



Ministry
of Defence

de&s

DE&S Secretariat (Land Equipment and ISTAR)

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Defence Equipment & Support
Maple 0a # 2043
MOD Abbey Wood
Bristol BS34 8JH



Via:

5-Sep-16

Our Reference: FOI2016/07076

Dear [REDACTED]

Your correspondence dated 6th July 2017 has been considered to be a request for information in accordance with the Freedom of Information Act 2000. You requested the following information:

Please send me:

- Any reports related to the testing and development of the ARWEN 37 antiriot gun.
- Results of the testing phase of the ARWEN 37
- Any high speed footage or photographs of the AR1 projectile in flight (ARWEN37 projectile)

I would like the above information to be provided to me as electronic copies of the documents or videos

If this request is too wide or unclear, I would be grateful if you could contact me as I understand that under the Act, you are required to advise and assist requesters. If any of this information is already in the public domain, please can you direct me to it, with page references and URLs if necessary.

If the release of any of this information is prohibited on the grounds of breach of confidence, I ask that you supply me with copies of the confidentiality agreement and remind you that information should not be treated as confidential if such an agreement has not been signed.

I am treating your correspondence as a request for information under the Freedom of Information Act 2000 (FOIA).

A search for the information has now been completed within the Ministry of Defence (MOD), and I can confirm that some information in scope of your request is held.

The information you have requested can be found enclosed at annex A, but some of the information falls entirely within the scope of the absolute exemption provided for at section 40 (Personal Data) and qualified exemption provided for at section 26 (Defence) of the FOIA and has been redacted.

Section 40(2) has been applied to some of the information in order to protect personal information as governed by the Data Protection Act 1998. Section 40 is an absolute exemption and there is therefore no requirement to consider the public interest in making a decision to withhold the information.

Section 26 is a qualified exemption and subject to public interest testing which means that the information requested can only be withheld if the public interest in doing so outweighs the public interest in disclosure.

Section 26(1)(b) has been applied to some of the information because it contains details which are operationally sensitive and would prejudice the capability and effectiveness of our armed forces. The balance of public interest was found to be in favour of withholding the information given that, overall, the public interest is best served in not releasing any details on the individuals or the units that took part in the trials and for these reasons I have set the level of prejudice against release of the exempted information at the higher level of "would" rather than "would be likely to".

Under Section 16 of the Act (Advice and Assistance) you may find it helpful to note that this weapon was not brought into service by the MOD.

If you are not satisfied with this response or you wish to complain about any aspect of the handling of your request, then you should contact me in the first instance. If informal resolution is not possible and you are still dissatisfied then you may apply for an independent internal review by contacting the Information Rights Compliance team, 2nd Floor, MOD Main Building, Whitehall, SW1A 2HB (e-mail CIO-FOI-IR@mod.uk). Please note that any request for an internal review must be made within 40 working days of the date on which the attempt to reach informal resolution has come to an end.

If you remain dissatisfied following an internal review, you may take your complaint to the Information Commissioner under the provisions of Section 50 of the Freedom of Information Act. Please note that the Information Commissioner will not investigate your case until the MOD internal review process has been completed. Further details of the role and powers of the Information Commissioner can be found on the Commissioner's website, <http://www.ico.org.uk>.

Yours sincerely,

[Redacted signature]

[Redacted name]

DES SEC PolSec Land Equipment & ISTAR



INFANTRY TRIALS & DEVELOPMENT UNIT



SHORT TRIAL REPORT

TITLE ARWEN ACE

Conclusions and recommendations of a practical nature in this report reflect the views of the Director of Infantry.

Recommendations regarding acceptance into service, or scales of issue, however, reflect only the views of the Infantry Trials and Development Unit and are subject to confirmation by the Director of Infantry.

INFANTRY TRIALS AND DEVELOPMENT UNIT

THE SCHOOL OF INFANTRY,
WARMINSTER,
WILTSHIRE, BA12 ODJ.

See Distribution

TEL: WARMINSTER [REDACTED]
ML EXT: [REDACTED]
REFERENCE TD/30/151
DATE 30 Nov 87

SHORT TRIAL REPORT

1. Trial Title:

ARWEN ACE

2. ITDU Task No:

40/87/A/5A

3. Trial Authority:

[REDACTED]

4. Trial request reference:

D/DGW(A)22/15/53 dated 23 Sep 87

5. Trial Officer:

[REDACTED]

6. Trial Staff:

[REDACTED]

7. Background: The L67A1 is to be replaced. [REDACTED] are conducting a market trawl for suitable replacements. As candidate weapons are identified they are to be sent to ITDU for preliminary assessment.

