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NPG REPORT NO. 321-1-52

U. S. NAVAL PROVING GROUND
DAHLGREN, VIRGINIA

CONFIDENTIAL

Twenty-Seventh Partial Report
on
Bombs and Associated Components

First Partial Report
on
Acceleration Test of Chemical Corps Munitions

AST 113
DEC 9 1959
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Project No.: NPG-Re3c-321-1-52
No. of Pages: 6

Date: FEB 18 1952

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SECURITY INFORMATION



NP9 46499

23 October 1951

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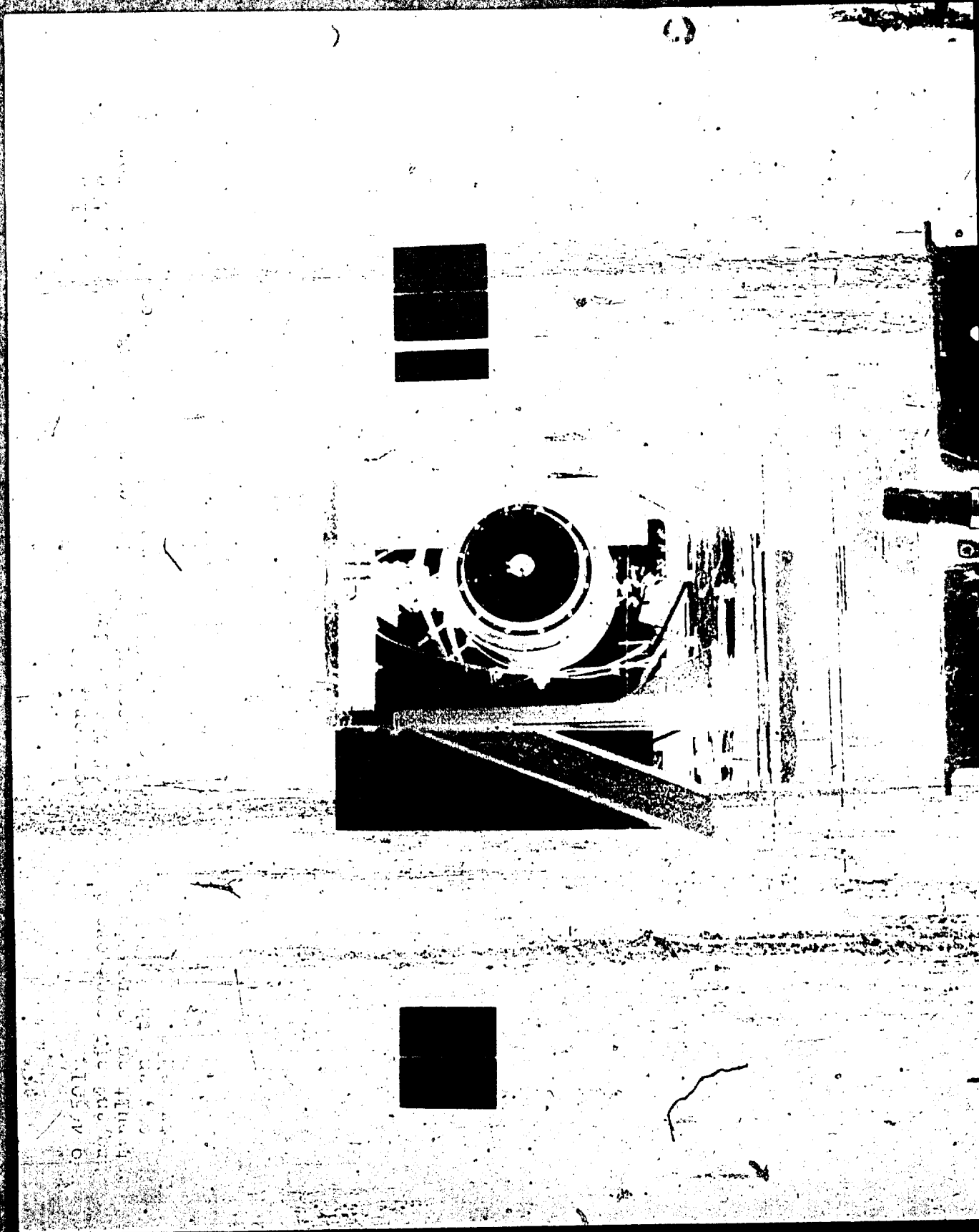
SECURITY INFORMATION

Straight tensile loading test of the Chemical Corps bomb E83 conducted on the acceleration wheel. Overall view showing acceleration wheel, E83 bomb, and the struts which the bomb is attached (cables around bomb are safety cables).

