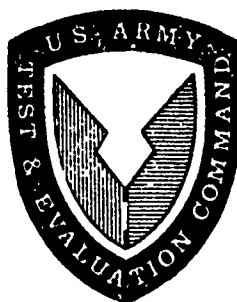


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SERVICE TEST OF
GRENADE, HAND, PRACTICE, XM69

FINAL REPORT

By

MAJOR DONALD J. MARNON

December 1969

UNITED STATES ARMY INFANTRY BOARD
Fort Benning, Georgia 31905

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DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY TEST AND EVALUATION COMMAND
ABERDEEN PROVING GROUND, MARYLAND 21005 JTC Dissck/sr/3608

AMSTE-BC

26 MAR 1970

SUBJECT: Final Report, Engineering Test and Service Test of Grenade,
Hand: Practice, Delay, XM69, USATECOM Project Nos. 8-MU-
013-069-002 and 003

Project Manager
Selected Ammunition
ATTN: AMCPM-SA2
Dover, New Jersey 07801

1. References.

- a. Letter, AMCPM-SA2, Project Manager for Selected Ammunition (FM-SA), dated 25 August 1969, subject: Grenade, Hand, Training, Delay, XM69.
- b. Letter, FOR-OT-UT, Department of the Army, dated 8 October 1969, subject: Deletion of Component Items to Hand Grenade, Practice.
- c. Letter, AMSTE-EC, US Army Test and Evaluation Command (USATECOM), dated 26 November 1969, subject: Service Test Plan for Grenade, Hand, Practice, XM69 with 1st Indorsement, ATOPS-TMG-TSN, US Continental Army Command (CONARC), dated 16 December 1969.
- d. Message, AMSTE-BC, USATECOM, dated 17 February 1970, subject as above.

2. Approval Statement. Subject reports are approved.

3. Background of Test.

- a. Department of the Army directed the replacement of the M26-series Hand Grenade with the Improved M33-series Hand Grenade (Baseball). As a result, it was necessary to provide a practice grenade for the new standard grenade. In order to assure proper troop training in the use of the recently changed body shape of the standard item, subject practice grenade was developed.

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b. With the introduction of secondary safety clip for hand grenades, the model designators were changed from those associated with the same grenades with a safety pin only. Listed are the model numbers of pertinent HE and practice grenades and equivalent ones with the safety clip added:

GRENADE MODELS

<u>Less Safety Clip</u>	
<u>HE</u>	<u>Practice</u>
M26(Oval Shaped)	M30

<u>With Safety Clip</u>	
<u>HE</u>	<u>Practice</u>
M61	M62

M33(Basoball None Shaped)

M67 XM69 (Test Item)

c. The XM69 practice hand grenade consists of five basic parts: a reusable non-fragmenting body, a black powder charge, the XM228 fuze, a plastic stopper, and a secondary safety clip.

d. The engineering test was conducted at Aberdeen Proving Ground (APG) and the service test at the US Army Infantry Board (USAIB). No additional testing of subject item is currently programmed.

4. Test Results.

a. No deficiencies or shortcomings were found during testing.

b. The test item met all of the 17 requirements. A total of 705 test grenades and 455 control grenades (M62) were detonated during service testing and 375 test grenades were detonated during engineering testing.

c. The overall functioning reliability was 97% at the 90% confidence level for the engineering test and 98% at the 90% confidence level for the service test. The established criterion was 95% reliability at the 90% confidence level and this was met in each test.

d. The test grenade was capable of being reused as many times as the M62 control grenade.

e. The test grenade was sufficiently durable to withstand the abuse normally encountered in training.

f. The test grenade required no maintenance in excess of that required for the M62 control grenade.

g. The average fuze functioning time for the practice test grenade was comparable to that of its standard counterpart.

5. Comments.

a. No specific military characteristics have been stated for the test

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item. However, the test grenade was designed to meet the specification and safety requirements established for other practice grenades, considering that it utilized former Standard A components with minor alterations. Criteria selected were the same as those used for the previous standard practice grenade, M62.

b. The test item compared favorably with the control practice grenade in all aspects. Ten trainees from the US Army Training Center, Fort Benning, Georgia, judged the test grenade to be easier to handle and throw than the control grenade. There was no significant difference in scores obtained using both grenades while running the grenade assault course.

c. The powder charge and plastic plug were considered to be nonessential items since test soldiers could detect the point of detonation 40 meters away by the noise and smoke caused by detonation of the fuzed body without the powder charge and plug.

d. By message referenced in paragraph 1d, this headquarters responded to an urgent request from Picatinny Arsenal for a formal position as to the suitability for Army use of the tested item. The conclusions below are reiterations.

6. Conclusions.

a. The XM69 Practice Hand Grenade is suitable for US Army use.

b. The powder charge and plastic plug are nonessential components of the XM69 Practice Hand Grenade.

7. Recommendation. The powder charge and plastic plug be deleted as components of the XM69 Practice Hand Grenade.

FOR THE COMMANDER:



GOODWIN MORROW
Acting Director
Inf Mat Test Dir

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ABSTRACT

A Service Test of the XM69 Practice Hand Grenade (XM69) (with XM228 fuze) was conducted by the US Army Infantry Board (USAIB) at Fort Benning, Georgia, from 3 November to 8 November 1969. The purpose of the test was to determine, under actual or simulated field conditions, the suitability of the XM69 and its associated reusable spare parts for use as a training item by the US Army.

Specific test phases to which the XM69 was subjected were physical characteristics, safety, functional suitability, reliability, durability, maintainability, human factors, and value analysis. The performance of the XM69 was compared to the M67 fragmentation hand grenade and the M62 practice hand grenade in applicable subtests.

There were no deficiencies or shortcomings found during testing. It was found during the Value Analysis subtest that the powder charge and plastic plug were nonessential items. The test grenade, if cleaned of all foreign matter after each throw, can be reused a minimum of 300 times.

An interim report of test was submitted to Headquarters, US Army Test and Evaluation Command on 12 November 1969 giving tentative results and recommendations. This final report reflects the same results and recommendations.

USAIB concluded that the XM69 Practice Hand Grenade is suitable for US Army use, and recommended that the powder charge and plastic plug be deleted as components to the XM69.

FOREWORD

The US Army Infantry Board was responsible for test planning, test execution, and test reporting.

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SECTION 1. SUMMARY

1.1 BACKGROUND

1.1.1 With the introduction of the secondary safety clip in the design of the current family of hand grenades, the model numbers of the grenades with safety clip were changed from the numbers associated with those grenades with safety pin only. Listed below are the original model numbers of pertinent current standard grenades and the corresponding ones with safety clip.

