FINAL REPORT
MARCH 1996

REPORT NO. 96-16

AMMUNITION PECULIAR EQUIPMENT (APE) 1955 GRENADE FUZE TESTER MIL-STD-398 TEST

Prepared for:
U.S. Army Defense Ammunition
Center and School
ATTN: SIOAC-DEM
Savanna, IL 61074-9639

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U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL
Savanna, Illinois

VALIDATION ENGINEERING DIVISION
SAVANNA, ILLINOIS 61074-9639

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19. ABSTRACT (Continue on reverse if necessary and identify by block number)

The U.S. Army Defense Ammunition Center and School (USADACS), Validation Engineering Division (SIOAC-DEV), was tasked by USADACS, Maintenance Engineering Division (SIOAC-DEM), to retest the ammunition peculiar equipment (APE) 1955 grenade fuze tester for shrapnel retention as defined in MIL-STD-398, Military Standard, Shields, Operational for Ammunition Operations, Criteria for Design of and Tests for Acceptance; Method 201, Fragment Retention Test.

This test was required to certify an engineering design change of the cleanout door assembly. The original design consisted of a concentric rotational door that covered the cleanout port where grenade fuzes were being tested. Tolerances between the rotational cleanout door and the drop table are specified at 1/64-inch. This size tolerance trapped frequent residue between the drop table and cleanout door, preventing the cleanout door from being easily opened for cleaning. (Continued)

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19. ABSTRACT. (Continued)

As a result of the difficulty in opening the cleanout door, it was redesigned as a hinged door to alleviate blast fragments from jamming the cleanout door.

Since this is the only structural change to the original APE 1955 grenade fuze tester, only the frequent retention test of MIL-STD-398 was required.

U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL
VALIDATION ENGINEERING DIVISION
SAVANNA, IL 61074-9639

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TABLE OF CONTENTS

PART 1

INTRODUCTION

A. BACKGROUND. Due to contamination buildup between the drop tube and the rotary cleanout door and difficulty in opening the rotary cleanout door, the design of the APE 1955 grenade fuze tester was changed. The change resulted in removing the rotary closing cleanout door with a tight-fitting hinged cleanout door. Due to this design change, the fuze tester had to be retested for conformance to MIL-STD-398, Military Standard Shields, Operational for Ammunition Operations, Criteria for Design of and Tests for Acceptance; Method 201, Fragmentation Confinement Tests.

B. AUTHORITY. This test was conducted IAW mission responsibilities delegated by U.S. Army Armament, Munitions and Chemical Command (AMCCOM), Rock Island, IL 61299-6000. Reference is made to Change 4, 4 October 1974, to AR 740-1, 23 April 1971, Storage and Supply operations; AMCCOMR 10-17, 13 January 1986, Mission and Major Functions of U.S. Army Defense Ammunition Center and School.

C. OBJECTIVE. The objective of this test was to determine the effectiveness of the hinged closeout door of the APE 1955 grenade fuze tester to retain fragments and fragmentation from functional grenade fuzes.

D. CONCLUSIONS. The maximum credible incident defined for this test is one grenade fuze. Four fuzes were functioned. The hinged cleanout door and the rest of the APE 1955 grenade fuze tester prevented the generation of secondary fragments, retained all fragments produced by the functioning grenade fuze, and prevented movement, overturning, and structural deformation to the test fixture.

E. RECOMMENDATION. Based on physical inspection of the APE 1955 grenade fuze tester in operation, it is recommended that the design change of the cleanout door be accepted for implementation on future production units.

PART 2

ATTENDEES

14 February 1996

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PART 3

TEST PROCEDURES

The APE 1955 grenade fuze tester was placed in the Savanna Army Depot Activity (SVDA), Surveillance workshop (SIOSV-SR), function test bay. Permanently mounted barricade shields provided personnel protection. The grenade fuze tester was modified for remote functioning behind the personnel barricade. A videotape camera was placed in front of the grenade fuze tester which focused on the area around the cleanout door. The videotape camera continuously recorded all tests. Both operators and test observers wore hearing protection devices.

Each grenade fuze functioned in the test fixture was mounted in a grenade simulator. The simulator was placed in the remotely controlled drop jaws at the top of the drop tube. The pull ring was connected to the pull ram. The loading door and the cleanout door were both closed. Operating personnel and test observers remained behind the barricade. A mirror was set in place to observe the area around the cleanout door. The grenade tester was remotely functioned.

Following functioning, the areas around the cleanout door, the APE 1955 base, and the floor surrounding the fuze tester were visually inspected for fragments and secondary fragments.

This process was repeated for four grenade fuzes.

PART 4

TEST RESULTS

TEST NO. 1. Smoke was observed escaping from the bottom of the cleanout door. Careful inspection of the fuze tester base revealed powder residue only. No fragments were found.

