

247 H. A. S. ...



ARMY  
M.T.  
SCHOOL

PREPARED BY  
ARMY MECHANICAL  
TRANSPORT SCHOOL  
BORDON

# QUESTIONNAIRE

**MATCHLESS**

M/C. SOLO - 350 C.C. O.H.V.  
MODEL 4/G. 3.L

A.M.T.S. 60/1.

JULY 1947.



MATCHLESS H/C

VEHICLE DATA AT A GLANCE

Engine	C. C. 347 C. C.	Bore 69 m. m.	Stroke 93 m. m.	Valves O. H. V.	Tappet Clearance Inlet - NIL ) Exhaust - NIL ) Cold
Engine Lubrication	Oil Tank Capacity	Filler Cap	Drain Plugs	Oil Filters	Breather
	3 pints 50 H. D.	O/S under saddle	Base of oil tank Base of sump	Removeable element Gauze strainer	In oil tank filler cap
Fuel Supply	Petrol Tank Capacity	Carburettor	Filters	Target Figure	Air Cleaner
	3 gallons	Amal	Two gauze type	75 M. P. G.	Later Models only
Transmission	Clutch Type	Clutch Lever Clearance	Chain Tension	Primary Chain Lubrication	Gear Box Lubricant
	Multi-plate dry	1/4 inch	Primary Chain 3/8" Secondary Chain 3/8" - 1/2"	Oil Bath 50 H. D.	Grease No. 0
Brakes	Footbrake			Handbrake	
	Brake adjuster - knurled screw at rear of brake rod Foot pedal adjuster - adjusting bolt at rear of foot pedal	Brake adjuster - knurled cable adjuster on fork			
Wheels	Type	Tyre Size	Tyre Type	Pressure	
	Well base	19 - 3.25	N.P.	Front - 18 lbs per sq. in. Rear - 22 " " " "	
Electrical	Battery	Dynamo	Dynamo Chain Tension	Ammeter	
	6 volts	Voltage Control	1/4 inch	Earlier models only	
Ignition	Wiring	Magneto Chain Tension	Contact Points	Plug Points	
	Negative to frame	1/4 inch	0.012"	0.020" - 0.025"	

MATCHLESS M/C

Questionnaire 1.

Frame-Front Suspension-Brakes-Wheels

Answers to Questionnaire 1.

Frame

Frame

1. What is the least ground clearance?
2. What parts are vulnerable to damage by bellying?

1. Lower portion of frame under engine 5 3/4".
2. Cross country prop stand, and lower portion of frame.

Front Suspension

Front Suspension

1. What lubrication is necessary?
2. (a) What points require inspection?

1. (i) Steering head races.  
2 nipples. 0.600.  
Every 3,000 miles.  
(ii) Level of oil (10 H.D.) checked by workshops every 3,000 miles or when fork action shows attention to be necessary.  
(See D.M.E. B307/1).
2. (a) (i) Check play in steering head, adjust if necessary.  
(ii) Examine for loose, bent and broken parts.  
(iii) Check handlebars for security and straightness.  
(iv) Test for security, screwed tubular front fork slider extensions. (Test after (i) above).

(b) How often?

(b) Weekly Task.

Brakes

Brakes

1. What brakes are fitted?

1. (i) Footbrake operating on rear wheel.  
(ii) Handbrake operating on front wheel.

Questionnaire 1 (contd.)Frame-Front Suspension-Brakes-WheelsBrakes (contd.)

2. How are brakes adjusted?

- Answers to Questionnaire 1 (contd.)
- Brakes (contd.)
2. (i) Foot brake has two adjustments. One to allow the pedal to be adjusted in the most convenient position for the rider. The other to allow for lining wear. Adjustable on the brake rod.
- (ii) Hand brake has a screwed adjuster and lock nut fitted in the fork end.
- NOTE: In addition there is also a special fitting on one end of each brake shoe for further adjustment BY UNIT MECHANIC.

3. What lubrication is necessary?

3. (i) Brake pedal spindle. 1 nipple. C-500. Every 3,000 miles.
- (ii) Front and rear brake cans. 2 nipples. Grease G.S. No.2. Every 1,000 miles.
- (iii) Cables and controls. Oilcan 50 H.D. Weekly task.

Wheels

1. What is the correct tyre pressure? Important. For severe cross country work pressure in tyre on driving wheel may be reduced by one third.

1. Tyre Size 3.25 x 19.  
Pressure in lbs. per sq. inch.
- |       |    |      |    |
|-------|----|------|----|
| Front | 18 | Rear | 22 |
|-------|----|------|----|
- Type N.P.
- Note. Tyre pressures are taken from E.M.E.R. - Vehicles General 0.766 issue 2. d. 4.7.46.

2. What tyre maintenance is required?

2. (i) Check pressures and inflate to correct pressure if necessary. Daily.
- Note: Pressures will be checked when tyres are cold, if pressures have fallen by more than 10%, report.
- (ii) All flints, stones, etc., will be removed. Daily.
- (iii) Ensure valve dust caps are in position at all times.

Questionnaire 1. (contd.)Frame-Front Suspension-Brakes-WheelsWheels (contd.)

2. What tyre maintenance is required? (contd.)

- Answers to questionnaire 1. (contd.)
- Wheels (contd.)
2. (iv) To even up wear, change position of tyres so that they will revolve in the opposite direction. Every 2,000 miles.
- (v) If there are any signs of rust on wheel rims when tyres are removed, scrape rims thoroughly and paint with:- Preservative Paint V.A.O.S. L.V. 6/M.T. 1. Part No. 46826.
- (vi) Any irregular wear of tyres should be reported immediately. For further instructions on the care of tyres see A.C.I.'s 1353/44, 1354/44 and 1355/44.

