toy market, but soon became an introduction to garden railways for many enthusiasts. A range of steel built vehicles with diecast parts including wagons, carriages and a die cast track system were provided as individual items, and also in boxed set form. Although the boxed set was for 32mm gauge, the individual loco and rolling stock were available for 45mm. Track was produced only in 32mm gauge.

The centrepiece was the locomotive. A diminutive 0-4-0 side tank of pleasing outline, with double acting oscillating cylinders provided the impetus for many modellers to make a start in the garden. The loco was produced in several liveries, as a series of special limited editions and in kit form in a black livery. Although widely accepted by the 16mm modelling fraternity, it is generally considered to be nearer to 14mm scale.

As built, the loco gained a reputation as an indifferent performer, with a preference for running backwards, and often required some work to make a good reliable runner. A number of "cottage industries" sprang up providing add-ons and replacement parts aimed at improving the loco. Most of these ceased production as the loco became unavailable. The main manufacturer nowadays is I.P. Engineering.

Once again in limited production, and widely available second-hand, the loco is again attracting attention from garden railers, and these notes are an attempt to collate the various suggestions and advice passed around over the intervening 20 years.

THE BOILER AND FIRING SYSTEM



Being aimed at the toy market with its safety considerations, the model is fired by solid fuel tablets carried in a burner tray. The first and easiest modification is to replace this with a spirit burner. These are currently manufactured by I.P. Engineering. Unlike previous products, no alteration is required to the loco, and an immediate improvement is gained.

Usually the wicks will be correctly fitted by the maker, but it is worth checking the set-up before use. The wicks need to protrude only about 3 – 6mm (¼") above the tubes. This should produce a nearly invisible blue flame about 1" (25mm) high, with only a little visible yellow. Modern wick material is non-asbestos ceramic fibre, but a recent innovation has been the use of fine stainless steel mesh rolled fairly tightly to fit the burner tubes.

Meth spirit is a very variable commodity. Spirit obtained from hardware stores tends to be recovered from other substances, and often contains impurities, which make the boiler dirty, and can lead to damage after prolonged use. The best option is I.M.S. B.P., which can be obtained from pharmacies, but may lead to some questioning. The Customs & Excise will grant a licence for the purchase, storage and use of I.M.S. which will make things easier. A popular alternative is “alcool a bruler”, widely used on the continent for cooking stoves. This burns with a clean flame, but has a strong odour reminiscent of the wine making industry,

Another alternative is gas firing. A butane burner and tank is available from PPS Steam Models. While gas firing is more controllable than meth spirit, it can cause more damage to the boiler if the water is allowed to run out. Both the tablet and spirit burners are designed to run out of fuel before the boiler is empty. This is not so with the gas burner, which will outlast the boiler capacity.

The boiler is a brass tube, with the various threaded fittings soft-soldered and having a plastic sight “glass” retained in place by the rivets holding the backhead plate. The safety valve and whistle are sealed with fibre washers. These are best replaced with rubber O rings. There are several types of O ring on the market, and some are quite unsuitable for the temperatures associated with steam under pressure. Use only black O rings.

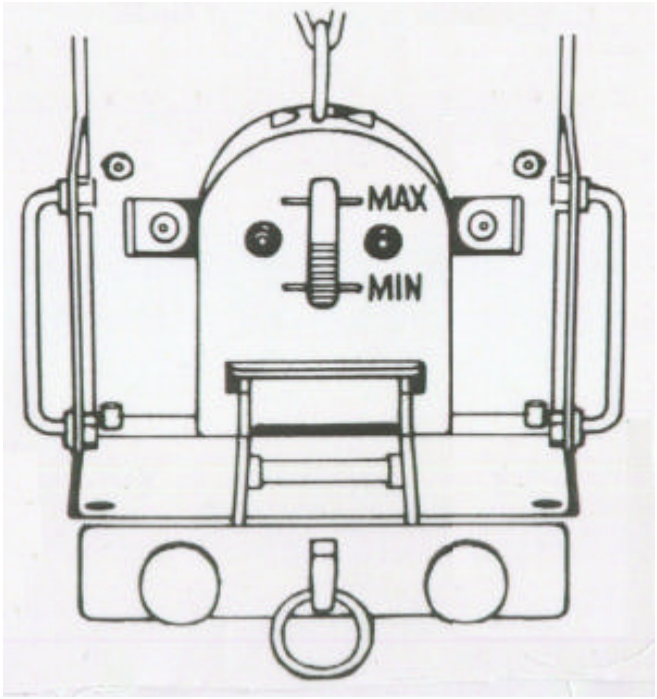
The safety valve itself is the next item for simple upgrading. As supplied, the loco must run at less than 1 bar steam pressure. This is equivalent to 14.7lb/sq in. Additionally, the original safety valve is not very railway-like, and tends to vent sideways rather than upwards. A direct replacement is available from IP, which is set to release at 20-25 ib/sqin. While this is not a dramatic increase, it does give a useful improvement in performance.

