

SECURITY.

EXPERIMENTAL REPORT

ON

PERFORMANCE TRIALS

OF

B.S.A., 2 SEATER, 4-WHEELED, 4-WHEEL DRIVE CAR.

Chassis No. 12855.

M.E.T. Report No. B. 238.

[Ref: R. 238 1/28 ?]
WD No. F 5614

18th November, 1938

Copy No. 145

REFERENCE:-

W.O. File 57/Vehicles/6405
M.B. Test Sheet No. B. 471

Test commenced: 11.10.38.

Test completed: 3.11.38.

STATEMENT

The B.S.A. - Daimler Scout car is similar to the Alvis Dingo and has the same M.F.E. design armoured body, but it differs from it in the following respects:-

- (i) It has a rear mounted centrally placed 6-cylinder engine with a fluid flywheel and Wilson gear box.

STATEMENT (Continued)

- (ii) The radiator is at the back and air is expelled through it by a cowled 6 bladed fan. The engine and radiator are unprotected, except from the front.
- (iii) The transfer box delivers the drive to two propeller shafts, one each side of the chassis, which drives the front and rear wheels on each side through four similar bevel boxes.
There is one differential gear between the two propeller shafts, situated in the transfer box.
- (iv) All four wheels are independently suspended on coil springs anchored by wishbone linkages, with Luvax piston type shock absorbers; they are driven through "tracta" constant velocity universal joints totally enclosed in spherical housings.
- (v) "Progressive" four wheel steering is used, in which the rear wheels automatically come into play when the front wheels are on full lock.
- (vi) A reverse gear is supplied in the transfer box which enables all four forward gears to be used for travelling backwards. This is engaged by a hand lever which simultaneously changes the steering so that the front wheels are locked and the rear wheels only are steered. This makes high speed reversing easy and safe.
- (vii) An improved and strengthened form of gunner's seat has been made with the gun arm on the nearside, so as not to interfere with the driver. It is equipped with a ratchet which allows for over 12 different height positions.

MILEAGE

Road: 1877, Cross-country: 310, Total: 2187.

OBJECT OF TRIALS

To ascertain the performance and reliability of the vehicle.

TESTS CARRIED OUT

Road and cross country performance trials as called for in the test sheet.

RESULTS OF TRIALS

See appendix.

CONCLUSIONS

This vehicle is about 10 cwt. heavier than the Alvis Dingo and has an engine of about the same S.A.E. output. The top gear ratio is higher and the bottom overall ratio lower.

The result of this is that:-

- (i) It is inferior to the Alvis in acceleration and speed on hills and uses rather more petrol.
- (ii) It is much more stable.
- (iii) It is faster on the level, being capable of over 60 m.p.h.
- (iv) It has exactly the same capacity for negotiating steep gradients.

The driving position gives plenty of room for a large sized man and is very comfortable.

The ground clearances are rather better than those of the Alvis, and the available wheel movement is 2" more. This and the fact that it cannot suffer from diagonal wheel spin make it superior on very uneven ground.

The turning circles are unusually small.

Speed and performance in "overall reverse" are very good indeed.

The footbrake is adequate but the handbrake needs improvement.

The suspension is more comfortable on rough ground than that of any vehicle previously tested at the M.F.E. and its speed of 30 m.p.h. on the 2 mile circuit is a record for the course for a wheeled vehicle.

The fluid flywheel makes driving in soft sand a very simple matter indeed. It allows the car to be held at rest and to be restarted on steep slopes with the utmost ease. It also enables it to creep forward slowly over the crest of a hill without fear of stalling the engine - a valuable accomplishment in a reconnaissance vehicle.

Although no actual temperatures have been taken, repeated stopping and starting on a severe gradient failed to overheat the oil in the flywheel.

CONCLUSIONS (Continued)

The Wilson box enables gears to be changed on the steepest slopes with safety by an inexperienced driver.

FURTHER ACTION

In any future models, the end clearance angles and ground clearances can be improved upon, and armour plate can be put round the engine, which is at present unprotected.

18/11 / 38.

WMB/DLE.

Maj-General A.E. Davidson, CB., DSO. (Copy No.1)
M.G.O.6., (Copies 2 & 3)
President, M.B., (Copies 4 to 7)
S. of D., (Copies 8 & 9)
C.I.A. (M.C.), (Copy No.10)

A.E. Davidson

Major,
Officer i/c "B" Section, M.B.E.

Forwarded.

ACW

Major,
Commanding, The Mechanization
Experimental Establishment.

Farnborough, Hants.
18 / 11 / 38.

LOADS

	T.	C.	Q.	Lbs.
Useful		3.	0.	0.
Ballast		1.	0.	0.
Total		4.	0.	0.

Includes one driver.

LATEN WEIGHTS

F.A.W.	1.	2.	0.	0.
R.A.V.	1.	3.	2.	0.
Total	2.	5.	2.	0.

TYRES

Front Dunlop Trakgrip 6.50 - 19, T.2

Rear " " " "

Pressures lbs/sq.in. 22.

Deflection, % 20.

Effective Radius ins. 15.03

SCHEDULE NO. B. 2.No. 4 Front Suspension Test.

A - Offside front wheel up.

Satisfactory - all wheels still on ground.