3. How are the wheels removed?

3. (a) To remove rear wheel.
- (i) Disconnect tail lamp.
- (ii) Slacken the two nuts which secure the rear portion of mudguard, slacken off the nuts securing mudguards stays, remove nuts and bolt securing tool box stay, lift rear portion of mudguard clear.
- (iii) Disconnect rear chain. (Don't remove).
- (iv) Disconnect speedometer drive at the wheel end.
- (v) Remove knurled adjusting nut and spring from foot-brake adjusting rod.
- (vi) Slacken the wheel axle and nuts.
- (vii) The wheel can now be withdrawn to the rear, giving a slight twist sideways to clear brake cover plate anchorage.
- (viii) To replace rear wheel, reverse above procedure taking care to replace spring clip of chain with closed end facing direction of rotation of chain.

Questionnaire 1. (contd.)Frame-Front Suspension-Brakes-WheelsWheels (contd.)

3. How are the wheels removed?  
(contd.)

3. (b) To remove front wheel,  
(i) Place machine on rear stand,  
(ii) Lift front of machine clear of ground, and place on front stand.  
(iii) Remove the pin retaining the front brake cable.  
(iv) Release the cover plate anchor nut.  
(v) Slacken off wheel spindle end nut.  
(vi) Remove the four wheel spindle clamp nuts, when the wheel with clamps will fall out of position.  
(vii) To replace, reverse above procedure, taking care to tighten spindle end nut before spindle clamping cap nuts.

4. (a) What inspection is required?

4. (a) (i) Ensure that wheels spin freely when the brakes are released.  
(ii) Examine for flats in wheel rims.  
(iii) Check wheel alignment.  
(iv) Check play in wheel bearings, and report if excessive to Unit Mechanic.  
(v) Examine for broken and loose spokes.  
(vi) Check sleeve nuts and wheel spindles. (Daily).

(b) How often?

(b) Weekly Task.

5. How are the hubs adjusted?

5. Adjustment of hubs to be carried out by Unit Mechanic.  
Front Hub.  
(i) Remove wheel as in 3(b).

Questionnaire 1. (contd.)Frame-Front Suspension-Brakes-WheelsWheels (contd.)

5. How are the hubs adjusted?  
(contd.)

5. (ii) Release bearing lock ring, screw up adjusting ring until all slack has been taken up, then slacken adjusting ring exactly 1/2 turn. Retighten lock ring.  
(iii) Replace front stand.  
Rear Hub.  
(i) Remove wheel as in 3 (a).  
(ii) Release bearing lock ring, screw up adjusting ring until all slack has been taken up, then slacken adjusting ring exactly 1/2 turn. Re-tighten lock ring.  
(iii) Re-fit wheel.

6. How are the hubs lubricated?

6. Front and rear hubs, 1 nipple each. Packed with Grease G.S. No.2 with wheels removed. Every 1,000 miles or more often if water and mud is negotiated frequently.

7. How is the speedometer gearbox lubricated?

7. 1 nipple. Grease G.S. No.2. Weekly Task.



Questionnaire 2.TransmissionClutch

1. What type of clutch is fitted?
2. What is the drive from main shaft to clutch?
3. (a) How is the Primary chain adjusted and what is the correct adjustment?

Answers to Questionnaire 2.Clutch

1. Multi-plate dry with four coil springs.
2. Chain drive (Primary chain),  
NOTE: Mainshaft has spring loaded shock absorber between itself and engine sprocket, thence Primary chain to clutch.

3. (a) To adjust Primary chain.  
(i) Slacken the top and bottom gearbox securing nuts.  
(ii) An adjuster is fitted, which is anchored to the frame, and screws into the gearbox top bolt.  
(iii) Adjust chain to  $3/8$ " up and down play midway between the two sprockets at the tightest spot, making final adjustment one of slackening chain.  
(iv) Re-adjust secondary chain, and check footbrake.
- (b) Weekly Task. Adjusted under supervision of Unit Mechanic.

4. (a) What lubrication is provided for primary drive?
- (b) What is the correct level when checked?
- (c) When changed?

4. (a) Primary chain case acts as an oil bath.
- (b) Level should be up to the level of inspection cover, 50 H.D. Weekly Task.
- (c) Drained by removing outer portion of chain case and replenished with fresh oil when water is present.

5. How may oil get on to clutch?

5. (i) Level of oil too high in primary chain case. (Chiefly due to water).
- (ii) Worn engine main bearing.

Questionnaire 2. (contd.)TransmissionClutch (contd.)

6. (a) What maintenance and adjustment is required to clutch control?

6. (a) (i) Inspect cable for correct adjustment, should be  $1/4$ " approx. free movement at control lever. (Adjuster provided).
- (ii) Lubricate cable and control lever pivot. Oilcan 50 H.D.

- (b) How often?

(b) Weekly Task.

Gearbox

1. What type of gearbox is fitted?

1. Four speed, constant mesh progressive type, fitted with positive foot change.

2. (a) What lubricant is used?
- (b) What capacity?
- (c) How and when changed?

2. (a) Grease No.0
- (b) 1  $3/4$  pints.
- (c) Changed when warm by removing drain plug in base. Every 5,000 miles.

- (d) What is the correct level?

- (d) Remove cap on kickstarter case and insert dipstick (made locally). Level should be  $2\frac{1}{2}$ " up dipstick.

- (e) When is the level checked?

(e) Weekly Task.

3. Where may leaks occur?

3. (i) Mainshaft from gearbox.
- (ii) Gearbox end cover and kick start case joint.
- (iii) Filling hole plug.

4. What is the drive from gearbox to rear wheel?

4. Chain drive. (Secondary chain).

5. (a) How is the Secondary Chain adjusted and what is the correct adjustment?