Some modellers have reported a hydraulic pressure test on a Standard Mamod boiler, where the sight glass developed a leak at 120lb/sqin, sealing again at when the pressure was reduced to 60lb. This would appear to indicate that the boiler is quite safe for use at 25lb/sqin, and possibly up to 40lb.

With a new loco, it is advisable to wash out the boiler, to remove any debris left from the manufacturer’s soldering process.

This can be done by half filling the boiler with meth spirit, and then adding a few dozen small self-tapping screws or 6-8BA nuts, via the safety valve orifice. Replace the valve, and give the loco a vigorous shake several times. Remove the valve, and empty the boiler, retrieving the screws/nuts (keep count!). If the effluent contains black bits and gubbins, then repeat the process until the effluent is clean.

If the loco has been assembled from a kit, the sight glass will be retained by screws, not rivets. These can be removed, making the above operation easier. The rivets can be carefully drilled out, and replaced with 6BA nuts, held in place and then soft-soldered on the inside.



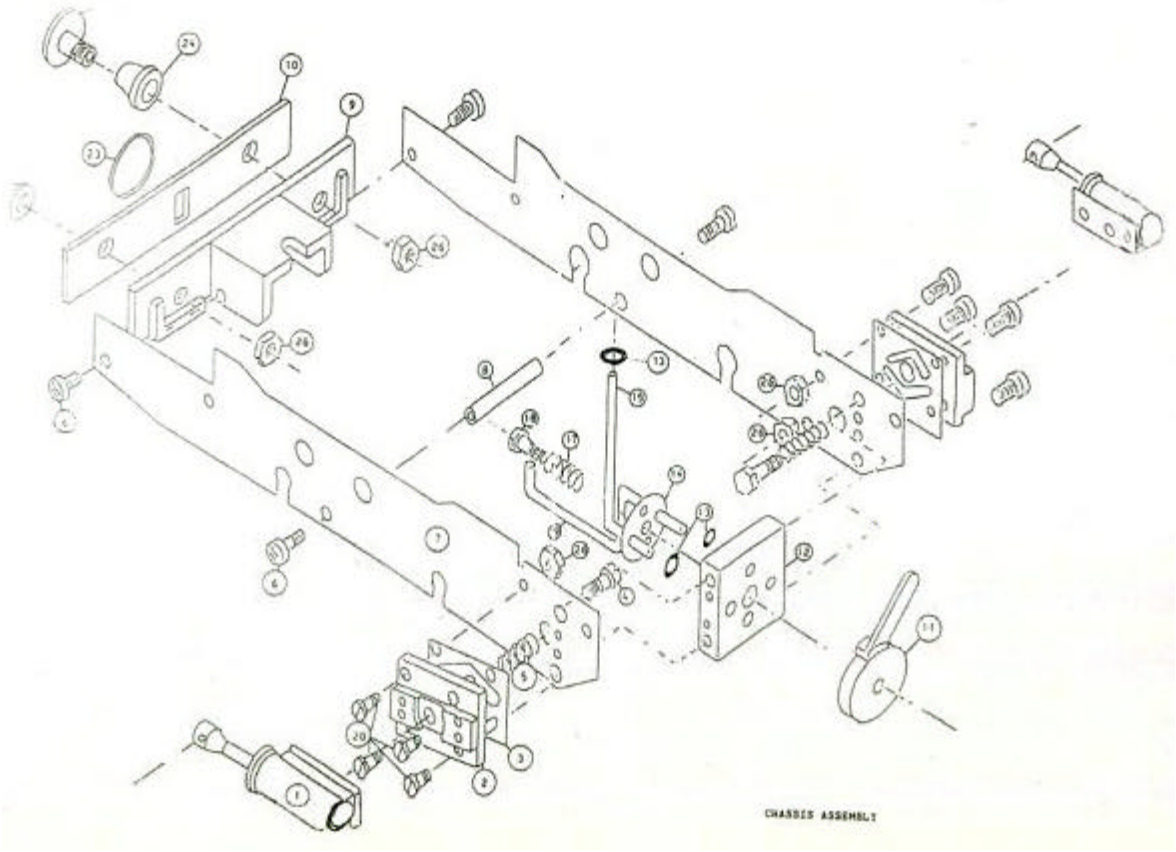
Take care to retain the O ring. If the boiler is allowed to run dry, as above, this plastic “glass” is often the first casualty, and replacements are available from the Mamod spares centre, or their dealers such as PPS. If possible, it is worth replacing the plastic sight “glass” with proper glass, such as from microscope slides, cut and ground to shape. After initial cutting to size, the shaping can be finished with a Dremel (or similar) tool.