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APG 46500 23 October 1951
Straight tensile loading test of the Clemens bombs bomb is conducted on the acceleration wheel. Close-up view of the bomb, bomb struts, safety cables, and strut to which the bomb is attached.





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NP9 46502

23 October 1951

Fore and aft acceleration test of the Chemical Corps bomb E83 conducted on the catapult and arresting gear unit. This view at approximately 1000 feet from the front shows the catapult car, accelerometer on top, and the E83 bomb mounted on a Mk 51 bombrack with sway brackles and a safety cable.

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img 4-503

Fore and aft sections
the cockpit
of flight

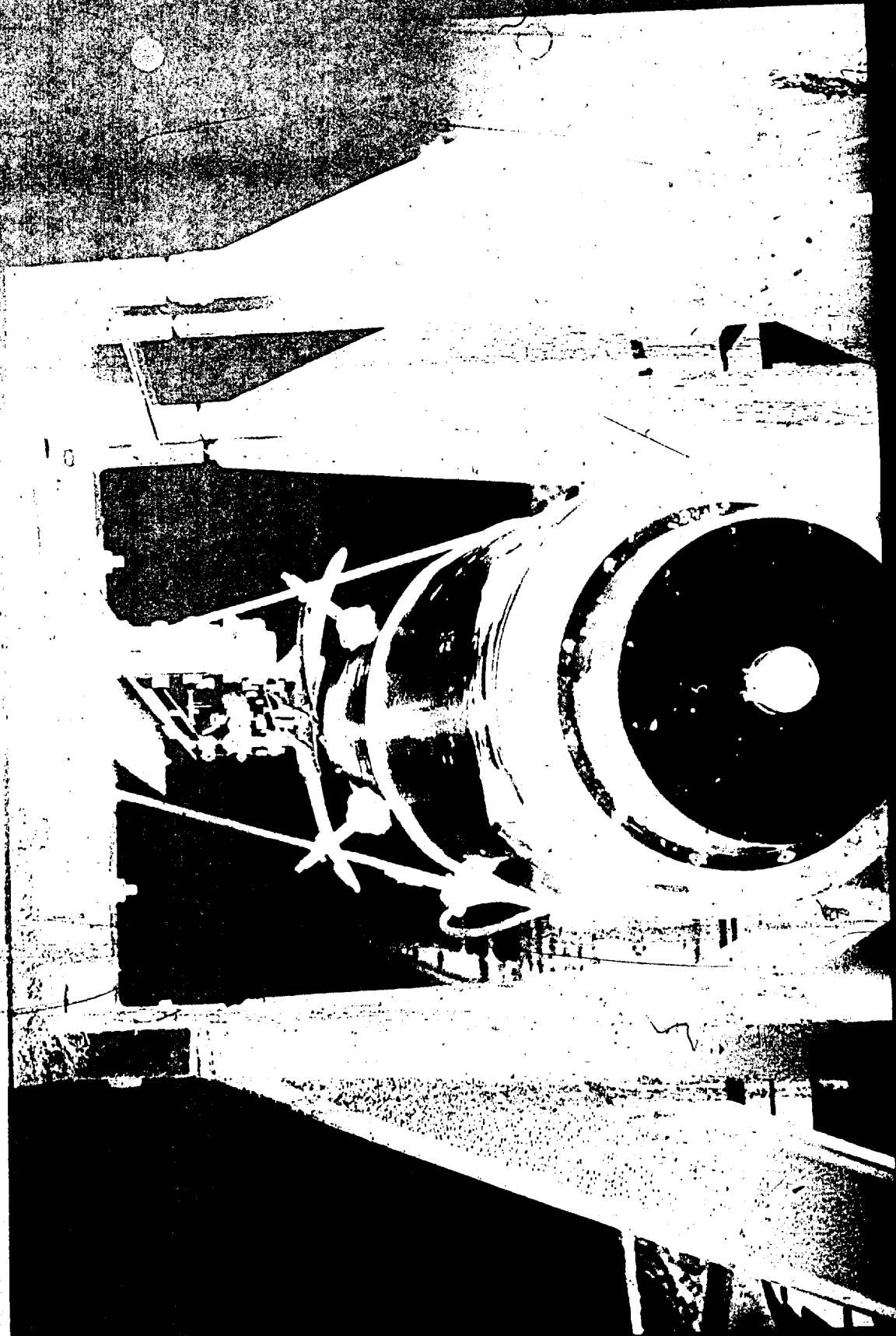


Figure 5-

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NFG REPORT NO. 917

Acceleration Test of Chemical Corps Munition

TABLE I

TABULATED TEST DATA

1100 Pounds E-83 Bomb

<u>Date</u>	<u>Acceleration</u> G's	<u>Deceleration</u> G's	<u>Direction</u>	<u>Remarks</u>
10/23/51	9	—	Vertical (Centrifuge)	No Change
10/23/51	2.9	2.5	Fore and aft	No Change
10/23/51	3	—	Fore and aft	Inadvertent fast return
10/25/51	3.0	2.3	Fore and aft	No Change
10/25/51	3.4	2.4	Fore and aft	No Change
10/25/51	3.75	2.4	Fore and aft	No Change

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APPENDIX B

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REPORT NO. 617

Acceleration Test of Chemical Corps Munitions

DISTRIBUTION

Bureau of Ordnance

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Re3	1
Re3c	1
Chemical Corps Research and Engineering Division, Office of Chief Chemical Corps, Army Chemical Center, Edgewood, Maryland	3
Chief of Ordnance, Department of the Army Attn: ORDTX-AR	2
Air Materiel Command Liaison Officer Wing 3 Headquarters, Aberdeen Proving Ground Aberdeen, Maryland	2
Bureau of Aeronautics Attn: Armament Section	2
Naval Gun Factory Attn: Aircraft Armament Section	1
NATC, Patuxent River, Maryland	1
NAOTS, Chincoteague, Virginia	1