5. (a) To adjust Secondary Chain  
(i) Slacken off the two hub spindle nuts, slacken adjuster lock nuts. Turn adjusters an equal number of turns to keep wheels in alignment.

Questionnaire 2, (contd.)TransmissionGearbox (contd.)

5. (a) How is the Secondary Chain adjusted and what is the correct adjustment? (contd.)

(b) When checked?

(c) What lubrication is required?

(d) Any other maintenance?

6. What further check must be carried out after adjustment of chains?

Answers to Questionnaire 2. (contd.)Gearbox (contd.)

5. (ii) correct tension is  $3/8"$  to  $1/2"$  up and down movement at tightest point midway between sprockets, final adjustment should be one of slackening chain.  
(iii) Check wheel alignment by taking measurement.  
(iv) Re-adjust footbrake.

(b) Weekly Task.

(c) Oilcan 50 H.D. Weekly Task.

(d) Examine chain sprockets for wear, alignment and broken teeth.  
Weekly Task.

6. (i) Check alignment of front and rear wheel with a piece of string or lath with straight edge.  
(ii) Check adjustment of rear brake.

Questionnaire 3.Eng. line

1. What is the type of valve gear and valves?

2. How are the valves operated?

3. (a) What is the correct valve clearance?

(b) When checked?

4. How is the valve gear lubricated?

5. What type of cooling system?

6. What are the precautions necessary with air cooled engines?

7. (a) What gas joints may leak?  
(b) What would be the cause of each?

(c) What would be the effect of each?

(d) How would you detect each?  
(e) How can each be remedied?

Answers to Questionnaire 3.

1. O.H.V. Poppet type.

2. By means of cam pinions, tappets, push rods and rocker gear.

3. (a) Inlet Nil Adjust when cold.  
Exhaust Nil Mechanic's job.

(b) Under supervision of unit mechanic. Weekly Task.

4. (a) Cam pinions and tappets by oil bath formed in timing case.

(b) Rocker gear and valves by pressure, excess oil to valve guides, passing down push rods, via tappet guides and timing gear back to sump.

5. Air cooled. Fins cast with cylinder.

6. (i) Engine should not be run for more than five minutes with machine stationary.

(ii) Fins should not be choked with dirt, mud etc.

(iii) Fins should not be cracked or broken.

7. For answers see pages 12 and 13.

## Answers to Questionnaire 3. - 7.

Joint	Cause	Effect	Detection	Remedy
Cylinder head joint.	1. Loose nuts. 2. Blown gasket.	Loss of compression.	Observation for bubbles of oil round joint. Test for compression, Test nuts with spanner.	1. Tighten nuts correctly. 2. Renew gasket, (Mechanic's job).
Sparking plug joint.	1. Fitted too loosely. 2. Inefficient washer. 3. Inefficient internal gas seal or internal washer missing.	Loss of compression. Poor running.	Observation for bubble of oil round base of plug. Listen for hisses. Test with spanner.	1. Tighten plug. 2. Renew washer. 3. Tighten plug securing ring or renew plug.
Piston rings	1. Worn bore. 2. Damaged or inefficient rings. 3. Rings stuck in groove.	Loss of compression. Loss of power. Oiling up of plug. High oil consumption. Crankcase dilution.	Test for compression. Frequent topping up. Blue smoke from exhaust. Note condition of oil and smell of petrol in oil.	1. Rebore.) 2. Renew. ) W/shops. 3. Free ) rings. )
Valves.	1. Incorrect tappet adjustment. 2. Poor fitting of valves on seatings due to:- (a) Fitting. (b) Wear. (c) Incorrect grinding. (d) Incorrectly adjusted exhaust valve lifter.	Loss of compression. Loss of power.	Check tappets. Test for compression. Erratic running of engine. Excessive noise and explosions in the silencer or in the carburettor.	1. Adjust tappets. (Mechanic's job). 2. Remove cylinder head and inspect valves. Re-grind or renew as necessary W/shops. (d) Re-adjust valve lifter.

3. (a) Internal valve spring broken. (b) External valve spring broken. 4. Bent valve. 5. Valve sticking in guide.	Loss of compression. Loss of power.	Inspection.	3. (a) Renew. (Mechanic's job). (b) Renew. (Mechanic's job) 4. Renew. (Mechanic's job). 5. Renew. (Mechanic's job).
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Questionnaire 4.Engine Lubrication.

1. What oil is used and what capacity? Where and what is the air vent?

2. How often is the oil:-  
(a) Checked?

(b) Changed?

3. What precautions in:-  
(a) Topping up?

(b) Changing?

Answers to Questionnaire 4.

1. 50 H.D. 3 pints.  
In filler cap to prevent vacuum forming in oil tank.

2. (a) Oil level in tank checked daily by visual inspection before starting engine and again with engine stopped after running for 5 minutes.

(b) New or overhauled engines, oil will be changed after 250 miles, again after a further 1,000 miles, and subsequently every 2,000 miles.  
A.C.I. 2590/41.

3. (a) Topping up.

- (i) Motor cycle on level ground.
- (ii) Use clean oil and wipe top of can.
- (iii) Use a clean filter funnel.
- (iv) Top up to bottom of elbow on oil tank. Avoid spilling. (Do not overfill).

(b) Changing.

- (i) Ensure correct quantity and grade of oil is available.
- (ii) Engine must be hot.
- (iii) Remove drain plugs from engine sump and oil tank. Do not lose washer.
- (iv) Disconnect oil return pipe.
- (v) Replace drain plugs and reconnect oil return pipe when system is drained.
- (vi) Clean filters.
- (vii) Preserve old oil for salvage.
- (viii) Refill oil tank to bottom of filler elbow. (Precautions as for topping up).
- (ix) Start engine and check oil circulation in oil tank.