8. Aim: To carry out a preliminary assessment of the ARWEN ACE to determine its suitability as a candidate for full technical and user trialling

9. Equipment details:

- a. The manufacturers sales sheet is at Annex E.
- b. Weapon - Registered No 00003.
- c. Ammunition -
 - 75 x AR1 Lot No 035 GD 12/86
 - 25 x AR1 R/E Lot No 001 GD 7/86
 - 25 x AR4 Lot No 010 GD 7/86
 - 25 x AR5 P Lot No 011 GD 8/86

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10. Trial Method: Details are at Annex A.

11. Results. General observations are at Annex B and the individual shooting results at Annex C. The mean results of the 2 firers are set out below. The main emphasis of the shooting being directed towards the AR1 type ammunition. The effectiveness of the other ammunition natures are at Annex B.

a. Consistency.

Range (metres)	20	30	40	50	60
Extreme Spread (mm)	365	455	545	515	600

b. Accuracy.

Range	20	30	40	50	60
MPI (mm) in relation to CZP (Y coordinates)	+160	+200	+325	+325	+445

c. Photographs. Photographs of the weapon and those components which are commented on in detail in Annex B are at Annex E.

12. Conclusions.

- a. The ARWEN ACE proved to be consistent at all ranges which were tested.
 - b. The weapon was unreliable and on occasions required the pistol mechanism to be removed after each round.
 - c. The front leaf sight is difficult to see through particularly in low light levels.
-

13. Recommendation: The ARWEN ACE has potential provided its reliability can be improved and is recommended for the full technical and user evaluation.

14. Contact for further information: Name: [REDACTED]
Tel: Warminster Mil Ext [REDACTED]

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15. Report issued by:

Signature: [REDACTED]

Name: [REDACTED]

Rank: Captain

Section: HQ

16. Report approved by:

[REDACTED]
● [REDACTED]
Lt Col
Comdt

Annexes:

- A. Trial Method
- B. General Observations
- C. Individual Firing Results
- D. Photographs
- E. Manufacturers Sales Literature

Distribution:

External:

Action:

[REDACTED]
[REDACTED]

Information:

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

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ANNEX A TO
TD/30/151
DATED 30 NOV 87

TRIAL METHOD

1. Dress. Combat kit, body armour (worn under combat jacket) and IS adapted combat helmet with a visor and neck guard.
2. Test 1 - Accuracy/Consistency/Functioning. Two firers each fired 1 x 5 round group from the standing position at 20, 30, 40, 50 and 60 metres. X and Y of each MPI was recorded. The target was a white paper-covered 2.5 metres by 2.5 metres 13mm thick plywood screen. The aiming mark was an inverted solid V which was drawn onto the target with a blue coloured pen. It was hoped that the target would not be penetrated by the rounds. This was not the case, see Appendix 1 to this Annex for the recommended details of future targets that could be used on similar trials.
3. Test 2 - Carriage. The aim was to test the ergonomic aspects of the weapon in relation to its comfort and the position of the sling attachment points. The following carriage test was performed.
 - a. Flat road surface 1.5 mile march.
 - b. Rough cross country 1.5 mile march.
 - c. Obstacles. Series of obstacles ranging from one metre to 2 metres in height and width (to include walls and ditches).
 - d. Crawl. A crawl of 20 metres over open ground.

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APPENDIX 1 TO
ANNEX A TO
TD/30/151
DATED 30 NOV 87

CONSIDERATIONS FOR FUTURE TRIALS

TARGETRY

1. The targetry used on this trial was partially successful but had it been raining it may not have been. After approximately 100 rounds a large area of the target had been shot away and the wind which was blowing from behind the target was lifting the paper away from the plywood. The original intention was to whitewash the plywood and then touch up marks made by rounds striking the target with fresh whitewash, this was assuming that the baton rounds would not penetrate the plywood. Had this method been used and it had rained, it is unlikely that it would have worked.

2. With a number of accurate baton guns firing from close range any wooden screen would be subjected to sufficient concentrated fire to eventually destroy that area of the screen. With this in mind it is recommended that penetration of the target screen be accepted at the planning stage and the screen on Cook Range adapted to accept smaller and thinner plywood screens. This would enable several aiming marks to be provided which would be used for the engagements at closer ranges and enable small areas of screen to be replaced when there was insufficient plywood left to accept a self adhesive patch. At longer ranges the shots would be much more dispersed and patching out less of a problem.