ORIGINAL

WITH SAFETY CLIP

M26A1 HE w/M204A2 Delay Fuze

M61

M30 Practice w/M205A2 Practice, Delay Fuze

M62

M33 HE w/M213 Delay Fuze

M67

1.1.2 The M67 HE, Fragmentation Hand Grenade is being fielded and it is understood that it may eventually replace the M61-type hand grenades in Army use. There is at present no practice version of this hand grenade. Therefore, with the fielding of the HE version of the M67 grenade, a requirement for a practice version exists. Picatinny Arsenal was given the task of developing a companion practice hand grenade. This has led to the development, on an expedited basis, of the XM69 Practice Hand Grenade (XM69) with XM228 Practice Hand Grenade Fuze (Delay) (XM228).

1.1.3 No specific military characteristics have been stated. The test grenade was designed to meet the specification and safety requirements established for other practice grenades. An engineer design test of the XM69 was scheduled by Materiel Test Directorate at Aberdeen Proving Ground, Maryland, for the second quarter of fiscal year 1970.

1.1.4 On 3 October 1969 the US Army Test and Evaluation Command (USATECOM) directed the US Army Infantry Board (USAIB) to conduct a service test of the XM69 under prevailing intermediate climatic conditions at Fort Benning, Georgia.

1.1.5 Testing was conducted during the period 3 November - 8 November 1969.

1.1.6 An interim report of service test was submitted to Headquarters, USATECOM on 12 November 1969 (ref 15, app V).

1.2 DESCRIPTION OF MATERIEL (See figure 1, app I, showing components)

1.2.1 The hand grenade, XM69, consists of 5 basic parts:

- a. A reusable non-fragmenting body.
- b. A black powder charge.
- c. An XM228 fuze.
- d. A plastic stopper.
- e. A safety clip.

1.2.2 The XM69 grenade body is made of steel and is painted blue with a $\frac{1}{4}$ -inch-wide brown band around the neck of the body. The maximum diameter is 2.62 inches and the complete weight, loaded and fuze, is 14 ounces.

1.2.3 The charge is 37.5 grains of black powder contained in a plastic bag. This charge is the same as used in the M62 practice grenade.

1.2.4 The fuze, XM228, is identical to the M213 delay (4 to 5 seconds) fuze used in the M67 grenade except 10 grains of black powder replace the high explosive booster pellet in the booster cup. The XM228 uses the same components as the M213 fuze and its functional and physical characteristics are identical to the M213 fuze in all other respects.

1.2.5 The plastic plug is the same as the plastic plug used in the M62 practice grenade.

1.2.6 The safety clip is a device to keep the grenade handle in place should the safety pin be unintentionally withdrawn and is used in conjunction with the safety pin. It is the same safety clip that is used with the M67 grenade.

1.2.7 The XM69 grenade is not issued as a complete round; the components are issued as required.

1.3 TEST OBJECTIVES

1.3.1 The overall service test objective was to determine, under actual or simulated field conditions, the suitability of the XM69 practice grenade, and its associated reusable spare parts, for use as a training item by the Army.

1.3.2 To confirm that the XM69 practice grenade is safe for Army use.

1.3.3 To evaluate the maintenance package and maintenance procedures in accordance with USATECOM Reg 750-15 and AMC Reg 750-15.

1.4 SCOPE

The service test was conducted at Fort Benning, Georgia, during the period 3 November - 8 November 1969. Six test soldiers from USAIB and ten trainees from the US Army Training Center, Fort Benning, Georgia, representative of those who would be expected to use and maintain the XM69 during training, were used in testing. The M62 practice grenade and the M67 fragmentation grenade were used as control grenades. The control grenade (M67) was used for comparison purposes with the XM69 in the Physical Characteristics and Human Factors subtests. The control grenade (M62) was used for all other comparison purposes with the XM69. Testing was conducted under field training conditions. Temperatures during testing varied from 45° to 68° F. Seven hundred and five test grenades and 455 control grenades (M62) were detonated during testing. The fuze functioning time was determined by detonating 678 test grenades and 434 control grenades (M62) of the above total. Since a separate Qualitative Materiel Requirement exists for a maneuver training grenade, tactical aspects of testing such as compatibility with load carrying equipment were not addressed.

On 28 October 1969, US Continental Army Command directed the US Army Infantry School (USAIS) to delete the use of powder charge and plastic plug as components to the M62 Practice Hand Grenade (ref 14, app V). Because of this directive, additional exercises were conducted wherein the test grenades were thrown without powder charge and plastic plug. The purpose of these exercises was to determine whether the XM69 used without powder charge and plastic plug gives the desired training results.

During the reusability exercise, one test grenade was reused 300 times without the powder charge and plastic plug. During the exercise in Subtest 3, when six test grenades and six control grenades (M62) were reused 50 times, three of the test grenade bodies and three of the control grenade bodies (M62) were not cleaned of all foreign matter after each throw. The purpose of this was to obtain information on how many times the grenade bodies could be reused before the bodies had to be cleaned prior to inserting a new fuze.

1.5 SUMMARY OF RESULTS

1.5.1 There were no deficiencies or shortcomings found during testing.

1.5.2 With the exception of color and markings and an insignificant weight difference, the test grenade has the same physical characteristics as the control grenade (M67) (Subtest No 1).

1.5.3 The test grenade required no additional safety precautions than required for the control grenade (M62) and was considered safe for US Army use (Subtest No 2).

1.5.4 The test grenade exceeded the desired functional reliability criteria of 90% (90% level of confidence) (Subtest No 3).

1.5.5 The average fuze functioning time for the test grenade was between 4.0 seconds and 5.0 seconds (Subtest No 3).

1.5.6 Test soldiers could detect the point of detonation of the test grenade (when used with or without the powder charge and plastic plug) 40 meters away by the noise and smoke caused by its detonation.

1.5.7 The test grenade was capable of being reused as many times as the control grenade (M62). The test grenade, if cleaned of all foreign matter after each throw, can be reused a minimum of 300 times (Subtest No 3).

1.5.8 The test grenade was sufficiently durable to withstand the abuse normally encountered in training usages (Subtest No 3).

1.5.9 The test grenade required no maintenance in excess of that required for the control grenade (M62) (Subtest No 4).

1.5.10 The test grenade was suitable with respect to the capabilities, limitations, and habit patterns of the soldier user (Subtest No 5).

1.5.11 The powder charge and plastic plug were considered to be non-essential items. No other nonessential or "nice-to-have" items were found during testing (Subtest No 6).

1.6 CONCLUSIONS

- a. The XM69 Practice Hand Grenade meets all criteria established.
- b. The powder charge and plastic plug are nonessential components of the XM69 Practice Hand Grenade.
- c. The XM69 Practice Hand Grenade is safe for US Army use.
- d. The XM69 Practice Hand Grenade is suitable for US Army use.

1.7 RECOMMENDATIONS (no change from interim report)

The United States Army Infantry Board recommends that the powder charge and plastic plug be deleted as components of the XM69 Practice Hand Grenade.