Questionnaire 4. (contd.)Engine Lubrication

4. (a) Where is the oil filter?

(b) When cleaned?

5. What type of oil gauge and where situated?

6. What may cause drop in oil pressure?

7. (a) Where may oil leaks be found?  
(b) What would be the cause of each?  
(c) What would be the effect of each?

(d) How would you detect each?  
(e) How may each be remedied?

Answers to Questionnaire 4. (contd.)

4. (a) Two filters in system. One felt type situated in the centre of the oil tank. Oil flow from sump to tank passes through this filter. One gauze filter over end of delivery pipe.

(b) Removed and cleaned when oil is changed every 2,000 miles. (Return pipe should be disconnected in order to drain filter reservoir).

5. No indicator fitted. Circulation checked by inspection, remove filler cap on oil tank, oil should be seen running from small spout just inside the filler cap.

6. (i) Defective pump.

(ii) Lack of oil.

(iii) Thinness of oil.

(iv) Break in the oil pressure system.

7. Answer see pages 16 and 17.

## Answers to Questionnaire 4. - 7.

Oil Leak	Cause	Effect	Detection	Remedy
Sump/ crankcase joint	1. Loose bolts. 2. Cross threaded.	Loss of oil with engine running.	Observe leaks.	1. Tighten bolts. 2. Workshops.
Cylinder base joint	2. Loose nuts 2. Faulty washer. 3. Cross threaded.	Loss of oil with engine running.	Observe leaks.	1. Tighten nuts. 2. Renew washer. (Mechanic's job). 3. Workshops.
Timing case joint.	1. Loose screws. 2. Faulty washer. 3. Cross threaded.	Loss of oil with engine running.	Observe leaks.	1. Tighten 2. Renew washer. 3. Workshops.
Rocker box cover joint, and tappet inspection cover.	1. Loose bolts. 2. Faulty washers. 3. Cross threaded.	Loss of oil with engine running.	Observe leaks.	1. Tighten bolts. 2. Renew washer. (Mechanic's job). 3. Workshops.
Oil pipes and unions between tank and sump. Oil feed pipe and unions to rocker box and valves.	1. Defective unions or nipples. 2. Loose union nuts. 3. Cross threaded.	Loss of oil.	Observe oil leaking, from pipes and unions.	1. Renew unions. 2. Tighten nuts. 3. Workshops.
Drain plugs.	1. Loose plugs. 2. Faulty washer. 3. Cross threaded.	Loss of oil.	Observe leak and note level in tank.	1. Tighten plug. 2. Renew washer. 3. Workshops.
Driving side main bearing.	Worn bearing.	Loss of oil with engine running.	Observe oil level building up in Primary Chaincase.	Workshops.
Plug securing filter in oil tank.	1. Loose. 2. Faulty washer. 3. Cross threaded.	Loss of oil with engine running.	Observe leaks.	1. Tighten plug. 2. Renew washer. 3. Workshops.
Push rod guard tubes.	Faulty washers.	Loss of oil with engine running.	Observe leaks.	Renew washers. (Workshops).

## Questionnaire 5. (contd.)

## Fuel Supply

9. (b) What may cause a rich mixture?

## Answers to Questionnaire 5. (contd.)

9. (b) (i) Air lever closed.  
(ii) Main jet detached from jet holder.  
(iii) Air control wire or nipple broken.  
(iv) Portion of rider's clothing fouling air intake.  
(v) Enlarged main jet.  
(vi) Enlarged needle jet.  
(vii) Worn taper needle.

10. What may cause fuel starvation?

10. (i) Choked petrol tap filters.  
(ii) Choked pipes.  
(iii) Water in carburettor.  
(iv) Choked jet.  
(v) Vent hole in tank filler cap, stopped up.  
(vi) Leak in joint, carburettor induction pipe.  
(vii) Damaged washers on petrol tap slide.  
(viii) Vent hole in float chamber cap blocked.  
(ix) Taper needle detached from throttle slide, blocking main jet.

11. How is the float chamber removed?

11. (i) Turn the tap off.  
(ii) Disconnect union connecting petrol feed pipe to tank.  
(iii) Disconnect jet plug from base of carburettor and remove float chamber complete, taking care not to lose fibre washers.

12. What precautions are necessary when replacing float?

12. Clip securing float needle must be at top and must engage in third groove from top of needle.

13. (a) What adjustments are provided for slow running?

13. (a) (i) Slow running adjusting screw.  
(ii) Throttle stop screw.

- (b) Are they a driver's job?

- (b) No.

## Questionnaire 5.

## Fuel Supply

1. What is the capacity of the tank and where is the air vent?

## Answers to Questionnaire 5.

1. (a) 3 gallons approx.  
(b) Air vent in filler cap.
2. 75 H.P.G. "Target" figure.  
Note: The "Target" figure is taken from E.M.E.R. General N.342 15.2.46.

3. What filling precautions?

3. (i) Motor cycle on level ground.  
(ii) Stop engine.  
(iii) Strictest attention will be paid to prevent wastage of petrol especially by over-filling of the tank.  
(See A.C.I. 791/41).  
(iv) See that filler cap is secured correctly.  
(v) If filling by can, use a filter funnel.

4. What taps are fitted?

4. One main tap. Push and pull type N/S.

5. What filters are provided?

5. Two cylindrical gauze filters. One attached to the tap, the other connected to the swivel union adapter, O/S of tank, which is connected to the main tap by a branch pipe.

6. Trace out the fuel supply system.

6. Trace on motorcycle.

7. What is the quickest way to find out if petrol is reaching carburettor?

7. Flood carburettor by means of tickler.

8. How is the main jet removed?

8. Remove jet plus situated beneath spraying chamber of carburettor. Jet holder not to be removed. Care must be taken that pick up assembly is not damaged during this operation.