Naval Air Development Station Johnsville, Pennsylvania	1
Naval Liaison Officer USAFPGC, Eglin Field, Florida	1
NOTS, Inyokern, China Lake, California	1
Commanding General, Aberdeen Proving Ground Aberdeen, Maryland Attn: Technical Information Section Development and Proof Services	1

B

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NPG REPORT NO. 917

Acceleration Test of Chemical Corps Munitions

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Commander (DF) Naval Ordnance Laboratory	3
Commanding General Air Material Armament Test Center Eglin Air Force Base, Florida	1
Local: OV	1
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NPG REPORT NO. 917

Acceleration Test of Chemical Corps Munitions

PART A

SYNOPSIS

1. This is the first partial report on the acceleration tests of ~~Chemical Corps Munitions~~. [↓] ~~The purpose of this test was to~~ ^{be conducted} determine if the E-83 experimental bomb would stand a vertical acceleration of 9 g's and a fore and aft acceleration of 3 g's. ~~These tests were conducted under Task Assignment NPG Re30-321-1-52.~~ The E-83 bomb was subjected to a vertical acceleration of 9 g's and a maximum fore and aft acceleration of 3.75 g's. No failure of any of the components resulted from these tests. ↗

a. It is concluded that the E-83 bomb will withstand a vertical acceleration of 9 g's and a fore and aft acceleration of 3.75 g's without damage to the bomb.

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Acceleration Test of Chemical Corps Munitions

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Acceleration Test of Chemical Corps Munitions

PART B

INTRODUCTION

1. AUTHORITY:

These tests were authorized by reference (a) and conducted in accordance with reference (b).

2. REFERENCES:

- a. BUORD conf ltr NPG-Re8c-BEK:fml Ser 25779 of 18 September 1951
- b. BUORD restr ltr NP9-Re3c-BEK:lkf of 17 October 1951

3. BACKGROUND:

The Army Chemical Center, Edgewood, Maryland requested, through the Bureau of Ordnance (Re3c), that acceleration tests be run by the Naval Proving Ground on certain Chemical Corps stores.