Boiler paint damage from overheating etc. can be touched up with Hammerite Pot Black, as used for motorcycle cylinders.

Because the boiler is soft-soldered, it can be damaged by overheating, especially with a gas burner. Hard (silver) soldered boilers are available as a direct replacement, having cylindrical sight glass, and able to run at much higher pressure. These are more resistant to damage from overheating. An 18swg silver soldered copper boiler complete with water sight glass, safety valve and steam regulator is available from IP Eng or PPS.

CYLINDERS AND VALVE ASSEMBLY

The loco cylinders are brass tubes soldered to backplates, which oscillate on spring loaded screws against a port block. The port holes are drilled through and line up with steam and exhaust holes in the brass reverser “valve” block. The steam passages to each end of the port block are formed in the thick sealing gasket, between the block and the loco frame. As the cylinder oscilates, the live feed and exhaust ports are uncovered alternately. In the 45m gauge version, these gaskets are extra thick or used in multiples, to move the cylinder unit outwards to align with the wheels.



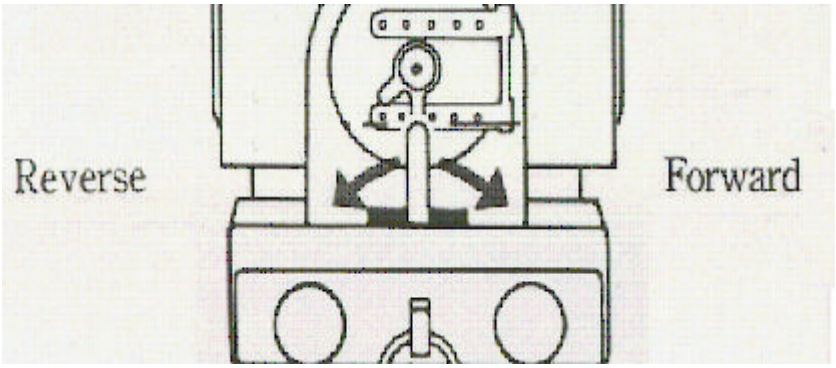
Replacement cylinder assemblies are available in which the steam passages are machined in the port block, and the cylinder and backplate are machined as one unit from solid brass. The following notes can be applied equally to these parts. Alternatively, replacement pistons are available, with O rings and glands, to be fitted to the original cylinders.

Factory manufactured locos are partly riveted, while the kit built version is wholly screw assembled, mostly 6BA. Oddly, the cab handrails are 5BA. Therefore to make alterations to a factory loco, it will be necessary to drill out some rivets. These can then be replaced with 6BA screws. The mounting holes for the various components have some degree of slackness, and indifferent assembly can lead to misalignment of steam passages, often the major cause of poor running. The other cause of problems and steam leaks is that the individual sliding surfaces may not be perfectly flat.

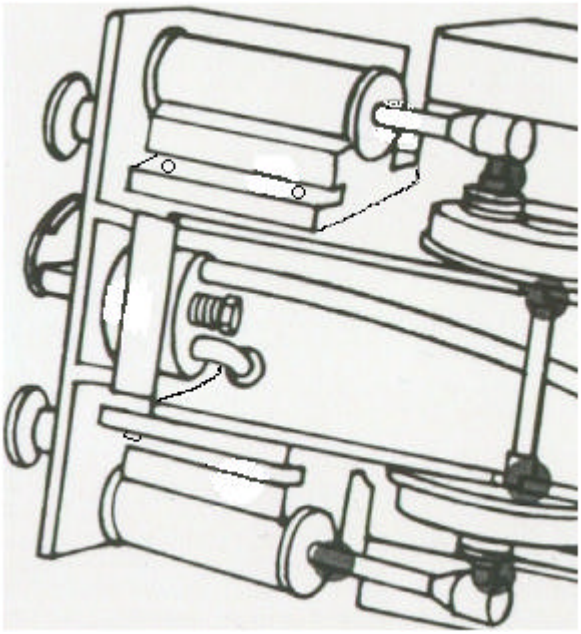
To correct this, requires a perfectly flat work surface, such as sheet of glass. Thin window glass is not strong enough, and can flex. Best is a square foot or so of 6mm plate glass, which must be quite clean, with no bits of grit on its surface. Next item is some wet and dry rubbing-down paper, of 400 grade. Some workers recommend 800 grade, or Brasso, which can lead to confusion. The main aim here is flatness, not necessarily smoothness. A new set of cylinder gaskets will be needed, and a few extra 6BA screws and nuts.