9. (a) What may cause flooding?

- 9 (a) (i) Bent needle or dirt under needle valve.  
(ii) Worn or pitted valve or seat.  
(iii) Float securing clip not engaged in groove on needle.  
(iv) Float punctured.  
(v) Tickler struck down.  
(vi) No washer or incorrect washer between float chamber and spraying chamber.



Questionnaire 6. (contd.)

Electrical Equipment

Dynamo (contd.)

4. Where are the cut-out and controller mounted?

5. What lubrication is required? How often? What lubricant?

6. (a) Any other maintenance? (b) How often?

Lighting

1. What precautions are necessary to the wiring?

Answers to Questionnaire 6. (contd.)

Dynamo (contd.)

4. Cut-out and controller mounted as one unit. Bolted to brackets and secured to frame under saddle, on models fitted with Lucas equipment. Those fitted with Miller equipment have cut-out incorporated in dynamo end, and controller only mounted under saddle.

5. (i) Dynamo bearings are packed with Grease H.M.P. No.3 and repacked on overhaul.  
(ii) Dynamo drive chain enclosed in the primary chain case and lubricated by splash from the primary chain.

6. (a) Check security of:-

- (i) Dynamo.
  - (ii) Commutator cover plates.
  - (iii) Cut out (and controller on Lucas dynamos).
  - (iv) Dynamo leads.
  - (v) Check tension of dynamo drive chain, should have 1/4" up and down movement at tightest spot. Any adjustment Mechanic's job.
- (b) Weekly Task.

Lighting

- 1. (i) All connections tight.
- (ii) All leads free and not rubbing frame especially leads from headlamp.
- (iii) Ensure leads are not pinched by petrol tank or any moving part.
- (iv) Tail lamp for security.
- (v) Horn bracket and leads for security.

Questionnaire 6.

Electrical Equipment

Battery

1. (a) Where is the battery situated? (b) How secured?

2. (a) What is the battery voltage? (b) What type?

3. (a) Which terminal is framed? (b) Where?

4. (a) What maintenance does the battery require?

(b) How often?

Dynamo

1. (a) Where is the dynamo situated? (b) How driven?

2. What type of control is fitted?

3. (a) What is the normal charging rate? (b) What test can be applied?

Answers to Questionnaire 6.

Battery

1. (a) N/S of frame under saddle. (b) Carrier attached to frame, battery secured by clip.

2. (a) 6 volt. (b) Lead acid.

3. (a) Negative to frame. (b) Under saddle.

4. (a) (i) Level of electrolyte to be 1/4" above the plates.  
(ii) Terminals to be clean and tight, and smeared with lanoline or vaseline. If unobtainable, terminals to be left clean and dry.  
(iii) Battery to be clean and dry.  
(iv) Vent holes to be clear, washers in place and plugs tight.  
(v) Battery to be secure in its housing.  
(vi) Earth connection to be secure.  
(vii) Examine for leaks.

(b) Weekly Task.

Dynamo

1. (a) Under magneto platform. Housed in the frame and secured by a strap.  
(b) By chain from the engine main shaft.

2. Constant voltage control.

3. (a) Varies according to condition of battery. If ammeter shows high discharge, disconnect and insulate the positive lead of battery.  
(b) Road speed 25 M.P.H. in top gear, all lights on. Ammeter should show 1/2 to 1 amp. charge.

Questionnaire 7. (contd.)Ignition

6. What precautions should be taken when driving through water?

Answers to Questionnaire 7. (contd.)

6. (i) Ensure contact breaker cover is a tight fit, and grease the joint.  
 (ii) Block vent hole in contact breaker cover with grease, this grease will be removed after water is satisfactorily negotiated.  
 (iii) Drive as slowly as possible to prevent splash.  
 (iv) Keep engine revs high and slip clutch when exhaust pipe is beneath surface of water.

7. (a) What lubrication is required to the ignition system?

7. (a) (i) Contact breaker cam felt wick. A few drops of 50 H.D. Every 5,000 miles.

(ii) Bowden cable. Oilcan (Mechanic's job).  
 50 H.D. Weekly Task.

(b) Any other maintenance query?

- (b) (i) Check contact breaker points for correct gap. Any adjustments to be carried out under supervision of Unit Mechanic. Weekly Task.  
 (ii) Remove and inspect sparking plug. Clean and adjust if necessary. Weekly task.  
 (iii) Inspect H.T. lead for shorts, cracks and rubbed portions. Weekly task.  
 (iv) Check security of magneto on its platform. Weekly task.

Questionnaire 7.Ignition

1. What type of ignition fitted?

Answers to Questionnaire 7.

1. Magneto.

2. (a) How is the magneto driven?

2. (a) By chain from the valve timing gear.

(b) What is the correct chain tension?

(b) 1/4" up and down movement at tightest spot.

(c) When checked?

(c) Not checked. Adjusted after magneto overhaul or when chain slackness is suspected.

(d) How adjusted?

(d) Slacken magneto platform bolts (2) and lever up front of platform until correct tension is obtained. Retighten platform bolts. (Mechanic's job).

(e) How lubricated?

(e) Chain case packed with Grease G.S. No. 2 on assembly. A small quantity of Grease G.S. No. 2 should be injected through the nipple on the chain case cover every 1,000 miles.

3. What is the correct gap for:-

(a) Contact breaker points?

3. (a) 0.010" - 0.012"

(b) Plug points?

(b) 0.20" - 0.25"

4. (a) How is advance and retard operated?

4. (a) Manually by Bowden cable control.

(b) What is the correct adjustment?

(b) Positive.

