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U. S. NAVAL PROVING GROUND
DAHLGREN, VIRGINIA

REPORT NO. 1062

TESTING OF
WARHEADS FOR AIR TARGET GUIDED MISSILES

th Partial Report

- -

FRAGMENTATION TEST OF WARHEAD NO. 124

INAL Report

opy No 1

Task
Assignment NPG-Re3f-607-1-53

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Fragmentation Test of Warhead No. 124

- -

PART A

SYNOPSIS

1. This test was conducted to obtain the fragmentation characteristics of the Naval Ordnance Laboratory Warhead No. 124, which contained a fluted rubber liner designed to cause the case to break up into thirty-six (36) 12"00 rods.

2. The fluted rubber liner was unsuccessful in causing break up of Warhead No. 124 into rods. All recovered fragments were under five (5) inches in length.

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APPENDIX D - ROD VELOCITIES. . . . . .TABLE II 1-2 (Incl)

APPENDIX E - DISTRIBUTION. . . . . 1-2 (Incl)

PART B

INTRODUCTION

1. AUTHORITY:

This test was authorized by reference (b) and conducted under Task Assignment NPG-Re3f-607-1-53, reference (a).

2. REFERENCES:

a. BUORD Conf ltr NP9 Re3f:EKJ:gg Ser 42699 of 29 Jul 1952
b. NOL Conf Work Request WG/8/53 of 6 Aug 1952
c. NPG Conf Report No. 1049 of 6 Oct 1952

3. BACKGROUND:

a. Reference (a) authorized the Naval Proving Ground to work directly with the Naval Ordnance Laboratory in the development and testing of warheads for guided missiles.

b. Reference (b) requested the Proving Ground to fragment Warhead No. 124, Composition B loaded, to determine the ability of a fluted rubber liner to control fragment size.

4. OBJECT OF TEST:

This test was conducted to obtain the fragmentation characteristics of the Naval Ordnance Laboratory Warhead No. 124, which contained a fluted rubber liner designed to cause the case to break up into thirty-six (36) 12"00 rods.

5. PERIOD OF TEST:

a.	Date Project Letter	6 August 1952
b.	Date Necessary Material Received	5 August 1952
c.	Date Commenced Test	19 August 1952
d.	Date Test Completed	19 August 1952

PART C

DETAILS OF TEST

6. DESCRIPTION OF ITEM UNDER TEST:

Warhead No. 124, Figures 1 through 3, has a case identical to that of Warhead No. 136, reference (c). The dimensions of the warhead are as follows: 8"00 outer diameter by 12"00 long by 0"375 wall thickness. This warhead contains a fluted rubber liner, Figure 3, with grooves spaced 10° apart so as to produce thirty-six (36) rods upon detonation. The warhead was Composition B loaded at the Naval Ordnance Laboratory. The loaded warhead weighed 59.94 lbs. and the calculated weight of the case and end plates was 35.5 lbs.

7. PROCEDURE:

a. The warhead was suspended horizontally over the water pit and initiated with a tetryl booster (1"825 O.D. by 1"00 thick) and a U. S. Army Special Engineer's blasting cap placed at the end facing towards 180°. Vertical steel panels 20 feet high and covering the longitudinal zone 77°-103° were placed 40 feet from the warhead. Rod-like fragment velocities were obtained by the usual high speed camera technique utilizing two 35mm Fastax cameras.

b. Fragments obtained from the water pit (polar angle zone 60°-120°) represent one-sixth of the total fragments expected from the warhead. A photograph of the field setup is shown in Figure 4.

8. RESULTS AND DISCUSSION:

a. Mass distribution data are listed in Table I, and the recovered fragments are shown in Figure 5. No rods were recovered greater than five (5) inches in length and the majority were only two (2) to three (3) inches long.

b. Rod velocities, given in Table II, had a median of 5300 ft./sec.

PART D

CONCLUSIONS

9. The fluted rubber liner was unsuccessful in causing breakup of Warhead No. 124 into rods. All recovered fragments were under five (5) inches in length.