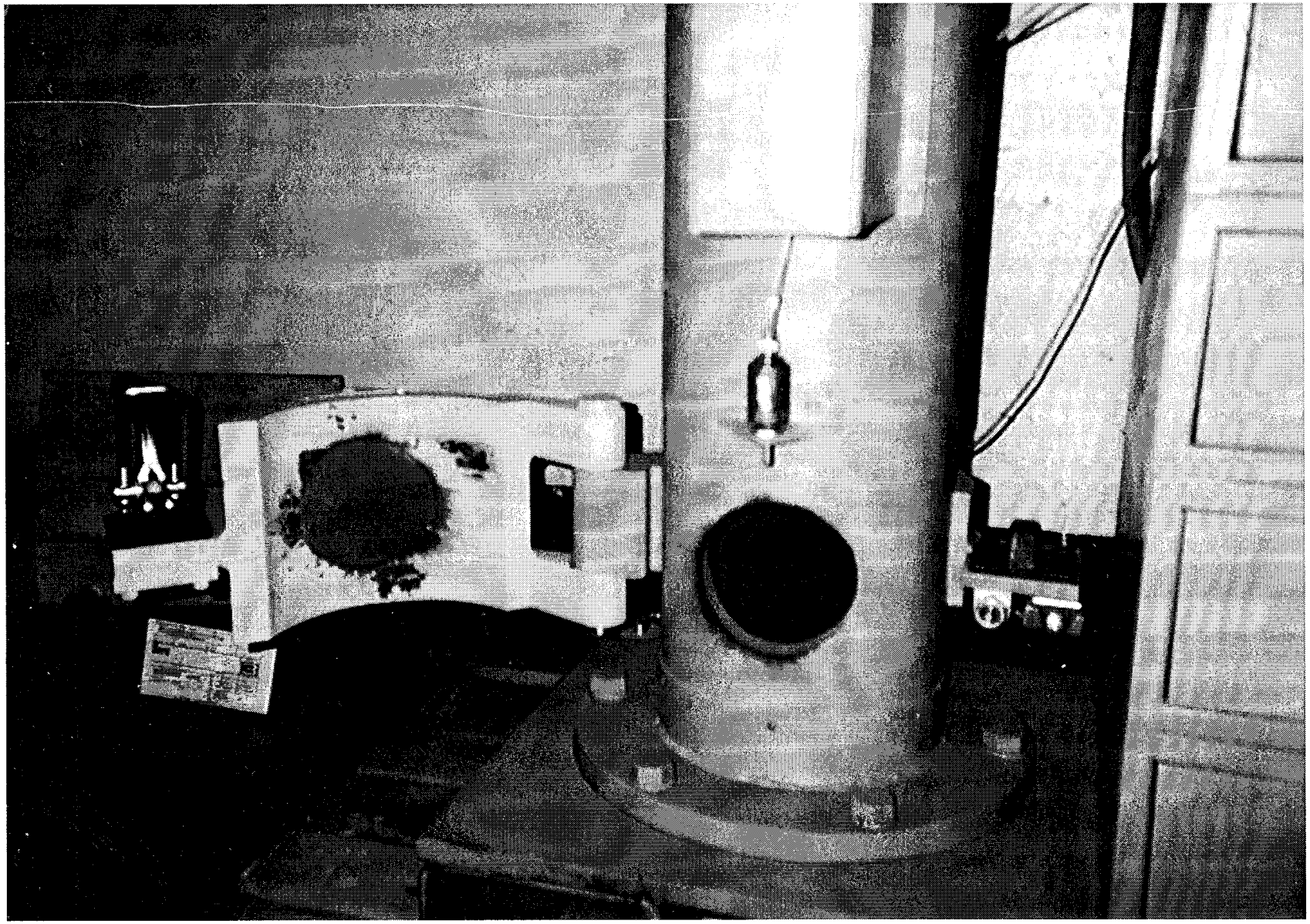
TEST NO. 2. Smoke was observed escaping from the bottom of the cleanout door. No fragments from the functioned fuze or secondary fragments were found.

TEST NO. 3. Smoke was observed escaping from the bottom of the cleanout door. No fragments from the functioned fuze were found outside of the fuze tester.