SECTION 2. DETAILS OF TEST

2.1 SUBTEST NO 1, PREOPERATIONAL INSPECTION AND PHYSICAL CHARACTERISTICS

2.1.1 Objectives

2.1.1.1 To determine the receipt condition of the test grenade.

2.1.1.2 To verify the completeness of the shipment.

2.1.1.3 To determine whether the test grenades were in condition to be tested.

2.1.1.4 To compare the physical characteristics of the test grenade with those stated in the Draft Technical Manual (DTM) and with those of the M67 fragmentation grenade.

2.1.2 Criteria

2.1.2.1 The size, weight, and shape of the test grenade must be the same as the control grenade (M67). (Ref item 1, app II)

2.1.2.2 Except for color and markings which identify it as a training device, the identification features of the test grenade must be the same as the control grenade (M67). (Ref item 2, app II)

2.1.3 Method

2.1.3.1 The test grenade's components were inspected for serviceability and for any evidence of damage incurred during shipment.

2.1.3.2 The test grenade's components were counted and the total compared against the total listed in the shipping document. The lot numbers of the test fuzes were compared against the lot numbers listed in the shipping documents. The Federal Stock Numbers (FSN) in the shipping document were compared with the FSN's listed in the DTM.

2.1.3.3 Three test grenades and three control grenades (M62) were thrown to determine whether the grenades were in condition for testing.

2.1.3.4 Three test grenades were weighed, measured, and photographed.

2.1.3.5 Three control grenades (M67) were weighed, measured, and photographed.

2.1.4 Results

2.1.4.1 All test grenade components were found to be in serviceable condition and no items were damaged in shipment.

2.1.4.2 Eight hundred XM228 test fuzes (80 Lot No 90414 - 720 Lot No 90576), 250 plastic base plugs, 250 safety clips (XM69), 500 M205A2 fuze (Lot No 10P-9-2), 250 safety clips (M62), 1200 powder charges, 50 steel bodies, XM69, 50 cast iron bodies, M62, 120 M67 fragmentation hand grenades, and 60 M61 fragmentation hand grenades were present for testing. All test components' FSN's were the same as the FSN's listed in the DTM.

2.1.4.3 Three test grenades were thrown and functioned satisfactorily. Three control grenades (M62) were thrown and functioned satisfactorily.

2.1.4.4 The average weight and width measurements of 3 test grenades were 14.77 ounces, and 2.5 inches, respectively. Photographs of the test grenade and components are shown in figure 1, app I.

2.1.4.5 The average weight and width measurements of 3 control grenades were 15.52 ounces, and 2.5 inches, respectively. A photograph of the control grenade (M67) is shown in figure 2, app I.

2.1.4.6 The test grenade and control grenade have the same physical characteristics with the exception of color and markings.

2.1.5 Analysis

2.1.5.1 All test items were in serviceable condition and in sufficient quantity for testing.

2.1.5.2 The required amount of test and control items was on hand to initiate testing.

2.1.5.3 The test grenades and control grenades (M62) functioned satisfactorily.

2.1.5.4 With the exception of color and markings and an insignificant average weight difference of .7 ounce less than the control grenade, the test grenade has the same physical characteristics as the control grenade (M67).

2.2 SUBTEST NO 2, SAFETY

2.2.1 Objectives

2.2.1.1 To determine the effectiveness of the safety features of the test grenade.

2.2.1.2 To determine the adequacy and completeness of the safety instructions contained in the DTM and the developer's safety release.

2.2.2 Criteria

The grenade must require no additional safety precautions beyond those currently required for the standard practice grenade. (Ref item 3, app II)

2.2.3 Method

2.2.3.1 During all testing observations were made to determine the effectiveness of the safety clip and safety pin in precluding accidental detonation. (A total of 705 test grenades and 455 control grenades (M62) was thrown with safety clip and safety pin attached.)

2.2.3.2 All precautions or limitations prescribed in the DTM and the developers safety release for the test grenade were observed during all testing.

2.2.3.3 Ten test grenades and 10 control grenades (M62) (all with safety clip, fuze, powder bag, and plastic plug) were detonated one at a time in the center of a circle with a radius of 18 meters. The outer edge of the circle had a 6-foot-high wall constructed of brown wrapping paper. A 3-foot-high wall of brown wrapping paper was also constructed within the above circle at the 5, 10, and 15-meter marks. Observations were made during this exercise to determine whether the primer holder and striker assembly of the fuze or any other parts of the grenade were projected as fragments beyond 18 meters.

2.2.3.4 The exercise described in paragraph 2.2.3.3 was repeated except no powder charge and plastic plug were used.

2.2.3.5 Observations were made during all subtests on the safety aspects of the test grenade.

2.2.4 Results

2.2.4.1 No accidental detonations occurred during testing.

2.2.4.2 No additional precautions or limitations other than those prescribed in the DTM and the developer's safety release were observed during testing.

2.2.4.3 During the exercise described in paragraph 2.2.3.3 no fragments were projected beyond 10 meters from the center of the circle.

2.2.4.4 During the exercise described in paragraph 2.2.3.4 no fragments were projected beyond 5 meters from the center of the circle.

2.2.5 Analysis

2.2.5.1 The safety clip and safety pin preclude accidental detonation of the test grenade.

2.2.5.2 The safety portion of the DTM and the developer's safety release is adequate.

2.2.5.3 The test grenade when functioned with the safety clip, fuze, powder charge, and plastic plug requires no additional safety precautions than required for the control grenade (M62).

2.2.5.4 The test grenade when functioned without powder charge and plastic plug requires no additional safety precautions than required for the control grenade (M62) without powder charge and plastic plug.

2.2.5.5 The test grenade is safe for US Army use when used as described in the DTM.

2.3 SUBTEST NO 3, FUNCTIONAL SUITABILITY, RELIABILITY, AND DURABILITY

2.3.1 Objectives

2.3.1.1 To determine the functional suitability of the test grenade.

2.3.1.2 To determine the reliability of the test grenade.

2.3.1.3 To determine the durability of the test grenade.

2.3.2 Criteria

2.3.2.1 This practice item must function reliably in 95% of usage (essential) 98% (desirable). (Ref item 4, app II)

2.3.2.2 The test grenade shall detonate by action of the time element between 4.0 to 5.0 seconds after arming. (Ref item 5, app II)

2.3.2.3 The noise and smoke produced by the detonation of the test grenade must be sufficient to enable the average soldier to detect detonation at 40 meters. (Ref item 6, app II)

2.3.2.4 This test grenade body will be capable of reuse as many times as the control grenade (M62). (Ref item 7, app II)

2.3.2.5 This test grenade will be sufficiently durable to withstand the abuse normally encountered in training usage. (Ref item 8, app II)

2.3.3 Method

2.3.3.1 During the conduct of all testing a total of 455 control grenades (M62) and 705 test grenades was thrown.

2.3.3.2 Six test soldiers each threw a total of 55 control grenades (M62) (1 grenade body was reused 50 times and the remaining 5 were randomly selected grenade bodies) at a target located 40 meters to their front. The center of the target had a distinct aiming point. The fuze functioning time was recorded by 3 NCO recorders with stop watches. After each throw the test soldier inspected the body of the grenade for cracks and cuts and then reloaded the grenade with a fuze, powder bag, plastic plug, and safety clip. Three of the grenade bodies were cleaned of all foreign matter prior to reloading, and three of the bodies were not cleaned but reused until cleaning became necessary to fit the fuze, powder charge, and plastic plug into the grenade body. The test soldiers were questioned after each throw to determine whether they could detect the point of detonation of the grenade by the noise and smoke.