Fragmentation Test of Warhead No. 124

- -

The tests upon which this report is based were conducted by:
W. WRIGHT, JR., Ensign, USNR, Fragmentation Firing Officer
Fragmentation Division
Terminal Ballistics Department

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Captain, USN
Ordnance Officer
By direction

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NPG REPORT NO. 1062

U. S. NAVAL PROVING GROUND
DAHLGREN, VIRGINIA

Fifty-fifth Partial Report

on

Testing of

Warheads for Air Target Guided Missiles

- -

Final Report

on

Fragmentation Test of Warhead No. 124

Project No.: NPG-Re3f-607-1-53
Copy No.: 12
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Date: NOV 19 1952

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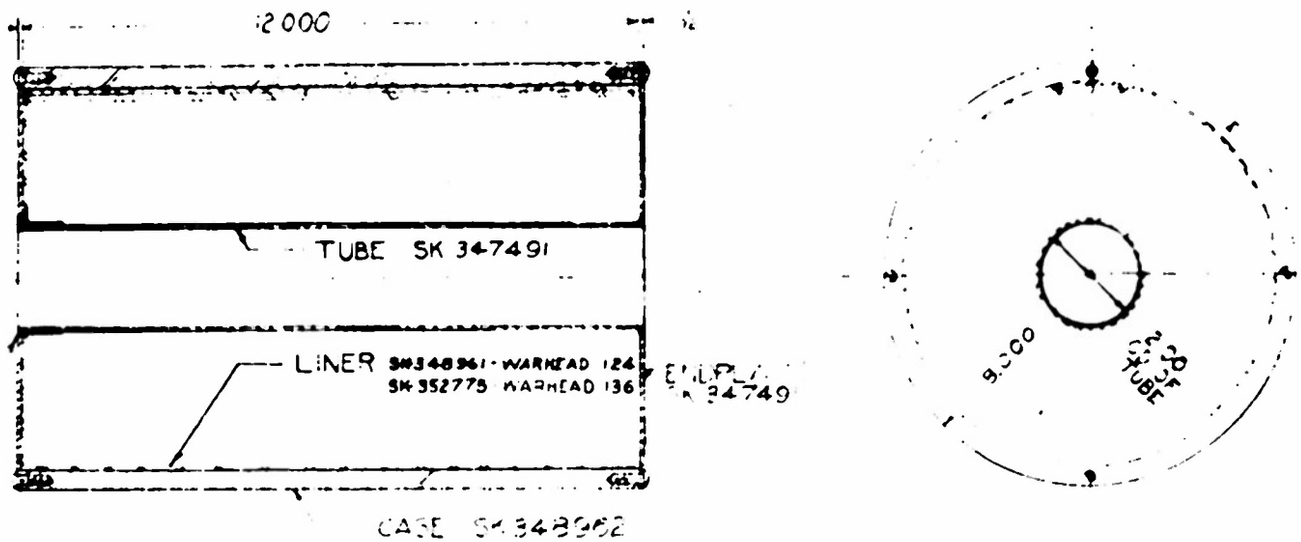

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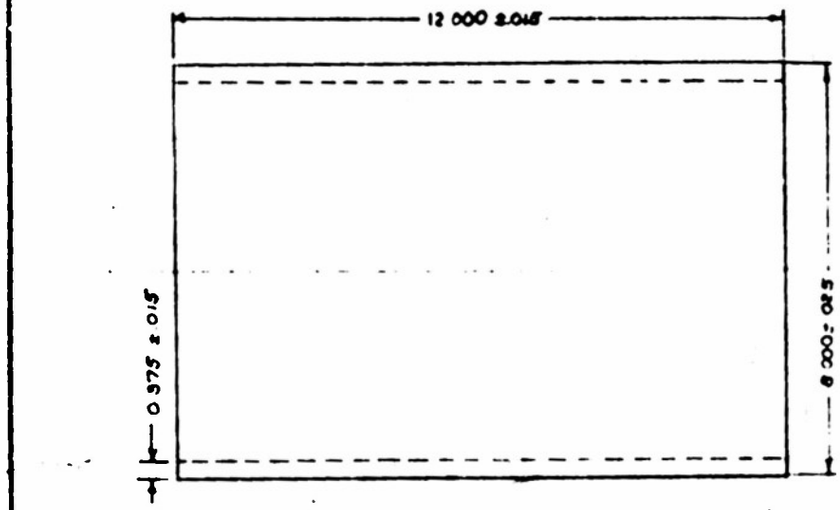