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ANNEX B TO
TD/30/151
DATED : NOV 87

ARWEN ACE ASSESSMENT - GENERAL OBSERVATIONS

1. Principal of Operation.

a. Observation. When a round is loaded and fired the ammunition case acts as the weapon chamber. To prevent firers accidentally placing their hand on or about the area of the loaded round, a raised section is provided. The area of the loaded round must be kept clear as the empty case is automatically ejected on firing. As opposed to preventing firers from holding the weapon with their forward hand clear of the ammunition, the hand is naturally attracted to the raised section, particularly firers with short arms. This caused concern as it was not known whether the forward escape of gasses could burn an unprotected hand. To answer this question several rounds were fired with the empty case being held into the weapon on firing. No adverse effects were experienced.

b. Comment. On the small number of rounds fired to check the safety on firing with regard to the firers forward hand, the ARWEN ACE proved to be totally safe.

2. Reliability.

a. Observation. Throughout the day the ARWEN ACE proved to be unreliable. The problem appeared to be caused by the combination of the weapons safety catch, the secondary safety catch (operated by the webb of the hand at the rear of the pistol grip) and the trigger. It affected some firers more than others for reasons which could not be explained. The solution required to get the weapon functioning again was to remove the pistol grip which housed the 2 safety catches and the trigger, this action allowed all the various components to reassert themselves once the pistol grip was clear of the body.

b. Comment. The second safety feature which was operated by the webb of the hand was not liked by any of the firers and required a conscious effort to remove this safety feature which detracted from the comfort during the holding, aiming and firing.

3. Rear Sight.

a. Observation. The height of the aperture located in the rear leaf sight only enabled a firer to aim the weapon with the visor in the half down position. When using the emergency sight the visor had to be fully raised.

b. Comment. It is essential that the gun can be fired with the protective visor fully down. It would therefore be necessary for the height of the rear aperture to be raised.

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4. Front Sight.

a. Observation. The front sight consists of a transparent flip-up leaf which has the graticule pattern marked on it. There are 2 scales, one for the baton gun role and a second scale marked in red for use with a type of ammunition which was not provided. Although the front sight appears very transparent, when viewed through the rear aperture where the light is restricted, it made the aiming at targets more difficult. Aiming would be extremely difficult when used in poor light conditions eg riotous situations where the light is being produced by either street lamps or burning vehicles, barricades etc. In addition, to comply with the manufacturers request, the front sight was not subjected to very harsh handling and the robustness of the front sight could not be confirmed. However it did look as though it could quite easily be accidentally snapped off if caught on webbing or whilst crossing obstacles.

b. Comment. The red second scale on the front sight complicated the aiming procedure particularly in low light levels and should be removed. In its present form the front sight is too difficult to see through and would not be acceptable.

5. Ammunition.

a. Observation. Throughout the day the AR1 performed very well. The AR1 R/E which was a lower powered round compared with the AR1 also performed well up to its specification. However, as would be expected of this round, its accuracy diminished very quickly at longer ranges. The AR4 was a very effective smoke screening round. Each round discharged 4 smoke pellets after one second flight. The rounds were reaching approximately 90 metres and generating an instant smoke screen with as few as 3 rounds. A 4 round volley produced a most impressive screen. The AR5P which is a practice barrier penetrates (no CS filling) proved to be very accurate and consistent at 50 metres.

b. Comment. The selection of ammunition available to ARWEN ACE appears to be both comprehensive and reliable.

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ANNEX C TO
TD/30/151
DATED 22 NOV 87

ARWEN ACE ASSESSMENT - INDIVIDUAL RESULTS

RANGE	20		30		40		50		60		50	
AMMUNITION	AR1	AR1	AR1	AR1	AR1	AR1	AR1	AR1	AR1	AR1	AR5P	AR5P
FIRER	ES (mm)	MPI (Y)	ES (mm)	MPI (Y)	ES (mm)	MPI (Y)	ES (mm)	MPI (Y)	ES (mm)	MPI (Y)	ES (mm)	MPI (Y)
[REDACTED]	290	+110	230	-110	750	+220	540	+250	700	+210	250	0
[REDACTED]	440	+210	680	+200	340	+430	490	+400	500	+680	250	0

Abbreviations:

ES - Extreme Spread
MPI(Y) - Mean Point of Impact (Elevation only)

Note:

1. [REDACTED] group at 30 metres was fired using the 20 metre aiming mark. All other groups fired at odd numbered ranges were aimed using the gap between the even numbered aiming marks.