2.3.3.3 Six test soldiers each threw a total of 55 test grenades (1 grenade body was reused 50 times and the remaining 5 were randomly selected grenade bodies) at a target located 40 meters to their front. The center of the target had a distinct aiming point. Three NCO recorders measured the fuze functioning time with stop watches. This information was verified by use of a visicorder. After each throw the test soldier inspected the body of the grenade for cracks and cuts and then reloaded the grenade with a fuze, powder bag, plastic plug, and safety clip. Three of the grenade bodies were cleaned of all foreign matter prior to reloading; three of the bodies were not cleaned but were reused until cleaning became necessary to fit the fuze, powder charge, and plastic plug into the grenade body. The test soldiers were questioned after each throw to determine whether they could detect the point of detonation of the grenade by the noise and smoke. The detonation of 10 of the grenades thrown in this subtest was photographed with a high speed camera and compared in the Value Analysis subtest.

2.3.3.4 Six test soldiers each threw 2 test grenades and 2 control grenades (M62) with powder charge and plastic plug into a ditch filled with 6 inches of water, located 5 meters to their front. (In the plan of test it called for a distance of 25 meters, but this was changed to 5 meters to insure that all grenades went into the water.) The fuze functioning time on all grenades was measured by 3 NCO's with stop watches. After each throw the test soldier inspected the body of the grenade for cracks and cuts. Observers were stationed 40 meters from the ditch and were questioned after each throw to determine whether they could detect the point of detonation of the grenade by the noise and smoke.

2.3.3.5 The exercise described in paragraph 2.3.3.4 was repeated except that 5 test soldiers each threw only 2 test grenades without powder charge and plastic plug.

2.3.3.6 Six test soldiers each threw 6 test grenades and 6 control grenades (M62) (with powder charge and plastic plug) on a concrete slab located 25 meters to their front. (In the plan of test, each test soldier was to throw 2 each test and control grenades, but this was increased to 5 each to get a better sample size.) The fuze functioning time was measured on all grenades by 3 NCO's with stop watches. After each throw the test soldier inspected the body of the grenade for cracks and cuts.

2.3.3.7 One test grenade body without fuze, safety clip, powder charge and plastic plug was thrown 8 times against a concrete wall with full force from a distance of 5 meters to inflict maximum punishment on the body. After each throw the grenade body was inspected for cracks and cuts.

2.3.3.8 One control grenade body (M62) without fuze, safety clip, powder charge, and plastic plug was thrown 2 times against a concrete wall with full force from a distance of 5 meters to inflict maximum punishment on the body. After each throw the grenade body was inspected for cracks and cuts.

2.3.3.9 Six test soldiers each threw 2 test grenades and 2 control grenades (M62) at a wooden wall located 25 meters to their front. The fuze functioning time was measured on all grenades by 3 NCO's with stop watches. After each throw the test soldier inspected the body of the grenade for cracks and cuts.

2.3.3.10 One of the test grenade bodies reused fifty times in paragraph 2.3.3.3 was reused an additional 250 times, without powder charge and plastic plug. The interior of the grenade body was cleaned of accumulated foreign matter only when it became necessary to do so to permit the insertion of a new fuze. The fuze functioning time on all grenades was measured by 3 NCO's with stop watches.

2.3.4 Results

2.3.4.1 During all testing a total of 455 control grenades (M62) was thrown. One fuze failed to function.

2.3.4.2 During all testing a total of 705 test grenades was thrown. Seven fuzes failed to function. The 7 failures were caused by the striker of the fuze not impacting the primer with sufficient force to cause detonation. The apparent reason for this lack of force was the lack of a proper angle on the top of the striker caused by incorrect stamping during manufacture (see figure 3, app I). Two of the 7 fuzes had the strikers replaced with previously thrown strikers and were detonated.

2.3.4.3 Neither the test grenade nor control grenade (M62) bodies were appreciably damaged by impact or detonation except the test and control bodies mentioned in paragraphs 2.3.4.11 and 2.3.4.12.

2.3.4.4 The desired functional reliability of 98% with a 90% level of confidence was exceeded by both the test grenade and the control grenade (M62). The test grenade, using a sample size of 705 with 7 failures, obtained a 98% reliability with a 96% level of confidence. The control grenade (M62), using a sample size of 455 with 1 failure, obtained a 98% reliability with a 99% level of confidence.

2.3.4.5 During all testing a total of 434 control grenades (M62) had the functioning time of the fuze measured with stop watches. The average functioning time was 4.96 seconds. No times were recorded below 4.0 seconds and 5 were recorded above 5 seconds (see chart 3-1, app I).

2.3.4.6 During all testing a total of 678 test grenades had the functioning time of the fuze measured with stop watches. During the exercise described in paragraph 2.3.3.4, only 280 test grenades out of the 330 test grenades fired were recorded with the visicorder due to technical difficulties with the visicorder. The average time of the functioning of the 280 test fuzes recorded with the visicorder was 4.67 seconds. The average time of the functioning of the 678 test fuzes recorded by stop watches was 4.74 seconds. None of the times recorded with the visicorder or with the stop watches was below 4.0 seconds or above 5 seconds (see chart 3-2, app I).

2.3.4.7 During all testing the test soldiers were able to identify the point of detonation from 40 meters away by the noise and smoke produced by the detonation.

2.3.4.8 During the exercises described in paragraphs 2.3.3.2 and 2.3.3.3, 6 test grenades and 6 control grenades (M62) were reused 50 times each. No damage was incurred to either the test grenade or control grenade (M62) body by the impact with the ground or the detonation. The test soldiers who threw the 3 test grenades and 3 control grenades (M62) which were cleaned of all foreign matter after each throw had no difficulty in inserting the new fuze, powder charge, and plastic plug into the grenade body. The test soldiers who threw the 3 test grenades and 3 control grenades (M62) that were not cleaned of all foreign matter after each throw experienced some difficulty in inserting the new fuze, powder charge, and plastic plug into the grenade body due to a build-up of aluminum residue from the expended fuze.

2.3.4.9 During the exercises described in paragraphs 2.3.3.4 and 2.3.3.5, all grenades functioned. The point of detonation was detected by observers stationed 40 meters away by the noise and smoke caused by the detonation. The signature effects of noise and smoke produced by the test grenades when thrown without powder charge and plastic plug were not as noticeable as when thrown with the powder charge and plug, but were clearly audible and visible to the observers stationed 40 meters away. No damage was incurred on any of the grenade bodies by the impact of the grenade or its detonation.