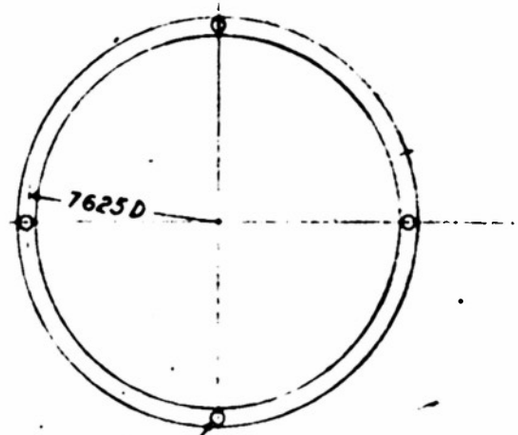

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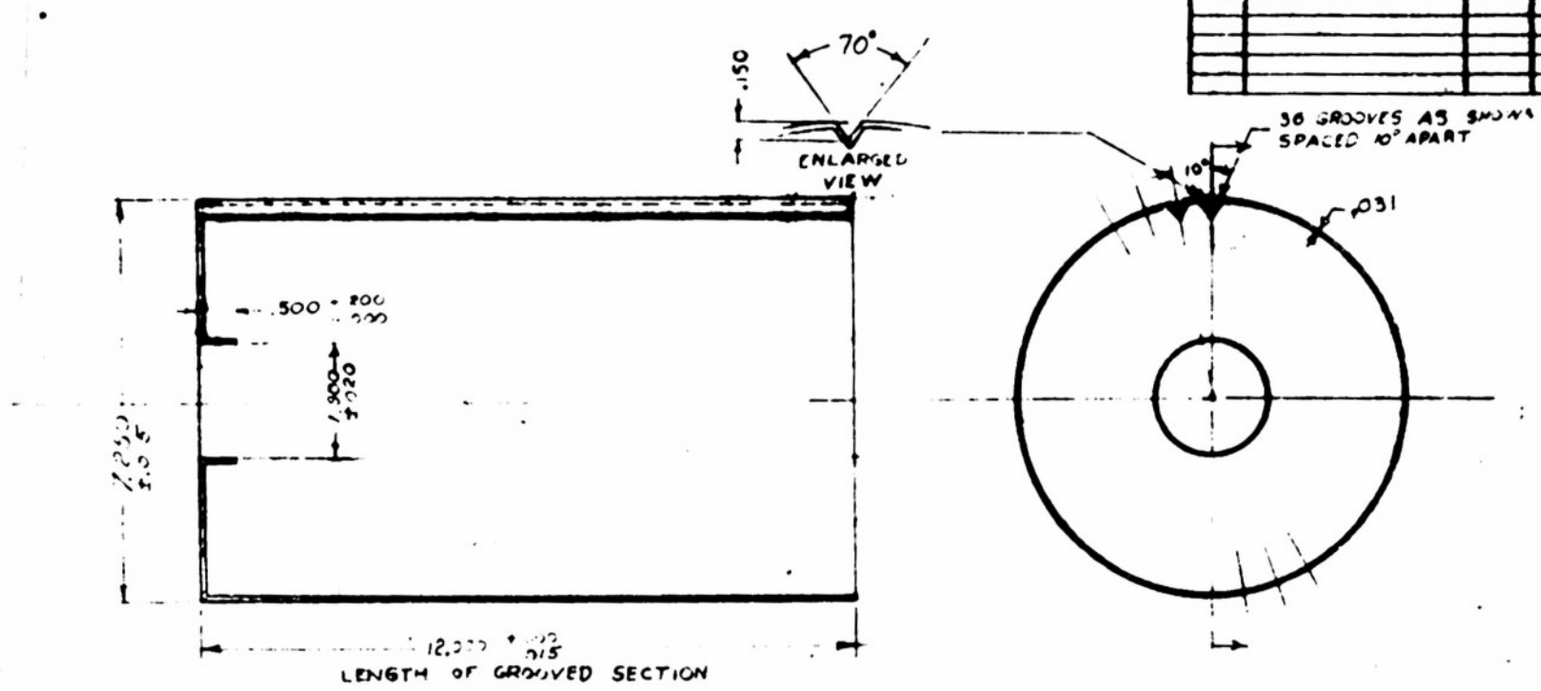