Dismantling of the various parts, can made easier by removing the smokebox. This casting is attached either side of the boiler by self tapping screws, and behind the buffer beam by short 6BA screws. The casting is then a tight fit over the boiler, and can be removed by gentle manipulation.

The reverser valve assembly



This is fixed by two screws each side, just behind the buffer beam, which also hold the cylinder port blocks. Having removed the screws, the valve can be manipulated and slid out from between the frames.



The steam and exhaust pipes are a push fit from the rear, and may be left behind. Care is needed to avoid crimping these pipes.

The valve front section includes the “regulator” lever, and is attached to the body by a long central screw with a spring and washer. On dismantling, take care to retain the washer, and the two O rings behind it. Inspecting the mating surfaces is likely to reveal semicircular marks from the movement of the valve. These marks are best removed by rubbing or lapping on the 400 w/d used wet, and laid on the glass plate. This operation will also ensure flatness of the faces. Keep lapping each part until all the marks are removed, and only the minute scratches from the w/d are left. It is advisable to do all the lapping in one direction only, and then make one stroke at 90°. Check that the scratches are at 90°, and that the last set actually cross all the others.

This will provide a key to retain a film of oil between the two moving parts. A final check is to rub the parts once across a piece of good quality writing paper. This will leave a black mark on the paper, as the carborundum particles are transferred from the brass.

Finally wash the newly lapped parts in meth spirit, to remove any grit from the brass, and steam holes.

This operation should produce a valve whose faces are truly flat, and the oil film trapped in the microscopic grooves will provide a steam tight assembly. It may be necessary to repeat the operation after testing the loco, until a satisfactory joint is achieved.

It has been suggested that the 2.5mm exhaust hole should be chamfered to 2.8mm, to ensure a free passage of exhaust. If this is to be done, it would be advisable to do it before lapping the faces as above. Do not chamfer the inlet hole.

The edges of the square valve block also need to be flat, as they mate against the side frame with no gasket. These edges should be ground as above on the w/d and glass. Care is needed to keep the block vertical, as it can easily tip at an angle, and spoil the good work. Mike Chaney has suggested counterboring the steam passages 5.1mm diameter and 0.5mm deep and fitting a M3 x1 "o" ring, this produces a steam tight joint on all flush surfaces.

Again, it has been suggested that the steam holes be enlarged. This is best done with the cylinders removed. The recommendation is to drill out the steam holes in the loco frames to 1/8”, although 3mm seems adequate. The valve block holes should be chamfered out similarly, to a depth of 2-3 mm. Again do this before lapping the side faces.

Having cleaned up the work pieces, and with the cylinders removed, offer the valve block to the frames, and fix with short 6BA screws. Check that the steam holes are in line, and adjust the frame holes if necessary with a needle file.

The exhaust pipe can be enlarged with some benefit. One way is to cut off the existing pipe, leaving a small piece protruding from the valve. A wider (5/32”) pipe can be shaped and fitted over this spigot. Alternatively, remove the whole pipe, and replace it with a pipe of the same O.D. (1/8”) but with thinner walls, and hence wider I.D. Some users advocate fitting a longer exhaust pipe to reach higher up the chimney. This can also be done with silicone tubing. The main purpose is to allow the injection of oil into the pipe, where a lubricator is not fitted. Working the loco wheels in the opposite direction to the valve setting will draw the oil down into the cylinders. The disadvantage is that it enhances the spray of oily condensate when first starting. A condensate collector can be made from a small tin or funnel soldered around a tube which just fits into the chimney. If this is used for the start of a run, it will keep things rather cleaner. If the longer exhaust pipe is not required for adding oil, it can be used to reduce the condensate spray by crimping the end, and filing an “organ slot” an inch or so below the end. This will direct the spray against the side of the chimney, from where it will dribble down into the smokebox. Ensure the "organ slot" is the same area as the internal area of the steam pipe, otherwise the resulting back pressure will reduce the loco's running.