5. (a) Where are H.T. shorts likely?

5. (a) (i) Plug insulation, dirty H.T. lead, perished rubber insulation or wet lead.

(ii) Loose suppressor or wet suppressor.

(iii) Badly connected, wet or loose immobiliser.

(iv) H.T. Pick-up cracked.

(v) Cracked, dirty or wet collector ring.

(b) How may they be detected?

(b) Detected by seeing or hearing sparks, or by weak or intermittent spark at plug.

FIRE PRECAUTIONS

- (1) Stop the engine when filling with petrol.
- (2) Do not allow smoking or any naked lights within 20 feet of the machine.
- (3) Keep the fire extinguisher (if fitted) full, in working order, and fitting correctly in its bracket.
- (4) See that there are no petrol leaks before garaging the machine.
- (5) Do not use water to put out a petrol fire.
- (6) If carburettor catches fire, turn off petrol and start machine.

MONTHLY INSPECTIONPREPARATION

When a vehicle is detailed for a monthly inspection the Driver will prepare it in the following manner:-

- (1) A thorough cleaning of all parts of the machine.
- (2) Equipment and tools laid out for inspection in the same order as shown in the vehicle outfit list.
- (3) Battery vent plugs removed.

The Driver should then stand by his machine in readiness to co-operate in the inspection.

RUNNING FAULTS AND GENERAL HINTS

1. If clutch cable or withdrawal mechanism becomes unserviceable, the machine may be driven home by using the exhaust valve lifter to effect a "Push Start" and then using the valve lifter when changing gear.
2. If throttle control cable breaks, machine may be reworked still rideable by:-
  - (i) Removing outer casing of Bowden cable, forming a loop in the inner cable and operating throttle by finger in loop.
  - (ii) Set engine speed as fast as possible on throttle stop.
  - (iii) Remove mixing chamber cap, air slide from its cable, and broken cable from throttle slide, and substitute the air slide control cable. Replace mixing chamber cap, leaving the air slide out. The air lever on the handlebars now acts as throttle control. (Mechanic's job).
3. Damaged non-pressure petrol and oil pipes may be repaired by connecting the damaged ends together with a piece of metal or rubber tube and insulating tape.
4. Remember the front brake is intended to be used, and may be used under almost any conditions, but when applying keep the front wheel straight and apply in accordance with prevailing road or surface conditions.
5. DO NOT stamp on the gear change pedal.
6. Keep the air vent in the fuel tank clear.
7. Correct tyre pressures are essential. (See E.M.E.R. Vehicles General O 766).
8. Never leave that "loose nut" to be "tightened" at some other time.

HANDING OVER AND TAKING OVER A VEHICLE

When a machine is handed over to a new Driver, the following procedure will be carried out:-

- (1) The tools and equipment will be laid out in front of the machine in the same order as shown in the A.B. 412H.
- (2) The Driver handing over, the Driver taking over and an Officer will be present, together with A.B. 412H.
- (3) The tools and equipment will be checked against the A.B. 412H, and any deficiencies noted and the necessary action taken.
- (4) The fuel tank level will be measured and checked against the current Work Ticket.
- (5) The new Driver will be shown the situation of periodical maintenance of the machine, and will be told which task was last carried out.
- (6) He will also be shown the A.B. 406 of the machine, his attention being called to any points that are being watched.
- (7) The new Driver will sign for the machine and its tools and equipment, less any items that have been noted as deficient.
- (8) Should circumstances be such that a Driver is called on to take over a machine and its tools and equipment without proper check and without having signed for it, it is his duty to report for checking at the first opportunity.
- (9) Change of Drivers will be recorded in the appropriate page of the A.B. 412H.



SOME NOTES ON THE EMPLOYMENT OF A.B. 406 FOR THE SEMI-TECHNICAL FOUR

WEEKLY INSPECTION OF A MOTORCYCLE BY REGIMENTAL OFFICERS

General

1. The following remarks are intended as a guide to the inspection procedure for a motorcycle. For further details reference should be made to the Manual of the machine.
2. When reporting a defect, the APPARENT FAULT should be recorded and NOT the remedy. The maintenance staff will see to the latter and if necessary refer to the S.M.E. It is important to state whether the defect is on the N/S or O/S, otherwise time is lost by the Mechanic in locating the defect.
3. The following classifications are employed when a defect is recorded: -  
 "S" denotes - Serviceable.  
 "O" denotes - To be kept under observation.  
 "A" denotes - Action by driver or crew.  
 "B" denotes - Requires a First Echelon repair.  
 "C" denotes - Requires a Second, Third or Fourth Echelon repair.
4. If possible a Mechanic should be in attendance during the inspection and carry out the following: -  
 (a) Check engine compression.  
 (b) Inspect points (clean and adjust if necessary).  
 (c) Magneto and Dynamo lubrication if necessary.  
 (d) Any other immediate adjustments found necessary.
5. The sequence of inspection should follow the order laid down in the A.B. 406.

INSPECTION PROCEDURE

ENGINE

1. Slump.

The odometer reading is obtained from the speedometer. The A.B. 412M will give the necessary information as to the last oil changes. When the slump and gear-box are next to be drained is governed by A.C.I. 2590/1941. (See Questionnaire 4.)

ENGINE (contd.)

ENGINE

- (a) Inspect for oil leaks. Oil leaks may be found at: -  
 (i) External pipes and connections. Rubbing and kinks.  
 (ii) Oil tank and drain plug.  
 (iii) Crankcase joint and drain plug.  
 (iv) Timing case and valve cover plate.  
 (v) Cylinder base joint.