B - Nearside front wheel up.

Satisfactory - all wheels still on ground.

No. 5 Wheelbase Clearance Test.

Not attempted.

No. 6 Chassis Clearance Test.

Front cross member - 9 1/2"

Front steering arms - 8 3/8"

Steering plate housing - 7 1/4" *

Nut securing steering rear - 7 3/8" *

Nut securing steering front - 7 3/4" *

Frame member 10 1/4"

SCHEDULE NO. B. 2 (Continued)

- (d) Water Splash At 18" satisfactory.
- (e) Turning Circles on concrete.
- | | | |
|----------|------------|--------|
| Forward: | Right lock | 22' 0" |
| | Left lock | 23' 3" |
| Reverse: | Right lock | 36' 0" |
| | Left lock | 40' 7" |

- (f) Tilting Test
- | | | |
|---------------------------|------|---------------|
| Concrete B
(1 in 4.01) | Up | Satisfactory. |
| | Down | Satisfactory. |

Stability Test

Does not overturn at 45°.

Distortion Test

1 1/2" rise of one front wheel just brings a second wheel off the ground.

SCHEDULE NO. B. 3

- 1.
- Retardation on level road, from approx: 20 m.p.h.

	Time Secs.	Distance Feet	Retardation	
			f.s.s.	
<u>Hand</u>	5.6	72.0	4.59	
	6.4	81.5	3.98	
	6.2	86.0	4.47	
<u>Foot</u>	2.0	25.5	12.75	
	1.8	27.0	16.67	
	1.8	27.5	16.97	

- 2.
- Controlled descent of 1 in 10.09 gradient at 8 m.p.h. for 1/4 mile.

Hand Satisfactory to control.
Front drums very hot - Rear drums cool.

Foot Satisfactory. Front drums hot.
Rear drums hot.

SCHEDULE NO. B. 3 (Continued)

2. Retardation on steep gradient (1 in 4.01) from 5 m.p.h.

<u>Hand</u>	Down	Controlled but would not stop.
	Up.	Just held. *
<u>Foot</u>	Down	Satisfactory.
	Up	Satisfactory.

* Owing to fluid flywheel, it is not necessary for the handbrake to be used in restarting on a steep slope. Vehicle can be held at rest by running the engine on a small throttle opening.

SCHEDULE NO. B. 4

1. Steep Hill Climbs (Concrete 1 in 4.01)

Restart in reverse. Very easy.

Restart forward. Very easy.

2. Flying Climb, Beacon Hill (1 in 10.45), 515 yards.

Time 32.5 seconds.

Average speed, 32.4 m.p.h.

Gears used, Top and third.

Standing Start, Beacon Hill

Time, 49.0 seconds.

Average speed, 21.5 m.p.h.

Gears used, First, Second and third.

4. Standing 1/4 Mile

Average speed, 2 runs, Forward 27.4 m.p.h.

Reverse 27.2 m.p.h.

Remarks

From a standing start the speed in both directions was governed by the acceleration of the machine.

5. 100 Miles Road Circuit

Average speed, 25.0 m.p.h.

SCHEDULE NO. B. 4 (Continued)

10. 50 Miles Circuit
 Average speed, 20.0 m.p.h.
 Fuel consumption, 12.5 m.p.g.

11. Sandy Nullahs
Non-stop run Successful.

Standing Starts

Position 1	Successful.
" 2	"
" 3	"
" 4	"

12. Sand Patch - Figures of Flight (Thermostat Removed)

Figs. Completed	0	6	12	18	24
Atmos: Temp: °F.	57	57	58	59	59
Water Temp: Final °F.	129	145	148	153	153
T.D. °F.	72	88	90	94	94
Time Mins--Secs.	-	2.45	3.0	3.20	3.10
Gears.	.	2	2	2	2

13. Sand Courses

Course A Satisfactory.

Course B Satisfactory.

Sand Bank:

Flying start Successful.

Standing start Successful.

SCHEDULE NO. B. 4 (Continued)

14. Miles Hill Gravel Slopes.
- | | |
|--|--|
| No. 8 (1 in 3.89) | Successful 2nd gear. |
| No. 7 (1 in 3.23) | Successful 2nd gear.
Repeated - stops and retarts
in 1st gear. |
| No. 6 (1 in 2.87) | Successful 2nd gear. |
| No. 5 (1 in 2.73) | Successful 1st gear. |
| No. 4 (1 in 2.65) | Successful 1st gear. |
| Concrete A (1 in 2.25) | Successful 1st gear. |
| Grass slope between
5 and 7 slopes. | Successful 1st gear. |
| Latrine slope | Successful 1st gear. |
15. Wet Clay and Bog.
Successful 1st gear.
16. Two-Mile C.C. Circuit.
Time, Mins-secs. 4 minutes.
Average speed, 2 runs. 30.0 m.p.h.
17. Chobham Ridges Course
Very good performance. Successful climbs of Tunnel
Hill and Red Road.
18. Sunny Hill
No. 1 Course, Flying start Successful.
Standing start. Successful.
No. 2 Course,
Flying climb. Successful.
19. Clay Banks
Near Bank (1) Successful.
Far Bank (2) Successful.
20. Ditches
No. 1 Successful.
No. 4 " "
Diagonally on difficult course. "