2.3.4.10 During the exercise described in paragraph 2.3.3.6, all grenades functioned and no appreciable damage occurred to the grenade bodies by the impact or the detonation.

2.3.4.11 During the exercise described in paragraph 2.3.3.7, the test grenade body was noticeably dented after eight throws (see figure 5, app I). A new fuze and plug were inserted into the grenade body and it functioned properly.

2.3.4.12 During the exercise described in paragraph 2.3.3.8, the control grenade body (M62) shattered upon impact with the concrete wall after the second throw (see figure 4, app I).

2.3.4.13 During the exercise described in paragraph 2.3.3.10, the test grenade body was reused 250 times for a total of 300 times for that particular grenade body. The powder charge and plastic plug were not used in this exercise. The grenade body was not cleaned of all foreign matter after each throw, but was reused until it was necessary to clean it to insert a new fuze. Chart 3-3, appendix I, depicts when cleaning was required to insert a new fuze and time required to clean the grenade body. The grenade body was inspected after each throw and there was no damage to the grenade body. The test grenade reused 300 times was cut open upon completion of the exercise and the inside of the grenade was examined. No deterioration or damage was detected on the inside of the grenade body.

2.3.5 Analysis

2.3.5.1 The test grenade and control grenade (M62) exceed the desired functional reliability criteria of 98% (90% confidence level).

2.3.5.2 The average fuze functioning time for the test grenade and control grenade (M62) is between 4.0 seconds and 5.0 seconds, meeting the established criteria.

2.3.5.3 The average soldier is able to detect the point of detonation of the test grenade and control grenade (M62) 40 meters away by the noise and smoke caused by its detonation.

2.3.5.4 The test grenade body is capable of being reused as many times as the control grenade (M62) and could be reused indefinitely if cleaned of all foreign material after each throw.

2.3.5.5 The test grenade and control grenade (M62) are sufficiently durable to withstand the abuse normally encountered in training usage.

2.4 SUBTEST NO 4, MAINTAINABILITY

2.4.1 Objective

To determine the adequacy of the maintenance portion of the DTM for the test item.

2.4.2 Criteria

The grenade shall require no maintenance in excess of that required for the control grenade (M62). (Ref item 9, app II)

2.4.3 Method

2.4.3.1 During testing, all maintenance prescribed by the DTM was performed on the test grenade and control grenade (M62).

2.4.3.2 During testing, all maintenance performed on the test grenade and control grenade (M62) was recorded and compared.

2.4.3.3 After each test grenade and control grenade (M62) was thrown, the grenade bodies were inspected for cracks, chips, or other damage.

2.4.3.4 Prior to reloading the test grenade and control grenade (M62) with a new fuze, powder charge, and plastic plug, the test soldiers removed any foreign matter from inside and outside the grenade body with the exception of the grenades thrown in Subtest No 5, where no maintenance was performed until necessary.

2.4.3.5 During the exercise described in paragraph 2.3.3.10, when one test grenade body was reused for 300 times, maintenance was performed only as necessary to permit the insertion of a new fuze.

2.4.3.6 The Maintenance and Reliability Analysis Chart, the Parts Analysis Chart, and the Maintenance Package Literature Chart were prepared in accordance with USATECOM Reg 750-15.

2.4.3.7 The DTM was examined for completeness and accuracy.

2.4.4 Results

2.4.4.1 The maintenance described in the DTM is sufficient to maintain the test grenade.

2.4.4.2 There was no significant difference between the maintenance performed on the test grenade and the control grenade (M62).

2.4.4.3 No significant damage occurred on the test grenade and control grenade (M62) bodies with the exception of the one test grenade and one control grenade (M62) thrown in the exercises described in paragraphs 2.3.3.7 and 2.3.3.8.

2.4.4.4 Each test grenade and control grenade (M62) that was cleaned of all foreign matter after each throw normally required less than 1 minute to empty the body. Tools used during this cleaning were a ten-penny nail or a screwdriver and needle-nosed pliers.

2.4.4.5 Chart 3-3, appendix I, shows the number of times that the grenade could be reused without cleaning the body of all foreign matter and the maintenance time required to clean the body when maintenance was performed.

2.4.4.6 The charts cited in paragraph 2.4.3.6 are contained in appendix IV.

2.4.4.7 The DTM contained the following errors:

a. Paragraph 4-4, Tabulated Data lists the grenade body as cast iron. The present test grenade body is steel.

b. Paragraph 4-8d states that the average soldier can throw the test grenade approximately 25 meters. FM 23-30 states that the control grenade (M62) can be thrown 40 meters by the average soldier. The test grenade is also capable of being thrown 40 meters by the average soldier.

2.4.5 Analysis

2.4.5.1 The test grenade requires no maintenance in excess of that required for the control grenade (M62).

2.4.5.2 The maintenance instructions contained in the DTM are adequate.

2.4.5.3 It appears that when the test grenade body is not cleaned of all foreign matter after each throw, the grenade body can be reused for another 20-25 times before maintenance has to be performed to allow the new fuze to be inserted into the grenade body. It will require approximately 20 minutes to perform this maintenance.

2.4.5.4 The DTM should be changed to read that the test grenade body is made of steel, and the average soldier should be able to throw the test grenade approximately 40 meters. See DA Form 1598, Record of Comments on Publications, contained in appendix IV.

2.5 SUBTEST NO 5, HUMAN FACTORS

2.5.1 Objective

To determine suitability of the test item with respect to the capabilities, limitations, and habit patterns of the soldier user.

2.5.2 Criteria

None

2.5.3 Method

2.5.3.1 Ten trainees from the US Army Training Center (USATC), Fort Benning, Georgia, were used for this exercise. The 10 trainees (7 right-handed and 3 left-handed) were given a 1-hour block of instruction to familiarize them with the test grenade. The test officer then split the ten trainees into two 5-man groups to run the grenade assault course. The course consisted of 6 stations each depicting a different tactical situation which required the trainees to use different positions and throwing techniques. They were required to throw a total of 12 practice grenades (without powder charge and plastic plug) throughout the conduct of the course. Current practice at USATC, due to a shortage of fuzes for the M62 practice grenade, was to throw only 2 of the 12 practice grenades with fuzes. The remaining 10 were the grenade body only. The same procedure was utilized for this exercise. The first group of 5 trainees ran the assault course using the control grenade (M62), and again with the test grenade. The second group ran the assault course first using the test grenade and then with the control grenade (M62). Both groups were graded by the instructors from the hand grenade committee while running the assault course. Upon completion of the assault course, both groups moved to the live grenade throwing area and each trainee threw two M67 and two M61 fragmentation grenades. The test project officer and NCO observed the trainees during the running of the assault course and the live grenade throwing and interviewed each trainee upon completion of testing.

2.5.3.2 Six test soldiers each threw 9 control grenades (M67) at a target placed 40 meters to their front. The test soldiers were interviewed by the test officer upon completion of the test to determine their reaction to the use of the XM69 as a practice version for the control grenade (M67) and to detect any differences between the two grenades.