TE: Pressure leaks can only be seen with the engine running. Inspect: -

- (b) Oil tank for security.
- (c) Oil level in tank.
- (d) Note condition of oil - metal fragments - dilution (feel and smell).
- (e) Silencer and exhaust pipe for "S".
- (f) Cylinder head for gas-tight joint.
- (g) Start engine and listen for knocks, note if engine is firing unevenly.
- (h) Examine exhaust smoke for correct mixture or excessive oil.
- (i) Test compression.
- (j) Engine mounting for security in frame.
- (k) Test exhaust lift for operation, and cable for frayed strands.

Cooling System

Inspect fins on cylinder for cracks or choked with dirt.

Fuel System

Inspect: -

- (a) Petrol tank for leaks, damage and security.
- (b) Serviceability of tank filler cap and vent hole clear.
- (c) Taps and unions for leaks.
- (d) Rubbing or kinked pipes.
- (e) Flooding of carburettor.
- (f) Operation of controls.
- (g) Cables for adjustment and frayed strands.
- (h) Start engine and check slow running.
- (i) Carburettor for security and damage.

1. Governor System(s)

Not applicable.

5. Ignition System

Inspect: -

- (a) Magneto mounting for security.
- (b) Examine chain for correct tension, lubrication and "S".
- (c) Condition of H.T. lead, sparking plug, suppressor and immobiliser connections.
- (d) General exterior condition of plug.
- (e) Sparking plug for tightness.
- (f) Operation of ignition control and cable for frayed strands.
- (g) Contact breaker for correct operation.
- (h) Contact breaker cover for security, damage and vent hole clear.

TRANSMISSION (contd.)

13. Power Take-off  
Not applicable.
14. Footbrake  
(a) Inspect brake for correct operation and adjustment.  
(b) Ensure brake is not binding when wheel is revolved.
15. Handbrake  
(a) Inspect brake for correct operation and adjustment.  
(b) Ensure brake is not binding when wheel is revolved.  
(c) Examine brake cable for operation and frayed strands, etc.
16. Shafts and Joints. Torque-reaction linkage, etc.  
This space can be used for Primary and Secondary Chains.  
Inspect:—  
(a) Primary and Secondary Chains for correct adjustment.  
(b) For worn or stretched chains.  
(c) Lubrication of chains.  
(d) Worn or damaged sprockets.  
(e) Correct alignment of sprockets.  
(f) For leaks in primary chain case.  
(g) Level of oil in primary chain case.

REAR AXLE

17. Axles and Hubs.  
This space can be used for rear wheel hub.  
As for front hub. (7).

18. Road Wheels.

- (a) Inspect alignment of wheels.  
(b) Inspect for buckled or distorted wheel rim.  
(c) Inspect for broken, bent or loose spokes.  
(d) Inspect tyre security bolt for tightness.

19. Tyres

As for front tyre. (10).

20. Chassis Frame

This space can be used for frame.

Inspect:—

- (a) Frame for distortion. (Does the frame look twisted, or is the steering difficult).  
(b) Frame for cracked members.  
(c) Bolted, welded or brazed assembly joints for security.

FRONT AXLE

7. Axle, Stub Axles and Hubs.  
This space can be used for front wheel hub.  
Inspect:—  
(a) Hub spindle bearings for rock and play.  
(b) Security of spindle nuts.  
(c) Speedometer drive and cable for security and "S"
8. Steering  
(a) Place box or block of wood under engine, thus holding front wheel off the ground and inspect steering head for up and down play, by attempting to lift the front wheel.  
Inspect:—  
(a) For loose, bent or broken parts.  
(b) Handlebars for security and straightness.  
(c) Forks for freedom of action.  
(d) General lubrication of steering head.
9. Road Wheels  
(a) Inspect for buckled or distorted wheel rim  
(b) Inspect for broken, bent or loose spokes.
10. Tyres  
(a) Inspect the tyre for general wear.  
(b) Test pressure noting condition of valve, valve cap, etc. State condition of tyre.  
(c) Inspect for bad cuts, flints, nails, etc.  
(d) Ensure that any new tyre fitted, and change of tyre position, are recorded in A.B. 4121 in accordance with A.C.I. 1354/L4.

TRANSMISSION11. Clutch

- (a) Ensure that there is the requisite free movement of clutch lever.  
(b) Inspect cable for correct operation, frayed strands, etc.  
(c) Inspect operation of clutch lever, and ensure clutch return springs are returning the lever to normal position.  
(d) Inspect for clutch slip or drag.

12. Gearbox

Inspect:—

- (a) Level and condition of lubricant in the gearbox.  
(b) Casing and cover plate for cracks and leaks.  
(c) Drain and level plugs for leaks and tightness.  
(d) Correct operation and security of foot change mechanism.  
(e) Correct operation of the kick-starter.  
(f) Security of gearbox to frame.  
(g) For lift in gearbox shaft.

21. Road Springs and "U" Bolts.  
Not applicable.

22. Body.

Inspect:-

- (a) Mudguards for security and "S".
- (b) Saddle for security and "S".
- (c) Stands and tool boxes for security and "S".
- (d) Horn bracket for "S".

23. Cab and Superstructure.  
Not applicable.

24. Condition of Tools and Equipment

Inspect the tools for "S" and cleanliness. They should be laid out in the order of the vehicle tool list and checked.

25. Tyre-pump, Airline and Filter.  
Inspect tyre pump and connection for "S".

26. Electrical Equipment.

(a) Start at the battery and work forwards. Inspect:-

- (i) Level of electrolyte.
  - (ii) Cleanliness of exterior - dust - mud - corrosion.
  - (iii) Lanoline (if not available, vaseline) on terminals, lugs, etc.
  - (iv) Leaks.
  - (v) Security in housing.
  - (vi) Vent holes clear, washers in place and plugs tight.
  - (vii) All connections clean and secure.
  - (viii) Test battery under load.
- (b) Test electrical equipment for correct operation.
- (c) Inspect dynamo for security.
- (d) Headlamp for security and "S".
- (e) Cut-out and controller mounting for security.