ARWEN ACE - PHOTOGRAPHS



Fig 1. Right Side.



Fig 2. Left Side.

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Fig 3. Carriage.



Fig 4. Fire Position Standing.

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Fig 5. Fire Position Kneeling.

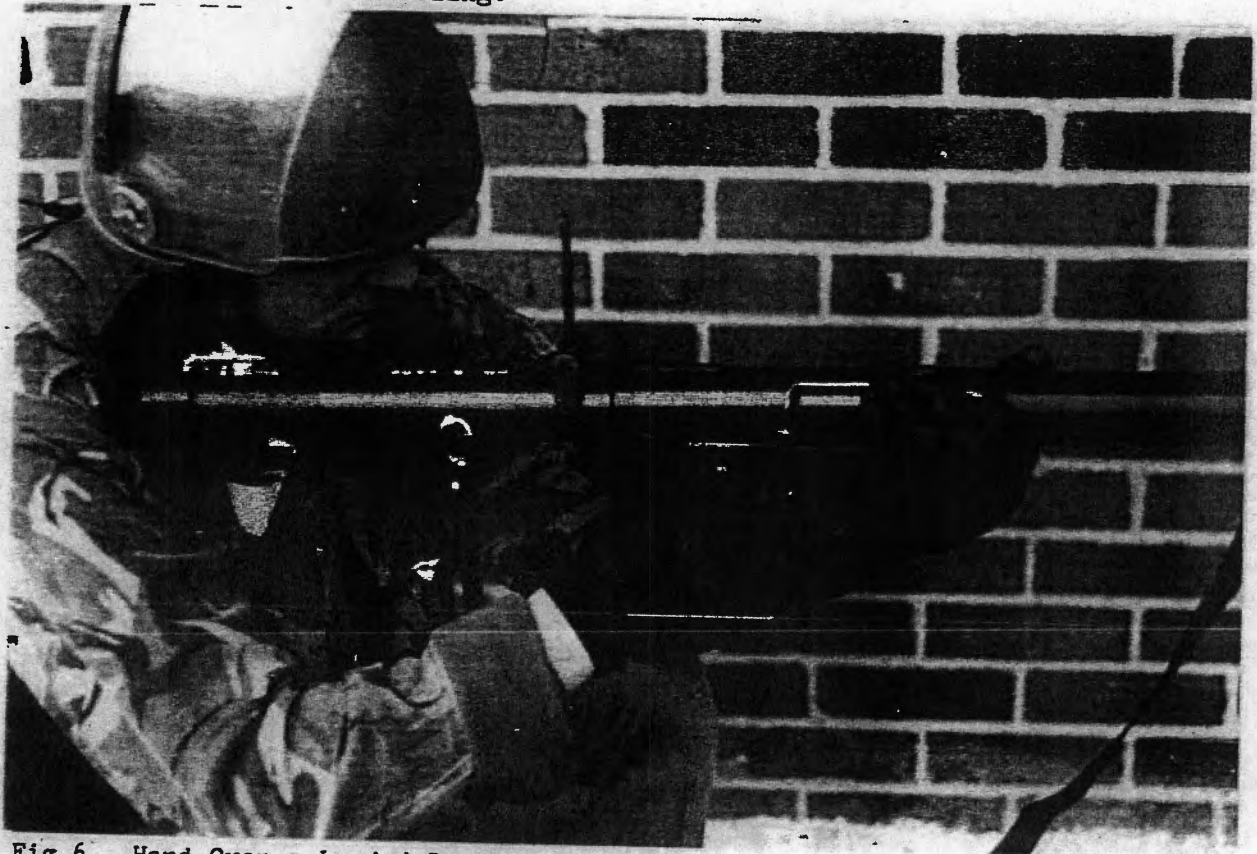


Fig 6. Hand Over a Loaded Round.

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Fig 7. Pistol Grip Showing the 2 Safety Catches.