2.5.3.3 During all testing, observations were made by the test officer and NCO to determine ease of arming, handling, throwing, ease of identifying the point of impact based on smoke and noise, effectiveness of safety features, replacement of components, and compatibility of the test grenades and control grenades (M62) with the skills and limitations of the trainees and test soldiers.

2.5.4 Results

2.5.4.1 There was no significant difference between the scores the trainees received while running the grenade assault course with the test grenade and with the control grenade (M62) (see chart 3-4, app I).

2.5.4.2 When interviewed by the test officer, each trainee commented:

a. That the sound and smoke from the test grenade were greater than that of the control grenade (M62) when used without powder charge and plastic plug.

b. That the test grenade did look and feel the same as the M67 fragmentation hand grenade, and use of it prior to throwing the M67 did properly prepare them to throw the M67.

c. That the test grenade was easier to handle and throw than the control grenade (M62).

2.5.4.3 The test soldiers commented that the XM69, with the exception of color and markings and high explosive filler, is the same as the control grenade (M67) and its use prepared them properly to throw the control grenade (M67).

2.5.4.4 During all testing, no derogatory comments or observations were made concerning the test item.

2.5.5 Analysis

The test grenade is suitable with respect to the capabilities, limitations, and habit patterns of the soldier user.

2.6 SUBTEST NO 6, VALUE ANALYSIS

2.6.1 Objective

To determine whether the test grenade has any unnecessary, costly, or "nice-to-have" features which could be eliminated without adversely affecting its performance, reliability, and/or safety.

2.6.2 Criteria

None

2.6.3 Method

2.6.3.1 During the conduct of all subtests observations were made to detect any nonessential or "nice-to-have" features which might have been modified or eliminated without compromising the effectiveness or safety of the test grenade.

2.6.3.2 One test soldier detonated 10 test grenades and 10 control grenades (M62) without powder charge and plastic plug. The detonation from each of these test grenades and control grenades (M62) was observed and photographed with a high speed camera. Six test soldiers were placed 40 meters away from the point of detonation to observe the signature effects.

2.6.3.3 The test officer and NCO observed the detonation of the grenades thrown in paragraph 2.6.3.2 and the detonation of all other grenades thrown with powder charge and plastic plug during all testing. The photographs of the detonation of the test grenades with powder charge and plastic plug taken during Subtest No 3, paragraph 2.3.3.3, and the photographs taken during the exercise conducted in paragraph 2.6.3.2, were compared.

2.6.4 Results

2.6.4.1 During all testing no nonessential or "nice-to-have" features were found, with the exception of the powder charge and plastic plug described below.

2.6.4.2 A comparison of the photographs taken with a high speed camera mentioned in paragraph 2.6.3.3 and observations by the test officer, NCO, and 6 test soldiers revealed that the test grenades and control grenades (M62), when thrown without the powder charge and plastic plug, achieve the same results as those grenades thrown with the powder charge and plastic plug.

2.6.5 Analysis

2.6.5.1 The powder charge and plastic plug are considered to be non-essential items and should be deleted as components of the test item.

2.6.5.2 No other nonessential or "nice-to-have" items were noted on the test item.

SECTION 3. APPENDICES

APPENDIX I. TEST DATA

CHART 3-1

Fuze Functioning Times of Test Grenade and Control Grenade (M62)

(Times Recorded with Stop Watch)

<u>Control Grenade (M62)</u>		<u>Test Grenade (XM69)</u>	
<u>Time</u>	<u>Frequency</u>	<u>Time</u>	<u>Frequency</u>
4.0 seconds	0	4.0 seconds	0
4.1	1	4.1	2
4.2	0	4.2	4
4.3	0	4.3	4
4.4	1	4.4	14
4.5	6	4.5	71
4.6	0	4.6	114
4.7	1	4.7	105
4.8	4	4.8	182
4.9	101	4.9	110
5.0	315	5.0	72
5.1	5	5.1	0
TOTAL GRENADES		434	678
AVERAGE TIME		4.96 seconds	4.74 seconds

CHART 3-2

Fuze Functioning Times of Test Grenade
(Times Recorded with Visicorder)

Test Grenade (XM69)

<u>Time</u>	<u>Frequency</u>
4.0 seconds	0
4.1	0
4.2	0
4.3	1
4.4	4
4.5	28
4.6	77
4.7	86
4.8	61
4.9	19
<u>5.0</u>	<u>4</u>
TOTAL GRENADES	280
AVERAGE TIME	4.67 seconds

CHART 3-3

XM69 Practice Hand Grenade

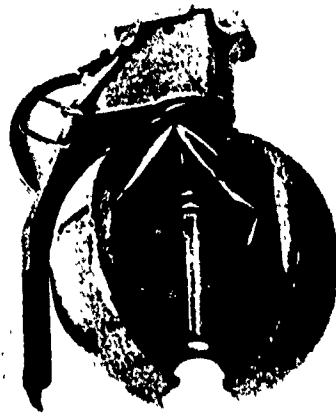
Reuse 300 Times (without powder bag and plastic plug)

<u>Throw</u>	<u>Maintenance Time to Empty All Foreign Matter</u>	<u>Tools Used</u>
1 - 72	24 minutes	Screwdriver and Needle- Nosed Pliers.
73 - 106	23 minutes	"
107 - 133	23 minutes	"
134 - 157	22 minutes	"
158 - 178	18 minutes	"
179 - 201	14 minutes	"
202 - 227	19 minutes	"
227 - 274	25 minutes	"
274 - 300	13 minutes	"