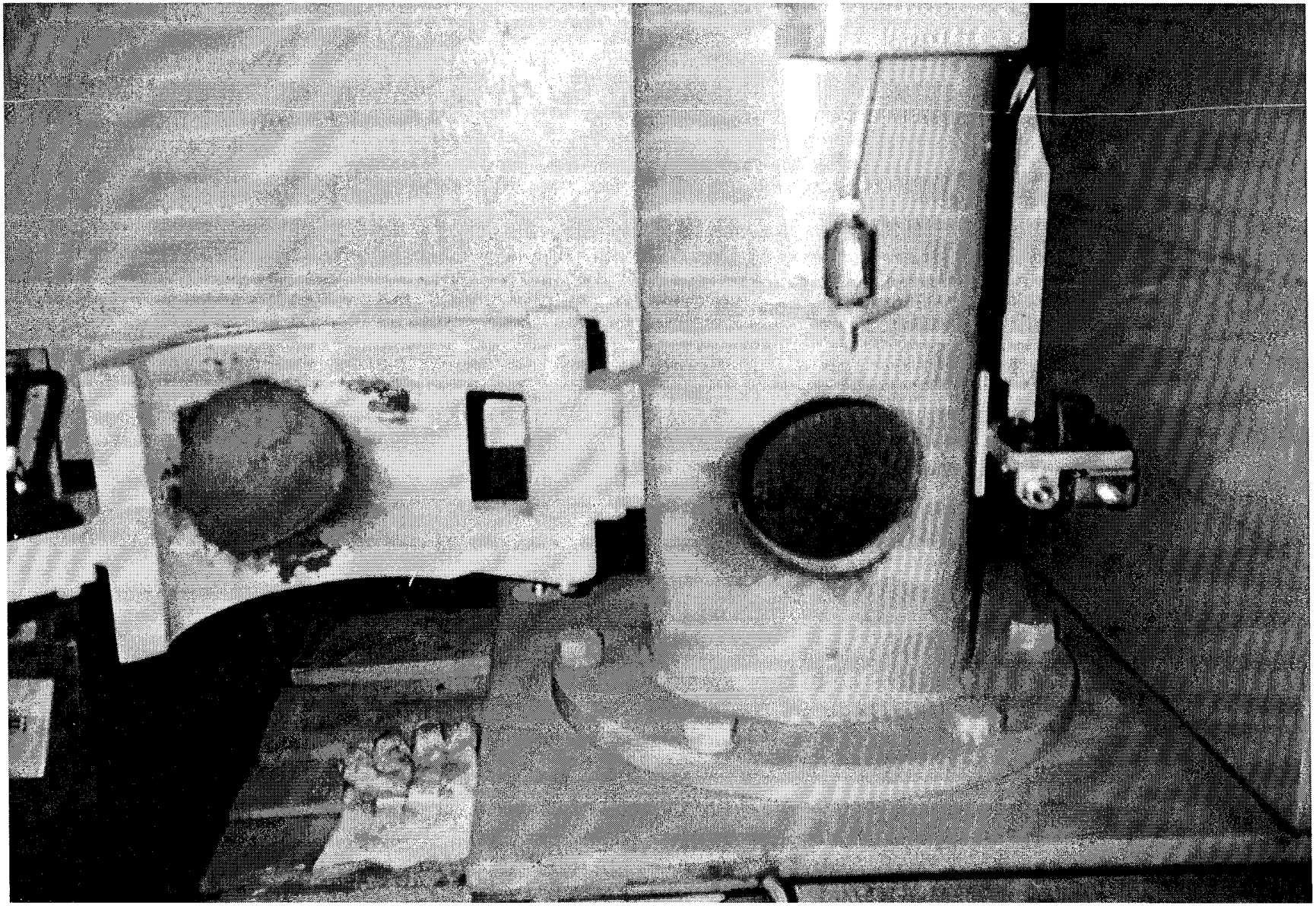
TEST NO. 4. Smoke was observed escaping from the bottom of the cleanout door. Again, no fragments or secondary fragments were found. No movement, overturning, or structural deformation was found in the APE 1955 grenade fuze tester.