27. Lubrication.

Report upon the state of lubrication throughout the whole inspection, noting damaged or missing nipples, which must indicate poor or no lubrication of the part concerned.

28. Cleanliness.

Report upon the state of cleanliness throughout the whole inspection.

29. Remarks on Road Test.

The machine must be tested over a standard circuit, including a test hill and if possible, by driving across country.  
Points to observe during the Test Circuit Run.

29. Remarks on Road Test. (contd.)

Engine

- (a) Starting.
- (b) Oil circulation.
- (c) Unusual engine noises.
- (d) Even pulling and adequate power - test hill.
- (e) Even pulling on level road at slow speeds in top gear.
- (f) Excessive exhaust and colour of exhaust.

Transmission

- (a) Clutch.
  - (i) Engagement.
  - (ii) Slip or drag.
- (b) Gearbox.
  - (i) Ease of engagement.
  - (ii) Jumping out of gear.
  - (iii) Noise from gearbox.
- (c) General noise, especially on over-run.

Brakes

- (a) Test each in turn for effectiveness.
- (b) Test footbrake by measuring stopping distance past a fixed point when travelling at a fixed speed, on the level. (Should be less than 45 ft. from 30 m.p.h.).

Steering

Test steering for wandering by finger tip control on handlebars. any slight distortion of forks that was not apparent during inspection will be noticed.

Electrical

- (a) Charging rate, (remember that voltage control is fitted).
- (b) Run on cross-country with lights on, this will soon show up loose connections, etc.

Frame.

- (a) Rattle.
- (b) Security of fittings, etc.

Final Standing Inspection.

Engine

- (a) Oil leaks.
  - (b) Idling speed.
- Investigate any irregularities noted on test.  
Point out any defects to the driver and record them in A.B.406.

30. General Condition.

- (a) Serviceability.
- (b) General maintenance. Is the Driver doing his job properly?

31. Classification Provisional.

Classified according to A.C.I. 2164/42 a/b 215/44.



## LIST OF D.M.E. CIRCULARS AND E.M.E.R.'s.

## IMMEDIATE ACTION

Circular Number	Date	Detail
B.609	14.12.43	Ignition H.T. Lead, Procedure on replacement.

## WHEN NECESSARY

Circular Number	Date	Detail
B.323	31. 7.42	Dynamo and regulator wiring.
B.343	24.11.42	Gearbox camshaft bearing - Kickstarter end.
B.343/1	31.12.42	Amendment to B.343.
B.356	12. 5.43	Speedometer head and drive cable (Smith manufacture) Modifications to improve reliability.
B.728	11.11.44	Markings for stowage in aircraft.
B.826	11. 6.45	Maintenance of Varley Batteries.

## LIST OF D.M.E. CIRCULARS AND E.M.E.R.'s. (contd.)

## GENERAL INSTRUCTIONS

Circular Number	Date	Detail
B.168	20. 1.42	Carburetor float needles. Test for defective needles before replacement.
B.174	8. 8.41	Ignition Timing.
B.231	28.11.41	Sparkling plugs oiling up. Adjustment of oil feed to inlet valve.
B.238	20.12.41	Crankshaft timing pinion. Correct fitting of key.
B.260	31.10.41	Kickstarter ratchet gears.
B.307/1	17. 7.44	Teledraulic forks. Maintenance by W/Shops. Cancels B.307.
B.325	8. 8.42	Tyres outer covers - limit of wear.
B.388	22.12.43	Fitting of modified fork crown and handlebar lug.
B.402	21.11.42	Handlebar grips - rubber substitute, method of fixing to handlebars, and twist grip rotors.
B.432	27. 1.43	Dynamo - Method for removal or replacement.
B.754	5. 7.44	Front and rear hub bearing seals.
N.342	15. 2.46	E.M.E.R. Target (M.P.C.) figures.
O.766	4. 7.46	E.M.E.R. Tyre Pressures.

LUBRICATION TABLE

Part	No. of Points	Lubricant	Task No.
Engine Oil Tank (Capacity 3 Pints)	1	50 H.D.	2
Speedometer Gearbox	1	Grease C.S. No.2.	4
Control Cables, Levers and Joint Pins	-	50 H.D. (Oillean)	4
Gearbox (Capacity 1½ pints)	1	Grease No.0	5
Chaincase Oil Bath	1	50 H.D.	5
Rear Chain	-	50 H.D. (Oillean)	5

RECORD OF PERIODICAL MAINTENANCE

ITEM	ACTION	LUBRICANT	PERIOD (MILES)	Initials		LAST MILEAGE		DONE DATE		Initials		LAST MILEAGE		DONE DATE	
				LAST	DONE	MILEAGE	DATE	Initials	MILEAGE	DATE	Initials	MILEAGE	DATE		
Brake Cam Spindles	Lubricate	Grease O.S. No.2	1000												
Road Wheel Hubs	Lubricate	Grease O.S. No.2	1000												
Magneto Drive Chain	Lubricate	Grease O.S. No.2	1000												
Engine Oil	Change	50 H.D.	2000												
Engine Oil Filters (2)	Clean	-	2000												
Tyres	Reverse direction of rotation		2000												
Steering Head	Lubricate	C.600	3000												
Teledraulic Forks	Check fluid level (W/S)	10 H.D.	3000												
Brake Pedal	Lubricate	C.600	3000												
Gearbox Lubricant	Change	Grease No.0	5000												
Contact Breaker Felt Wick	Lubricate (M)	50 H.D.	5000												

(M) Mechanics Job.  
(W/S) Workshop Job.