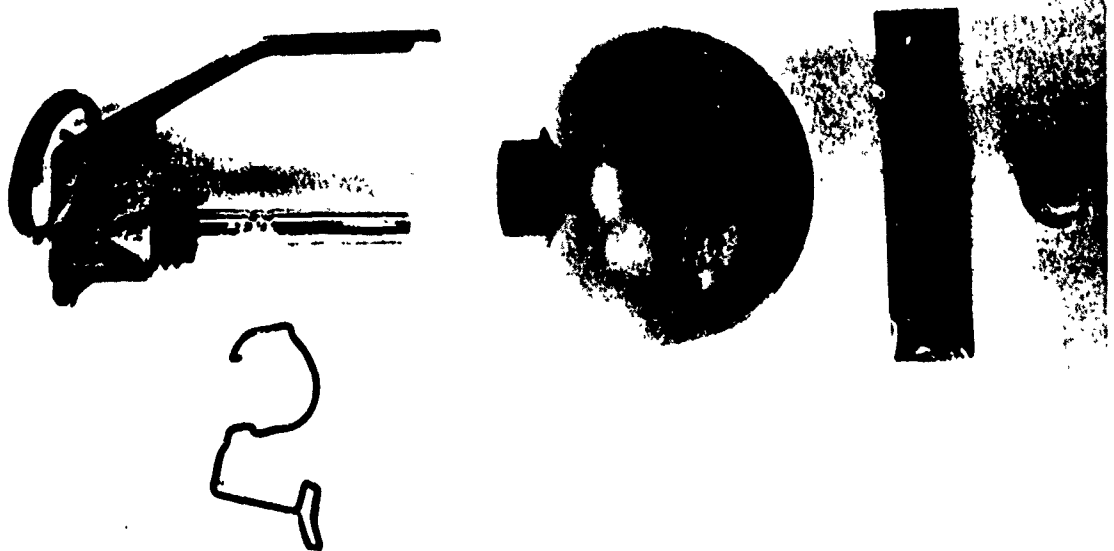
CHART 3-4

Results of Grenade Assault Course

<u>Trainee's Name</u>	<u>Score w/XM69</u>	<u>Score w/M62</u>	<u>Total Possible Score</u>
NUNN	36	36	60
DIXON	45	43	60
BOOKER	34	42	60
JAEGERS	27	30	60
JONES	43	39	60
NESMITH	32	40	60
BURKE	34	36	60
ORR	42	37	60
CALHOUN	39	45	60
SAPP	<u>36</u>	<u>24</u>	60
TOTAL	368	372	
AVERAGE SCORE	36.8	37.2	



Grenade, Hand, Practice, XM69



Components of Grenade, Hand, Practice, XM69

Left to right: XM228 Fuze, Safety Clip, Body
Powder Charge, and Plastic Stopper.

Figure 1



Figure 2

Grenade, Hand: Fragmentation, Delay, M67

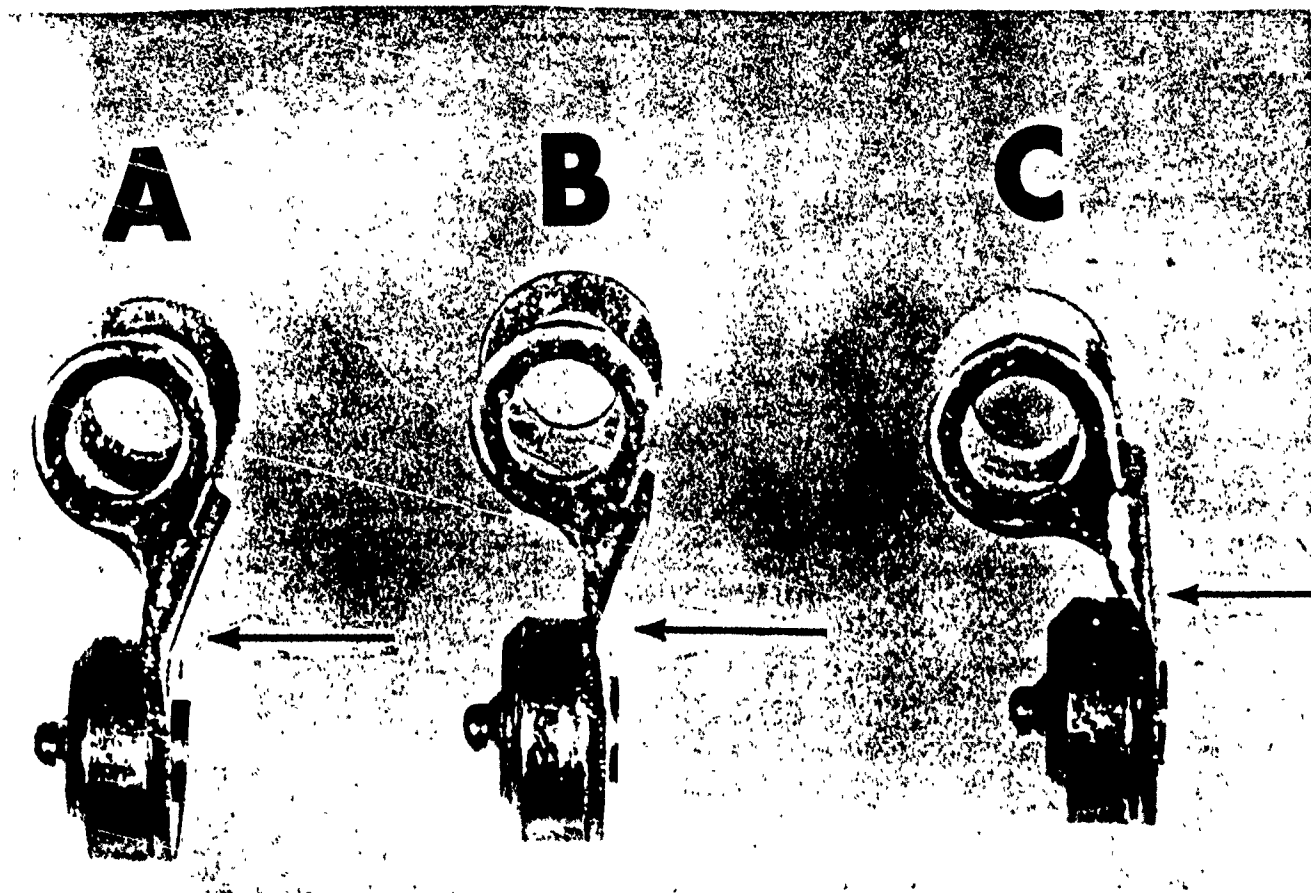


Figure 3

A - Striker from new fuze (correctly aligned)

B - Striker from a functional fuze (correctly aligned)

C - Striker that failed to function

The arrow on Striker C points to the area where the proper angle is not formed. The arrows on Strikers A and B point to the required proper angle.