PART 5

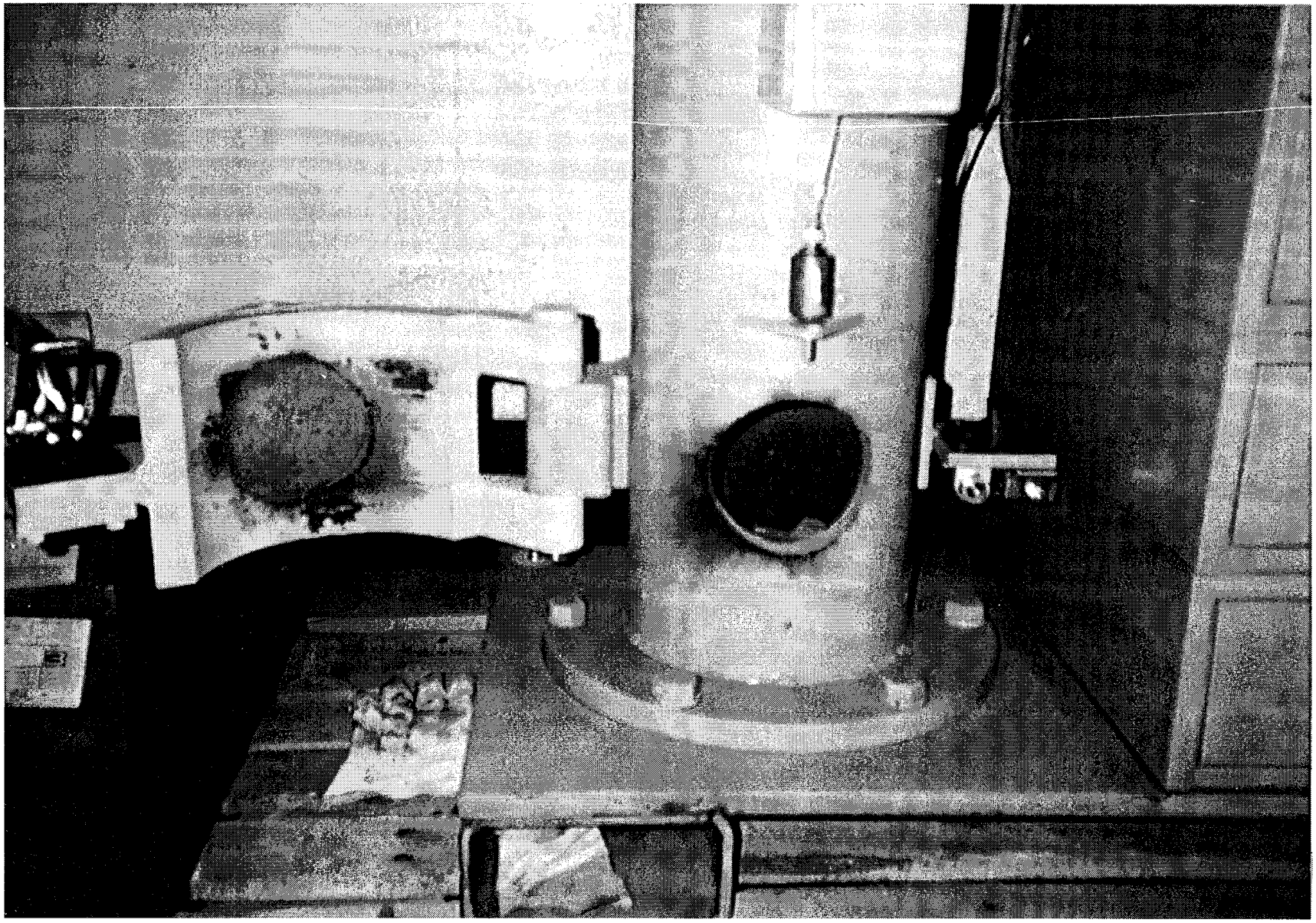
PHOTOGRAPHS



	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	
Photo No. USADACS-DEV-96-16-01. This photo shows a closeup view of the APE 1955 modified cleanout door after functioning a grenade fuze. Note smoke residue at the lower left of the cleanout hole and lower right on the door. No schrapnel was found outside the drop tube.		



	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	
Photo No. USADACS-DEV-96-16-02. This photo shows a closeup view of the APE 1955 modified cleanout door after functioning four grenade fuzes. Note smoke residue on the drop tube and cleanout door. No schrapnel was found outside the drop tube.		



	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	

Photo No. USADACS-DEV-96-16-03. This photo shows a closeup view of the APE 1955 modified cleanout door after functioning four grenade fuzes. Note smoke residue on the drop tube and cleanout door. No schrapnel was found outside the drop tube.

PART 6

APPENDIX

DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY INDUSTRIAL OPERATIONS COMMAND
ROCK ISLAND, ILLINOIS 61299-6000

REPLY TO
ATTENTION OF

AMSIO-DMS (715-fff) 01 DEC 1995

MEMORANDUM FOR Director, U.S. Army Defense Ammunition Center and School, ATTN: SIOAC-DEM, Savanna, IL 61074-9639

SUBJECT: Testing the APE 1955, Grenade Fuze Tester

1. Redesign of the lower access door of the APE 1955 is complete. Because the APE 1955 was previously tested and accepted, only the lower access door requires testing.

2. The primary test objective is to demonstrate fragments will not exit the lower access door. Testing for heat flux and overpressure is not required. Use the fuze with the largest net explosive weight for the test. The addition of a 25 percent overcharge is not required since it is not easy to add the charge to a fuze. The test was repeated three times.

3. The POC is Mr. Robert Loyd, AMSIO-DMS, DSN 793-2975, E-mail amsio-dms@ria.emh2.army.mil.

FOR THE COMMANDER:

for Glenn S. Leach
DAVID P. SKOGMAN
Chief, Safety Office

CF: AMSIO-SMA-N

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