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# AD

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7th Part of AAEE/843/1/P



MINISTRY OF SUPPLY

# AEROPLANE AND ARMAMENT EXPERIMENTAL ESTABLISHMENT

BOSCOMBE DOWN

HASTINGS C. 17.2 WD. 476  
(4 HERCULES 106)

DROPPING OF LIQUID FUEL IN DRUMS BY PARACHUTE

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7th Part of Report No. AAEE/843/1/P

AEROPLANE AND ARMAMENT EXPERIMENTAL ESTABLISHMENT  
BOSCOMBE DOWN

- 7.7.53

Hastings C Mk.2 WD.476  
(4. Hercules 106)

Dropping of liquid fuel in drums by parachute

A. & A.E.E. Ref: 6615/20  
M. O. S. Ref: 7/Acft/889  
Period of Test: September 1952 - April 1953

| Progress of issue of Report |        |                                                                                                                                                                                                                                      |
|-----------------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Report No.                  | Title  |                                                                                                                                                                                                                                      |
| 2nd Part of AAEE/843/1/P    | WD.476 | Trials of Parachuting static cable installation.                                                                                                                                                                                     |
| 3rd - do -                  | WD.476 | Pannier dropping trials using Handley Page gravity type roller conveyor. (Second version).                                                                                                                                           |
| 4th - do -                  | WD.476 | Performance and handling at 80,000 lb. A.U.W. under I.C.A.N. and Tropical conditions, when carrying external loads.                                                                                                                  |
| 5th - do -                  | WD.476 | Loading, carriage and dropping by parachute of heavy equipment and men. Tactical combinations with two Cars or Car and Trailer or Car and 75 mm Howitzer.                                                                            |
| 6th - do -                  | WD.476 | Loading, carriage and dropping by parachute of heavy equipment and men. Carriage and dropping of one Car 5 cwt. 4 x 4, one Gun 6 pdr. Q.F. Mk. IV, Six CLE Mk. III containers and paratroops dropped before and/or after the stores. |

Summary

The tests carried out show that liquid fuel in 40/50 gal. steel drums may be dropped satisfactorily by parachute from the Hastings C Mk.2 under similar conditions to those laid down for the Hastings C Mk.1 (9th Part of Report No. AAEE/843/P).

This Report is issued with the authority of



Air Commodore  
Commanding A. & A.E.E.

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Appendix

Summary of Tests

/1. Introduction.....

## 1. Introduction

Tests having shown that liquid fuel in 40/50 gall steel drums may safely be delivered by parachute from the Hastings C. Mk.1, by manual ejection from either paratroop exit or simultaneously from both doors (Ref.1), check tests were made to prove that these stores could also be dropped from the Hastings C. Mk.2 aircraft using similar equipment and method of despatch.

## 2. Description of Test Equipment

2.1 Aircraft. The aircraft used for these tests was Hastings C. Mk.2 WD.476, fitted with the paratroop despatcher's intercommunication facilities, the paratroop lights for signalling purposes and two ejector platforms. The ejector platforms were those used in this application on the Mk.1 aircraft. (Ref.1).

2.2 Fuel Drums. The drums used were Barrels, Light Steel, 40/50 gall. (Ref. 40P/506).

2.3 Parachutes. The parachute system was that used in Ref.1 i.e. a pair of Type 'R' parachutes for each drum modified to apex tie deployment on an 18 ft. static line.

2.4 Parachute Harness. The harness used for all of the tests was the standard Army Pannier Harness (Army Stores Ref. AD. 0444).

2.5 Extension Lift Webs. On some of the drops an 11 ft. extension lift web was interposed between the parachute and the store to find out whether this would give better parachute conditions.

2.6 Liquid contents of Drums. AVTAG (Paraffin) was used as ballast for the drums and the gross weight of each drum was then 460 lb.

## 3. Preparation of Equipment

The equipment was prepared in a similar manner to that described in Ref. 1.

## 4. Tests carried out

4.1 Seven flights were made during which a total of 21 drums was dropped. The drums were dropped separately at first from each paratroop exit and then simultaneously from both doors. The aircraft was flown straight and level for each drop at speeds varying from 115 to 125 knots A.S.I. with 20° flap. The dropping height was 400 feet above ground level. On some of the tests extension lift webs as described in para. 2.5 above were used. Details of the tests will be found in the Appendix hereto.