This leads nicely to the question of exhaust regulators. These are widely used in model engines, and many people advocate their use in the Mamod. The idea is to introduce a controlled amount of back pressure, aiding speed control, steady running, and steam economy. This modification is perhaps best left until the loco is performing well, and tending to run away! Briefly, a longer pipe is fitted as above, but with its upper end level with the chimney top, and sealed with a solder plug. A second pipe an inch or so long is made to fit over the exhaust pipe, with a small disc sealing its end, and just protruding from the chimney. Both pipes then have a

matching organ slot filed, no more than half way through. Rotating the disc will open and close the slot, providing the necessary control of back pressure.

When finally reassembling the unit, it is advisable to use a thin film of gasket “blue” compound, but do not let it block the steam holes. During reassembly, care is needed to fit the steam and exhaust pipes into the O ring in the valve block. A little steam oil will help.

Another problem which has been noted is that the valve lever may come against the footplate before the port has fully opened. This may cause apparent better running in one direction or the other. It may be sufficient to bend the lever in the appropriate direction, or to remove and re-position it. Alternatively, file a notch each side of the footplate, to accommodate the lever.

The cylinder assembly

Like the reverser valve, the cylinder blocks have flat faces which move against flat faces on the port blocks. These will benefit from the above lapping operation. With the reverser valve removed, the cylinders are attached by two screws and nuts to the rear of the port block. Having removed these, the cylinder assembly can be lifted away from the side frame. In a factory loco, these screws are replaced by rivets, which need to be carefully drilled out. Removing the cylinders will probably destroy the gaskets so it is advisable to have a new set ready before starting the job. New replacement cylinder units will also benefit from this treatment.

Removing the pivot screw and spring, will reveal the two mating faces of the cylinder assembly. These will probably have the familiar arcs worn into the faces. The faces should be lapped using the same lapping process outlined for the reverser valve. It is a good idea to give the backs of the port blocks a light lapping to clean up and remove any bits of old gasket. Check also the mating surfaces of the frames, make sure they are clean and flat, as this area can become distorted during repeated dismantling and reassembly

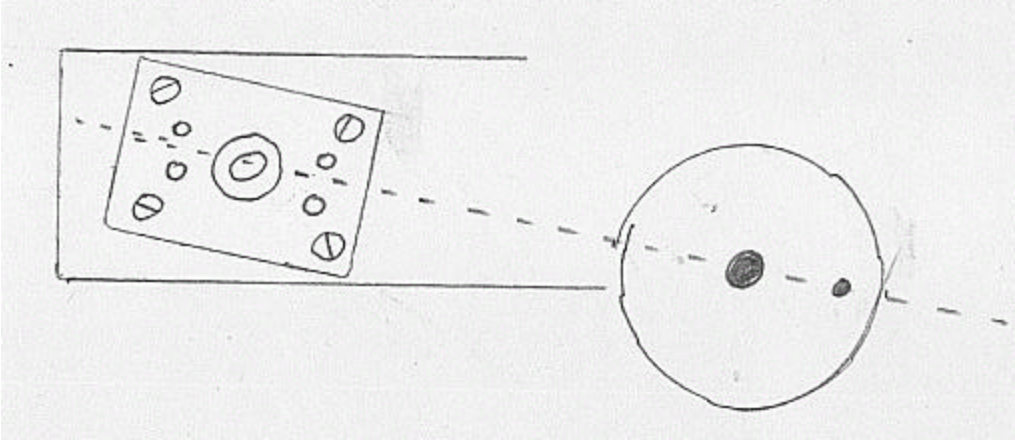
When finally cleaning up the parts, pay attention to the port holes in the cylinders, and try to remove as much deposit as possible. It is useful to inject a little steam oil into the ports, and work the pistons for a few strokes. This will eject most of the debris and oil – careful of the eyes!

If new pistons are to be fitted to the original cylinders, the end caps must be sweated off. It is possible that new pistons will be too tight a fit. In this case the pistons can be treated with Brasso on a soft cloth and rotated between the fingers. This may take some time to achieve a good fit. Finally reassemble and sweat the end caps into position.

The glands fitted to replacement parts should have a thin O ring, and the nuts need to be just nipped tight with a spanner. Over tightening will case binding and poor running. A smear of steam oil on the piston rod will help.

