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MINISTRY OF SUPPLY

AEROPLANE AND ARMAMENT EXPERIMENTAL ESTABLISHMENT

BOSCOMBE DOWN

HASTINGS C. K. 1
(FOUR HERCULES 101)

DROPPING OF LIQUID FUEL IN DRUMS BY PARACHUTE

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AEROPLANE AND ARMAMENT EXPERIMENTAL ESTABLISHMENT
BOSCOMBE DOWN

31 JUL 1953

Hastings C Mk.1
(Four Hercules 101)

Dropping of liquid fuel in drums by parachute

A. & A.E.E. Ref: 6615/20
M. O. S. Ref: 7/4oft/889
Period of Test : February, 1953

Report No.	Progress of issue of Report Title
4th Part of AAE/843/P	TG.500 Trials of Modified Parachuting Static Cable Installation.
5th - do -	TG.500 Carriage and Dropping Trials of Apparatus Sea Rescue Type A Mk.2 (Lindholme) from the External Container Racks.
6th - do -	TG.500 Loading, Carriage and Dropping by Parachute of Heavy Equipment and Men. Carriage and Dropping of One Car 5 cwt. 4 x 4, One 75 mm Pack Howitzer, Six Containers and Paratroops dropped before and/or after the Stores.
7th - do -	TG.500 Loading, Carriage and Dropping by Parachute of Heavy Equipment and Men. Carriage and Dropping of One Car 5 cwt. 4 x 4, One Trailer 10 cwt. GS Light-weight, Six Containers and Paratroops dropped before and/or after the stores.
8th - do -	TG.500 Loading, Carriage and Dropping by Parachute of One Car 5 cwt. 4x4, One Gun 6 Pdr. QF Mk.4 Six Containers and Paratroops dropped before and/or after the stores.

Summary

The tests carried out show that liquid fuel may be dropped satisfactorily by parachute in 40/50 gal. steel drums, despatched singly by means of an ejector platform from either paratroop exit or as a pair (one from each exit) ejected simultaneously, from the Hastings C Mk.1 aircraft flying at a speed within the range 115-125 knots A.S.I. with 20° flap.

The method of preparation of the drums and the parachute system used were similar to those for dropping this store from the Valetta aircraft.

This Report is issued with the authority of



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

List of Contents

	<u>Page</u>
1. Introduction	3
2. Description of Test Equipment	3
3. Preparation of Equipment	3
4. Tests carried out	3
5. Results of Tests	4
6. Conclusions	4
7. Recommendations	4

Appendix

Summary of Tests

/1. Introduction.....

1. Introduction

Tests were carried out to prove that liquid fuel could safely be delivered by parachute in 40/50 gal. steel drums by ejection from the paratroop exits of the Hastings C Mk.1 aircraft. The tests were based on the ejector platform method of despatch and included the case of two drums dropped simultaneously, one from each of the two paratroop exits. The harness and parachute system were those already developed for dropping this store from Valetta aircraft (Ref.1).

2. Description of Test Equipment

2.1 Aircraft. The aircraft used for these tests was Hastings C Mk.1 TG.500, fitted with the paratroop despatcher's intercommunication facilities, the paratroop lights for signalling purposes and two ejector platforms. These platforms were similar to that previously designed for the Hastings (See AP. 4203B Vol.1 Sect.1 Chap. 10, para. 11), except that a wooden batten was fixed to the top surface of the board parallel to and at 4" from the aft edge. This modification corresponded to that found necessary on the Valetta ejector platform (Ref.1) and was fitted to the aft edges of both port and starboard Hastings platforms.

2.2 Fuel Drums. The drums used were Barrels, Light Steel 40/50 gall. (Ref. 4QP/506).

2.3 Parachutes. The parachute system was that used in the case of the Valetta (Ref.1) viz. a pair of Type 'R' parachutes (Ref. 15D/391-398) for each drum, these parachutes being modified for apex tie deployment on an 18 ft. static line as described in Ref. 2.

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 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 drums were prepared as described in para 1.A. Method 5 of Appendix 'B' to Ref. 1. The parachute attachments were as described in para. 2.A. of Appendix 'B' to Ref. 1.

4. Tests carried out

4.1 Three test flights were carried out during which 12 drums were 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. Details of the tests are given in the Appendix.

4.2 The drums were loaded into the aircraft by means of a Coventry Climax Fork Lift Truck and secured as freight by 1 ton Aerolex Straps (Straps, Lashing, Type P Ref. 27H/2776).

4.3 For the tests involving dropping from one door only, three despatchers were used, one remaining in intercommunication with the pilot and the other two carrying out the handling and ejection of the drums. For the tests involving simultaneous dropping from both doors, five despatchers were used, one remaining in intercommunication with the pilot and two carrying out the handling and ejection of the drum at each door.

4.4 When required for despatch each drum was rolled into position easily by two men. Each drum was positioned on its side on an ejector platform with the parachute attachment D-rings inboard. Two modified Type 111 /parachutes...

parachutes were then attached as shown in Fig.2 of Ref. 1. The static lines from the parachutes were tied to freight lashing points at positions forward and aft of each platform.

4.5 When drums were dropped simultaneously from both doors a cine record of the drop was taken from the ground, with the photographer positioned on the track of the aircraft, so that any interference between the drums or the parachutes would be recorded.

5. Results of Tests

All the results were satisfactory, with adequate tail clearance and with no interference between drums or parachutes when the drums were ejected simultaneously. There was no apparent damage to the drum. Detailed results of tests will be found in the appendix.

6. Conclusions

6.1 Fuel drums (Ref. 40P/506) may be safely dropped by parachute from Hastings C Mk.1 aircraft under the following conditions:-

(a) Each drum to be filled to its standard capacity and to be prepared for dropping as described in para 1A, Method 5 of Appendix 'B' to 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, the static lines being secured separately 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 knots to 125 knots A.S.I. with 20° flap setting. The normal minimum height above ground level should be 400 feet but heights down to 300 feet may be used accepting some damage to drums with possible minor loss of fuel.

7. Recommendations

It is recommended that the Hastings C Mk.1 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. AEE/842/P - 3rd Part. Valetta C Mk.1 VL. 262.
Dropping of liquid fuel in drums
by parachute. 10.3.53.
2. Report No. AEE/Tech/84/P Tests on a Modified Type 'R'
Parachute. (Valetta C Mk.1 VL.262)
24.2.53.

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Summary of Tests

Flight No.	Number of Tests made	Aircraft		Tail Clearance	Remarks
		Speed in Knots	Ht. in ft. AGL		
1	2	115	400	Satisfactory	Drum ejected singly from port door. Exit and landing satisfactory in both tests.
	2	125	400	Satisfactory	- as above -
2	2	115	400	Satisfactory	Drum ejected singly from stbd. door. Exit and landing satisfactory in both tests.
	2	125	400	Satisfactory	- as above -
3	1	115	400	Satisfactory	Drum ejected from port and stbd. doors simultaneously. Exit and landing satisfactory. Ample separation.
	1	125	400	Satisfactory	Drums ejected from port and stbd. doors simultaneously. Exit satisfactory. Ample separation. Stbd. drum made normal descent and satisfactory landing. Port drum made fast descent, due to one chute streamer, but landed undamaged.



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