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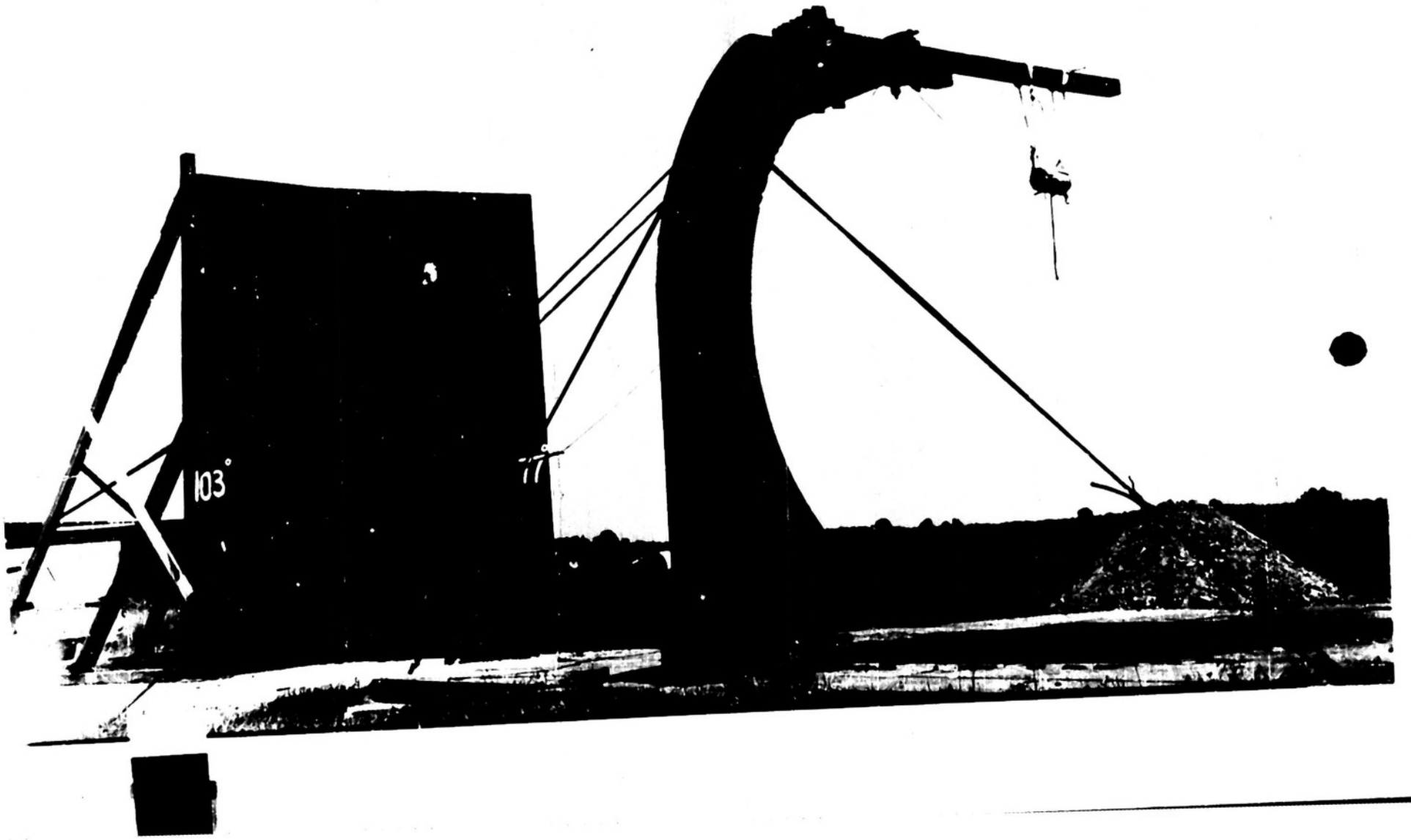
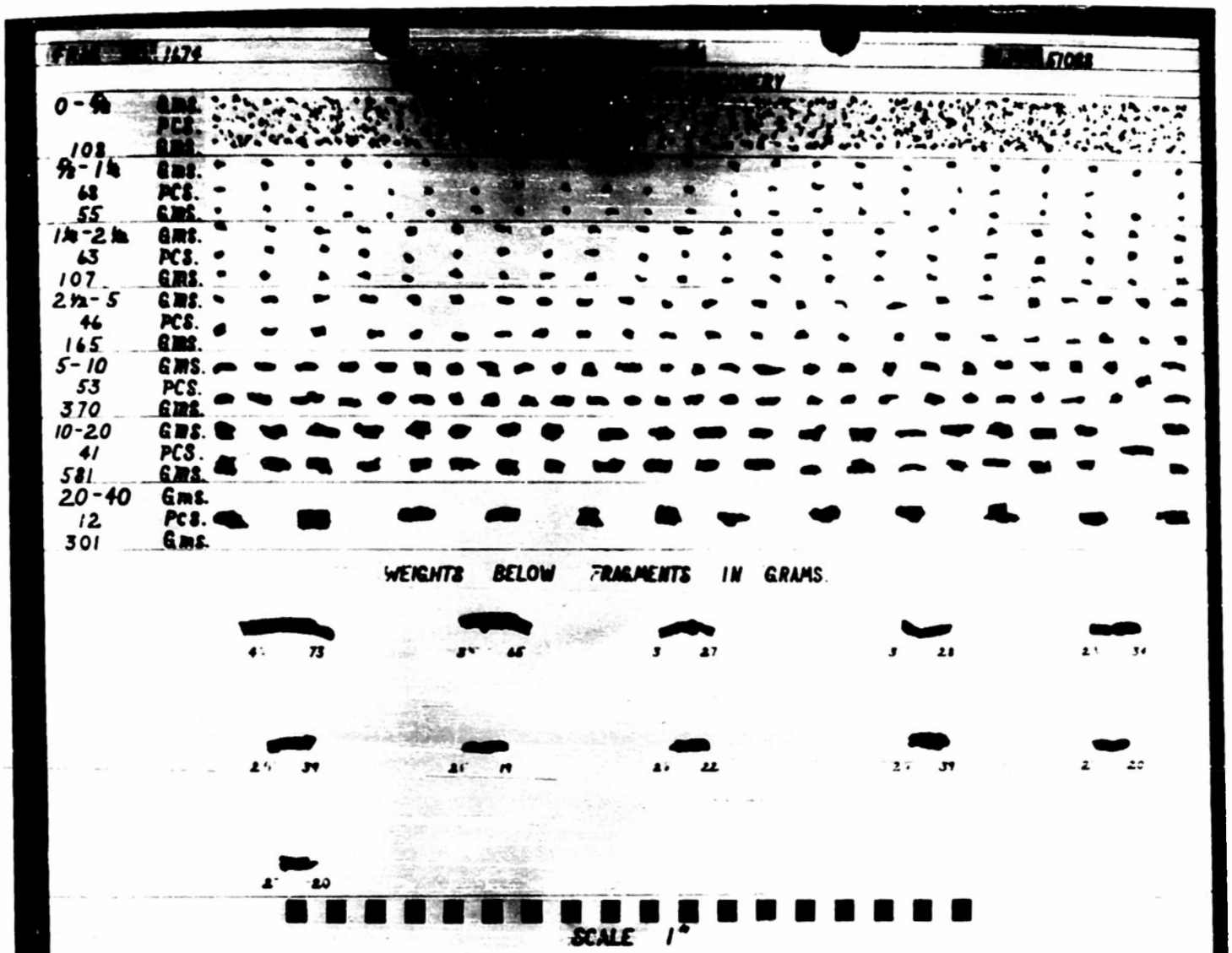
Water Pit Set-up for Warheads No. 124.
FIGURE 4