Before reassembling, lay the new gasket over the port block, and check that the steam holes are clear. If necessary, trim a little round the holes. A suggestion is to use the Mamod gaskets with replacement cylinders. This should not be necessary, since the steam passages are machined into the brass block, and the thick Mamod gaskets will move the cylinders outwards. However, I have done this with some success. The Mamod gasket was carefully sliced into two with a sharp craft knife, so that two gaskets were produced, giving a compromise in the cylinder position. On final reassembly, a thin smear of blue jointing compound is useful.

Alignment of the port block on the frame is an important consideration. Assemble the block to the frame with the cylinder removed, leaving a little slack in the mounting screws. Using a straight edge, manipulate the block until an imaginary centre line between the steam ports is



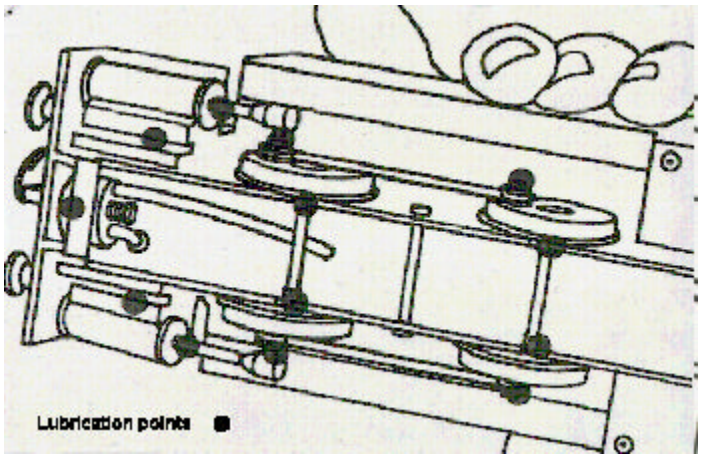
aligned with the wheel centre and crankpin.

Tighten the screws, and make a small mark against the frame and block in two places, to aid reassembly in the correct position. Remove the block , and refit the cylinder.

Before finally tightening the cylinder mounting screws, check that the pistons are able to move freely without binding on the crankpins. It may be necessary to ease the cylinder(s) toward the rear, to avoid the piston bottoming in the cylinder, and binding on the crankpin. When all is rotating freely, tighten the screws, paying attention to alignment as above.

Before operating the loco, prise the cylinders away from the port block, and inject some oil between the faces. For the first run, it may be better to use thin machine oil such as 3 in 1, to aid bedding of lapped surfaces, replacing this with steam oil for subsequent runs. This is a matter for the user to decide.

LUBRICATION



As produced, the loco has no provision for cylinder lubrication. The operator is instructed to place a smear of oil on the piston rods, wheel bearings and crankpins.

For cylinder lubrication, a displacement lubricator is available, which fits on the side of the smokebox, and can perhaps be disguised as an air pump, or sandbox. Fitting requires some dismantling, so it would seem sensible to fit this simultaneously with other items. From the smokebox, the feed pipe is led down between the frames, and the tee is push fitted into the reverser valve, in place of the normal steam pipe. The steam pipe is shortened and fitted in the rear of the tee piece. In operation, the lubricator reservoir is drained of any residue, and then filled with steam oil. Steam is supplied via the tee piece, and a little condenses, causing the oil to displace upwards, and become atomised with the steam, so reaching the cylinders. Eventually the oil is completely used, and replaced by water, which is drained out before refilling.

In the past, instructions were to use 20/50 car engine oil. While this may be suitable for the axle bearings etc., the cylinders require proper steam oil. This is formulated to withstand the high temperatures attained with steam under pressure. Some users advocate using steam oil for the bearings also, since these too become hot while running. There have been a few reports of thick steam oil causing a build-up of treacle-like deposits, even in the cylinders, leading to sluggish running. Perhaps one of the thinner steam oils would be better for the bearings. It is a good idea to clean the loco periodically, by spraying the underside liberally with WD40, brushing with an old 1/2"paint brush, and then wiping away with the proverbial oily rag.

It is advisable to prise the cylinder away from the port block, and introduce some steam oil between the faces. While running, the oil film on the cylinder port faces will gradually wear away, causing performance to deteriorate. This can be corrected by re-applying oil to these faces.

WHEELS

The cast wheels fitted to the Mamod loco are a friction fit on the shouldered steel axles. The axle ends are turned over to lock the wheels in place. This system is not perfect, and the wheels tend to work loose. This causes crankpins to lock up, and work loose, leading to knocking noises and poor running. The wheels and crankpins can be removed, cleaned and refitted with Loctite retaining fluid, but since the flanges are rather fine for garden running, the best action is to replace the wheels with steel versions. These are designed as a direct replacement, and fit in the original axle holes. A thin flat spanner will be required to tighten the retaining nuts. It has occasionally been found necessary to squeeze the frames slightly inward during this operation. It is probably wise to file a little from the frame spacer, and grind away an area of the frames around the locking nuts to reduce the thickness, as distorting the frames can lead to steam leaks around the cylinder mountings.