4.2 The loading, securing and despatch techniques were similar to those described in Ref. 1.

## 5. Results of Tests

5.1 Ejection and parachute deployment were satisfactory in all of the tests. On Test 3 one of the drums fell freely to earth due to the bursting of the pannier harness at full development of the parachutes. This harness however had been used repeatedly on previous tests and its failure was attributable to fair wear and tear.

5.2 The tests with the four drums on which the 11 ft. extension lift webs were used were all satisfactory, but the parachute development was not appreciably quicker than with those not fitted with the extension lift webs.

5.3 The tail clearance was satisfactory in all cases. Where drums were ejected simultaneously from port and starboard doors there was no interference between either parachutes or stores. Detailed results of tests will be found in the Appendix.

## 6. Conclusions

Liquid fuel may be safely dropped by parachute in Barrels, Light Steel (Ref. 40P/506) from Hastings C. Mk.2 aircraft under the same conditions as when dropped from the Hastings C. Mk.1 (Ref.1).

These conditions are as follows:-

(a) Each drum to be filled with fuel to its standard capacity and to be prepared for dropping as described in Ref. 1. (Although these tests were made using AVTAG the differences of weight with other fuels are not significant in the present consideration).

(b) The parachute system for each drum to be a pair of Type 'R' assemblies modified for apex tie deployment on an 18/22 ft. static line as described in Ref. 2.

(c) The drums to be despatched singly from either door or as a pair by dropping one drum from each door simultaneously by means of ejector platform(s) as described in paras. 2.1 and 4.3 of Ref.1, the static lines being secured to freight floor lashing points, one forward and one aft of the doorway.

(d) The aircraft to be flown straight and level for the drop at speeds within the range 115 to 125 knots A.S.I. using 20° flap. The normal minimum height above ground level should be 400 ft. but heights down to 300 ft. may be used accepting some damage to drums with possible minor loss of fuel.

## 7. Recommendations

It is recommended that the Hastings C. Mk.2 aircraft be cleared for the dropping of liquid fuel in 40/50 gall. steel drums under the conditions outlined in para. 6 above.

## References

1. Report No. AAE/843/P - 9th Part. Dropping of liquid fuel in drums by parachute.
2. Report No. AAE/Tech/84/P. Tests on a modified Type 'R' parachute. (Valetta C. Mk.1 - VL. 262).

## Circulation List

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Summary of Tests

| Flight No. | No. of Tests made. | Aircraft      |                       | Tail clearance | Remarks                                                                                                                                                                                                                     |
|------------|--------------------|---------------|-----------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|            |                    | Speed (knots) | Height in feet A.G.L. |                |                                                                                                                                                                                                                             |
| 1          | 4                  | 115           | 400                   | Satisfactory   | Drums ejected singly from port door. Exit and landing satisfactory in all tests.                                                                                                                                            |
| 2          | 3                  | 115           | 400                   | Satisfactory   | as above.                                                                                                                                                                                                                   |
| 3          | 3                  | 115           | 400                   | Satisfactory   | Drums ejected singly from port door. One drum fitted with 11 ft. extension lift webs. All exits and landings satisfactory.                                                                                                  |
|            | 3                  | 125           | 400                   | Satisfactory   | Drums ejected singly from port door. One drum fitted with 11 ft. extension lift webs. All exits satisfactory. One drum fell freely due to harness bursting on development of parachutes. Remaining two drums landed safely. |
| 4          | 3                  | 115           | 400                   | Satisfactory   | Drums ejected singly from starboard door. One drum fitted with 11 ft. extension lift webs. All exits and landings satisfactory.                                                                                             |
| 5          | 2                  | 125           | 400                   | Satisfactory   | Drums ejected singly from starboard door. One drum fitted with 11 ft. extension lift webs. Both exits and landings satisfactory.                                                                                            |
| 6          | 1                  | 115           | 400                   | Satisfactory   | Drums ejected from port and starboard doors simultaneously. Exits and landings satisfactory.                                                                                                                                |
| 7          | 1                  | 125           | 400                   | Satisfactory   | Drum ejected singly from starboard door. Exit and landing satisfactory.                                                                                                                                                     |



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Availability Open Document, Open Description, Normal Closure before FOI Act: 30 years  
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