Fragments from Warhead No. 124 recovered from the Water Pit.
FIGURE 5

TABLE I

MASS DISTRIBUTION DATA

FRAGMENTATION OF WARHEAD NO. 124; COMPOSITION B LOADED

		NUMBER AND WEIGHT OF RECOVERED FRAGMENTS																
		0-0.625 grams		0.625-1.25 grams		1.25-2.5 grams		2.5-5 grams		5-10 grams		10-20 grams		20-40 grams		Total		Photo No. NP9
Warhead No.	Total Weight (lbs.)	Wt. gms.	No.	Wt. gms.	No.	Wt. gms.	No.	Wt. gms.	No.	Wt. gms.	No.	Wt. gms.	No.	Wt. gms.	No.	Wt. gms.	No.	
124-1	59.94	108	-	55	68	107	63	165	46	370	53	581	41	301	12	1687	283	51088

TABLE II

FRAGMENT VELOCITY DATA

Water Pit

40 Ft. Radius Arena — Date Fired: 19 August 1952

35mm Fastax Camera #1 — 2580 Frames per sec.

Rd. 1, Warhead No. 124 — Filler: Comp. B

Total Weight: 59.94 Lbs. — Filler Weight: 24.4 Lbs. (est.)

Frame in Which Hit Occurred	No. Rod-Like Fragments	Velocity (f/s)
19	2	5430
20	4	5160
21	1	4910
Median		5300
Average		5200

Fragmentation Test of Warhead No. 124

- -

TABLE II (Continued)

Water Pit

40 Ft. Radius Arena — Date Fired: 19 August 1952

35mm Fastax Camera #2 — 2580 Frames per sec.

Rd. 1, Warhead No. 124 — Filler: Comp. B

Total Weight: 59.94 Lbs. — Filler Weight: 24.4 Lbs. (est.)

Frame in Which Hit Occurred	No. Rod-Like Fragments	Velocity (f/s)
19	2	5430
20	4	5160
21	1	4910
Median		5300
Average		5200

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