One minor point is the leading of the quartered cranks. The British convention is to lead with the right ie the right hand crank is forward of the left hand. One of my locos leads with the left, in continental fashion.

RUNNING AND BALANCE

Before running the loco on the track, it is useful to set it up on blocks. Two wooden blocks can be used, but a better option is to make a wooden base, and screw the blocks to each end. The appropriate length and spacing of the blocks can be judged by positioning the loco on the

blocks, making sure that the moving cylinders are not obstructed. A small piece of mirror, glued to a strip of wood so that it sits at an angle under the loco, is a valuable accessory which will give a view of the burner flames, and show any water/steam leaks. Using a block system in this way gives the user an opportunity to judge how the loco responds to its controls and other factors. It is also a useful maintenance accessory.

Some users advocate running-in first on compressed air for 20 minutes or so, avoiding the high temperatures of steam power. One way of doing this is to use a car spare tyre or foot pump connected to the safety valve bush.

Once the loco is running properly, it may be found difficult to attain fine control. A useful tip is to cover the control lever with a small piece of silicone tube, which will provide some heart insulation for the fingers, and can be painted black.

To aid fine control, a regulator kit is available, again from I.P. Fitting this unit requires removal ot the whistle, and cutting a slot in the cab front. The new regulator then fits in the whistle bush, and projects into the cab, where a handle is provided for the driver.

This regulator makes the steam dome redundant, and its steam pipe must be sealed off. The kit includes a blanking plug for this purpose. Some users prefer to solder over the pipeway under the boiler, although this can be melted if the boiler should run dry.

Assuming that the loco is now running reasonably well, it will benefit from a water fill valve. This will allow the boiler to be topped up while in steam, allowing longer runs to be achieved, and helping to avoid boiling dry. A simple device based on the Goodall design can be fitted to one of the boiler bushes. If the regulator kit has been fitted, the safety valve can be mounted on this, leaving the original safety valve bush for the filler valve. Without the regulator, the whistle, mainly cosmetic, can be removed anyway, and its place used for the safety valve. Having fitted the water filler, it is tempting to use a syringe for filling. This can lead to problems, mainly by using too large a syringe, which will require greater force to overcome the boiler pressure. This can cause the valve to leak water and steam, at least for a while after topping up. Better to use a small syringe, or a hand pump bottle. These are usually supplied with the valve, and are essentially a garden spray bottle, with a tube fitted to the outlet nozzle. These deliver a small volume of water, requiring many “squirts” to fill the boiler, but quite convenient for adding a small amount while in steam.

The ultimate control option is to use radio. Fittings kits are available for the loco, to link the reverser valve to the cab and radio servo. The servo and receiver need battery power, and require space which is at a premium on this little loco. One option is to add a tender, to carry the batteries and receiver. Several such tenders are marketed.

It will be found that the loco’s weight is concentrated at the front end, where a good deal of brass is used. This can cause the rear end to lift when starting a train cab first. Preference for running backwards is a fault of the Mamod loco, which hopefully can be corrected by following the previous steps. The original wheels are rather light, and have small flanges. All these factors may lead to frequent derailments. Replacement wheels help a great deal, but balancing is still a good idea.

The loco can be balanced by adding lead weights under the cab floor. About 160-180g is required. If the lead is cast into two blocks 80-90g each, and a suitable shape, it should be possible to add the blocks outside the frame, and disguise them as cab steps.

Before leaving the running section, the rolling stock is worthy of a brief comment. Like the loco wheels, the carriage and wagon wheelsets are die cast in an aluminium alloy, and are very light. It can be beneficial to replace these with steel versions. Suitable sized steel wheelsets are supplied by Garden Railway Specialists. These are intended for re-gauging Bachman 45mm stock to 32mm, and have extended axles, which are almost a perfect fit in the Mamod axleboxes. Catalogue reference is PG502. There may be a little friction, which can be cured by smoothing between the finger and thumb with a little 400 w/d paper. A little machine oil will help. After unscrewing the buffers, the frames can be sprung slightly apart, and the wheelsets removed and refitted.