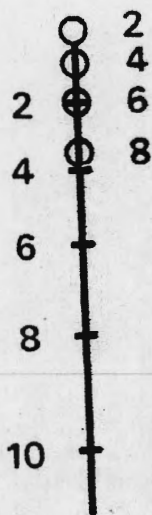


Fig 8. Fore Sight.

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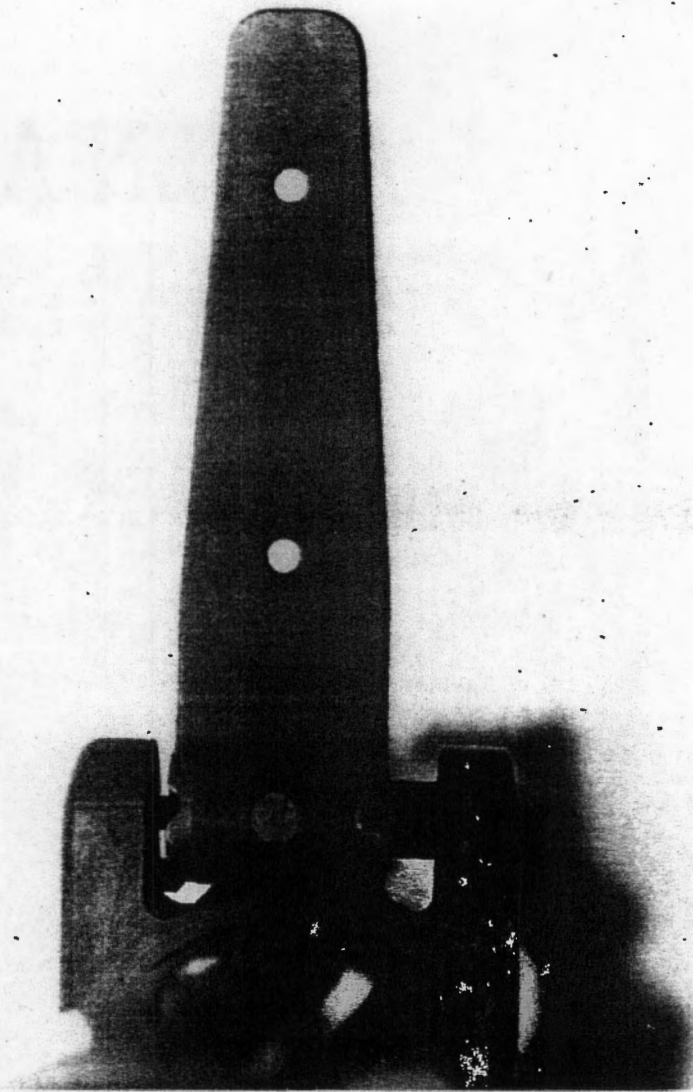


Fig 9. Rear Sight.

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EQUIPMENT

Data Sheet

ARWEN® ACE



ACE is a new-generation, single-shot weapon which fires the complete range of purpose-designed ARWEN® ammunition and is part of the proven ARWEN® Crowd Control System.

ACE is light weight, robust, easily carried and offers a cost effective alternative to the ARWEN 37 when multishot capability is considered inappropriate.

ACE, with non-break action, rifled barrel and automatic ejection, is fast and accurate in use.

Features

The weapon is light (only 2.1kg); finished in matt black; and, because of careful design, is very safe. It is easy to use, being suitable for right or left-handed firers of any height or build. Exposed parts are made of anodized aluminium alloy and plastics, which are unaffected by damp environments.

Where steel parts are necessary, they are in well shielded positions where they can be kept well lubricated and protected from rust. Routine stripping, cleaning, lubrication and re-assembly are easily done without tools other than brushes and cloths. The latter and approved lubricants can be provided if required.

Accessories

A carrying sling is provided as standard and a carrying case can be supplied with each weapon. ACE is easily loaded from a cartridge belt carrying two detachable pockets which are compatible with most military style webbing.

ROYAL ORDNANCE

Defence systems, sub-systems and components

Technical Data



WEAPON

Calibre	37mm
Type of action	Single-shot, auto-ejection
Safety catch	Lever and/or grip safety options
Rifling	5 groove
Weight	2.1kg (2.3kg loaded)
Length	760-840mm
Rate of fire	12 rounds/minute (aimed shots)

ACCESSORIES

Carrying case
Ammunition belt
Reloading dies
Cleaning brush

Due to a policy of continuous development and improvement, Royal Ordnance Plc reserve the right to supply products which may differ slightly from those illustrated.

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