4. OBJECT OF TEST:

- a. To determine if the Chemical Corps experimental bomb E-83 would withstand a vertical acceleration force of 9 g's without damage.
- b. To determine if the Chemical Corps experimental bomb E-83 would withstand a fore and aft acceleration force of 3 g's without damage.

5. PERIOD OF TEST:

a. Date Project Letter	17 October 1951
b. Date Necessary Material Received	22 October 1951
c. Date Commenced Tests	23 October 1951
d. Date Tests Completed	25 October 1951

6. REPRESENTATIVES PRESENT:

D. M. Kone	Army Chemical Center
K. J. Farmor	Army Chemical Center
George A. Miller	Army Chemical Center

Acceleration Test of Chemical Corps Munitions

PART 2DETAILS OF TEST

7. DESCRIPTION OF ITEM UNDER TEST:

The E-83 experimental bomb is a store weighing 1100 lbs. It is approximately 18 inch in diameter and approximately 70 inch in length. It is supported by suspension lugs 14 inches apart. These suspension lugs are bolted to the bomb body using four (4) 1/4-20 bolts per lug.

8. DESCRIPTION OF TEST EQUIPMENT:

a. The vertical acceleration test was performed on the large centrifuge wheel. This device consists of two horizontal plates connected by a vertical axle. It is about this vertical axis that the wheel rotates.

b. The fore and aft acceleration tests were conducted on a car traveling on a track, launched by a catapult Type F, Mk. 6 Mod. 1 and stopped by an arresting gear unit Mk. 4. Acceleration and deceleration data were obtained from a Waugh accelerometer mounted on the catapult car.

9. PROCEDURE:

a. The bomb was first mounted on the centrifuge wheel with its longitudinal axis parallel to the vertical axis of the wheel. In this position the centripetal acceleration of the bomb corresponds to a vertical acceleration of the bomb carried in normal flying attitude. The rotational velocity of the wheel was increased to 96.5 rpm which corresponds to a force of 9 g's on the bomb since its center of gravity is 34 inch from the center of rotation.

b. The bomb was mounted on a catapult car and the first catapult shot produced an acceleration of 2.9 g's. No damage was done to the bomb. An inadvertent fast return against the launching cable, however, sheared all bolts holding the suspension lugs. The bolts were replaced and three more catapult shots were made with the bomb receiving a maximum acceleration of 3.75 g's. No damage was done to the bomb by these three catapult shots.

Acceleration Test of Chemical Corps Munitions

10. RESULTS AND DISCUSSIONS:

a. No changes were noted in the bomb after the 9 g vertical acceleration test on the centrifuge wheel.

b. Although the suspension lug bolts sheared on an inadvertent fast return after the first catapult shot, an examination of the sheared bolts showed them to be an extremely hard brittle structure having a Rockwell C hardness of 45 ± 2 . It is not known what accelerations were encountered during this return because of the damping characteristics of the accelerometer, but it does point up the need for careful control of the heat treatment of vital strength parts such as the suspension lug bolts.

PART DCONCLUSIONS

11. It is concluded that the Chemical Corps experimental bomb E-83 will withstand a peak acceleration of 9 g's vertically and 3.75 g's fore and aft without sustaining damage.

PART EDISPOSITION OF MATERIAL

12. The E-83 experimental bomb was returned to the Army Chemical Center, Edgewood, Maryland.

Acceleration Test of Chemical Corps Munitions

The tests upon which this report is based were conducted by:

J. C. TALLEY, Ordnance Engineer,
Laboratory Services Division,
Aviation Ordnance Department


This report was prepared by:

L. P. MITCHELL, Lieutenant, USN,
Laboratory Services Division Officer
Aviation Ordnance Department

This report was reviewed by:

W. F. MILLER, Director of Research,
Aviation Ordnance Department
S. VAN MATER, Captain, USN,
Aviation Ordnance Officer,
Aviation Ordnance Department

APPROVED: IRVING T. DUKE
Rear Admiral, USN
Commander, Naval Proving Ground


C. T. MAURO
Captain, USN
Ordnance Officer
By direction

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