COSMETIC IMPROVEMENTS

In the past, a great many add-on body parts were produced for this loco.
At the time of writing, these are reduced to cylinder covers, and side tank/bunker overlays.

Adding cylinder covers is a popular way to hide the moving cylinders, but these make access difficult. Lubricating the cylinder port faces can then only be done with the loco inverted. If the loco is the subject of a prolonged maintenance job, then the covers should be left to last. These covers can be made quite simply from sheet material, such as thin brass or tinplate. The I.P. covers as supplied for Jane, are attached by double sided adhesive tape. The loco surfaces need to be thoroughly cleaned before applying the covers, as the adhesive can come away as the loco heats up. The Salem covers are drilled for screw fitting, and the loco footplate needs to be drilled to suit. Fitting the nuts under the footplade/cover assembly can be a very fiddly task.

More functional than cosmetic, are replacement buffer beams, fitted with the more common centre buffer/coupler widely used in 16mm systems. Again produced by I.P., these fit in place of the Mamod side buffers. The Mamod coupler will need to be removed, and a hole drilled to take the fixing screw for the replacement unit.

OTHER VERSIONS

The Mamod locomotive has been the basis of some interesting and ingenious conversions by individual modellers, and has been the basis of “improved” locomotives produced by other manufacturers.

MSS, the spares and service division of the Mamod organisation now produce the MSS loco. This is essentially the Mamod loco under a different name.

I.P. Engineering produce their “Jane”. This is an upgraded version of the Mamod, with silver soldered boiler, O ring pistons and steel wheels. Most of the Jane parts are available to upgrade a Mamod.

PPS Steam Models produce “Jenny”. This is a hybrid of the above two products, and has the added advantage of individual hand assembly and close fitting of steam parts.

USEFUL FIRMS

Mamod Sales & Service, PO Box 17, Mortimer, Berkshire, RG7 3UF
0118 983 4182
Basic Mamod spare parts and accessories. Complete locos and rolling stock are sometimes available. Also the MSS loco.

I.P. Engineering, 46 Carisbrooke Crescent, Poole, Dorset, BH15 4LD
01202 660304 ivan@ipengineering.co.uk http://www.ipengineering.co.uk
The Jane loco, and tender, various add-ons for upgrading the Mamod, and suitably matching rolling stock kits.

PPS Steam Models, Coach House, The Cooperage, Frome, Somerset, BA11 1JX
01373 471023 pps_steam@lineone.net
Stockist of the basic Mamod range, IP Jane, and a range of add-on parts and modifications.
The PPS Jenny loco, made up from Mamod and Jane parts, individually assembled and with many of the previous modifications already carried out.

Salem Steam Models, Corner Patch, Llandeilo, Carmarthenshire, SA19 7HD
01558 822530
Formerly a major supplier of Mamod mods and spares, now a much reduced range, with tank overlays, bunker and cylinder covers.

Brandbright Ltd., The Old School, Cromer Rd., Bodham, Holt, Norfolk, NR25 6QG
01263 588755 steam@brandbright.co.uk
A major supplier of 16mm scale models, kits and parts. Stockists of the I.P. Engineering range.

Garden Railway Specialists, Station Studio, Princes Risborough, Bucks, HP7 9DT
001844 345158
Major supplier of various makes of “G” scale items. Limited range of 32mm gauge wheels etc.

Paper ‘n’ Steam Galore, 5 New Cut, Chatham, Kent ME4 6AA
01634 813650
Stockists of steam models and books. Good range of Mamod new and s/h railway items.

ACKNOWLEDGEMENTS

Credits are due to the many members of the Assocation of 16mm NG Modellers who have freely contributed help and advice over many years, through the pages of 16mm Today

Likewise the international members of the 16mm modellers e-mail group, whose advice is so readily given , and from whom the idea for this booklet originated.

Thanks also to Alan Whittaker of PPS Steam Models, for practical advice.

Peter Williams for proof-reading and suggestions.

JW Early for proof reading and files conversion.

BIBLIOGRAPHY

Much of this work has been compiled from the many articles on Mamod conversions and upgrades which have appeared in 16mm Today, the quarterly journal of the Assocation of 16mm NG Modellers. These cover a wide variety of approaches to various problems.

The issue numbers are listed below:-

17, 19, 20, 21, 22, 23, 30, 32, 33, 34, 39, 40, 45, 48, 50, 55, 59, 60, 63, 75, 78, 80, 81, 84, 86

Most back issues are readily available from:-

St Nicholas School L.S.G. 9 Regent Crescent, Redhill, Surrey, RH1 1JN