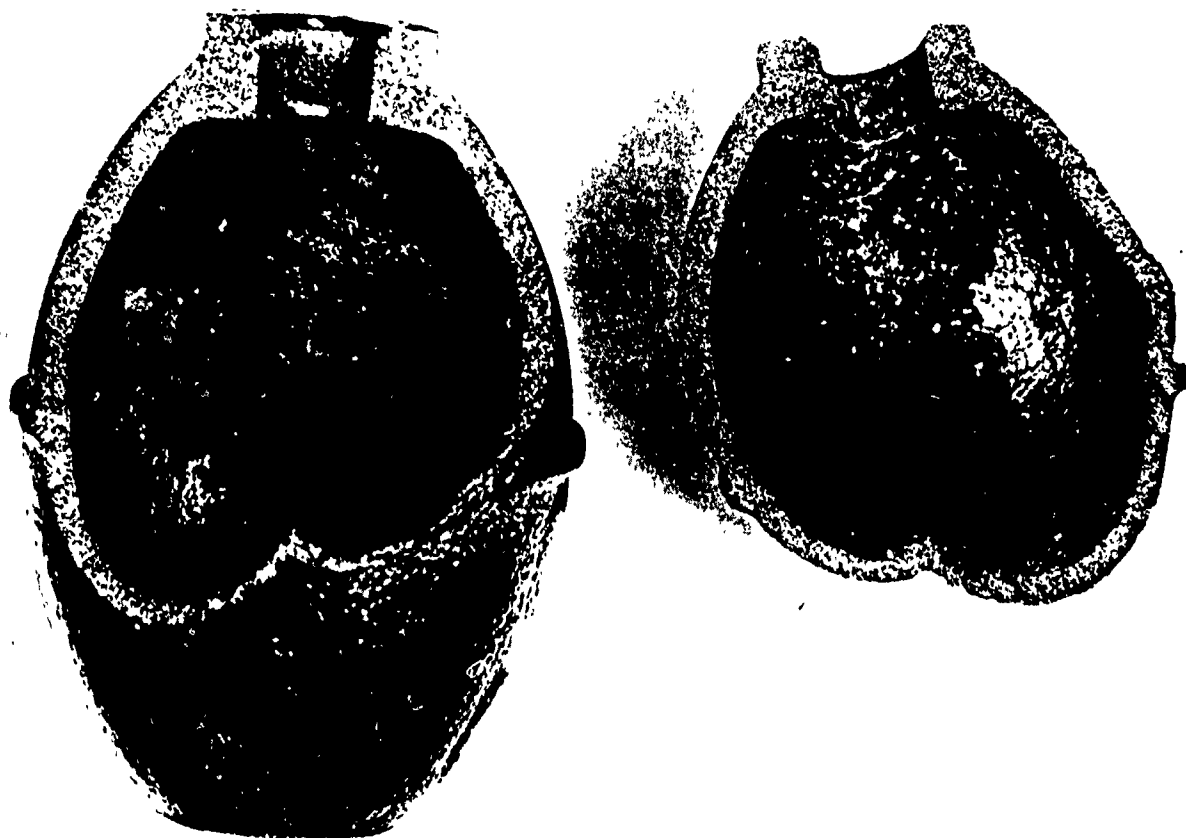


Figure 4

Shattered control grenade (M62) after 2 throws
against a concrete wall.



Figure 5

Grenade, Hand, Practice, XM69

Note the dents and disfigurements on the test grenade body after 8 throws against a concrete wall.

APPENDIX II. TEST FINDINGS

Item	Source	Requirements	Applicable Subtest	Remarks
1	App V, #1, para 2.b(1)(a)	The size, weight, and shape of the test grenade must be the same as the control grenade (M67).	2.1	Met. See analysis, para 2.1.5.4.
2	App V, #1, para 2.b(1)(b)	Except for color and markings which identify it as a training device, the identification features of the test grenade must be the same as the control grenade (M67).	2.1	Met. See analysis, para 2.1.5.4.
3	App V, #1, para 2.b(4)	The grenade must require no additional safety precautions regarding its detonation beyond those currently required for the standard practice grenade.	2.2	Met. See analysis, para 2.2.5.3.
4	App V, #1, para 2.b(3)(c)	This practice item must function reliably in 95% of usage (essential) 98% (desirable).	2.3	Met. See analysis, para 2.3.5.1.
5	App V, #11, Sec I, II, para 7.b.(1)(b)	The test grenade shall detonate by action of the time element between 4.0 to 5.0 seconds after arming.	2.3	Met. See analysis, para 2.3.5.2.
6	App V, #1, para 2.b(2)(b)	The noise and smoke produced by the detonation of the test grenade must be sufficient to enable the average soldier to detect detonation at 40 meters.	2.3	Met. See analysis, para 2.3.5.3.
7	USAIB and USAIS	This test grenade body will be capable of reuse as many times as the control grenade (M62).	2.3	Met. See analysis, para 2.3.5.4.
8	App V, #1, para 2.b(3)(a)	This test grenade will be sufficiently durable to withstand the abuse normally encountered in training usage.	2.3	Met. See analysis, para 2.3.5.5.
9	App V, #1, para 5	The grenade shall require no maintenance in excess of that required for the control grenade (M62).	2.4	Met. See analysis, para 2.4.5.1.

APPENDIX III. DEFICIENCIES AND SHORTCOMINGS

None

APPENDIX IV. MAINTENANCE EVALUATION

MAINTENANCE AND RELIABILITY ANALYSIS CHART

INSTRUCTION SHEET

DESCRIPTION

COLUMN

- 1 Group number as indicated in the Maintenance Allocation Chart.
- 2 Component and related operations as indicated in the Maintenance Allocation Chart. Operations indicated as in Depot Category are not shown.
- 3 Maintenance Level, Prescribed. Category prescribed by the Maintenance Allocation Chart is indicated by utilizing the letters O/C O, DS, or GS. O/C - Operator of Crew; O - Organization; DS - Direct Support; GS - General Support.
- 4 Maintenance Level, Recommended. Letters O/C, O, DS, or GS indicate the category recommended by the test agency.
- 5 TM Instructions, Adequate. An X in this column indicates the TM instructions are considered adequate.
- 6 TM Instructions, Inadequate. The test agency reference number used on DA Forms 1598 is indicated in this column, if the instructions are considered inadequate.
- 7 Active Maintenance Time. Man hours used to the closest tenth. If the operation was not actually performed but was reviewed, the estimated active maintenance time is indicated by using the prefix E. Average active maintenance time is used if the operation was performed more than once.
- 8 Life. Number of hours, miles, or rounds accumulated before or since this operation was performed. An entry is made each time this operation is performed, followed by the appropriate life unit; i.e., M, H, or R. An "S" will be placed in this column if the operation was performed on a sampling basis and not because of an actual failure.
- 9 Reason performed. The symbol "Unsched" will be shown in this column if the operation was performed as a result of unscheduled maintenance. If the operation was performed as a result of scheduled maintenance, it is indicated by the symbol "Sched" in this column. If the operation was performed only to verify procedures and tools, not as a result of breakdown, it is indicated by the symbol "Sim" in this column.

COLUMN

10 Remarks. If the operation is related to any other subtest covered in the body of the test report, the paragraph number is inserted for cross reference. If the operation was not performed as a result of using the sampling technique authorized by AR 750-6, one of the following remarks is entered as appropriate.

- a. Reviewed - not performed.
- b. Neither reviewed nor performed due to (No TMs) or (Insufficient service test time).
- c. Other, as appropriate.

If an EPR is related to a maintenance operation, the EIR number will be inserted.

Chart 4-1

MAINTENANCE AND RELIABILITY ANALYSIS CHART

GROUP NO	COMPONENT AND RELATED OPERATIONS	O/C - Op Crew			TM INSTRUCTIONS		ACTIVE MAINT TIME	LIFE M-Miles H-Hours R-Rounds	REASON FOR STOPPAGE	REMARKS
		Pre-scribed	Recom-mended		Ade-quate	Inside-quate				
1	2	3	4	5	6	7	8	9	10	
1	Practice Hand Grenade body (empty foreign matter from inside body)	0	0	X		60 sec	1 throw	Sched	None	

PARTS ANALYSIS CHART

INSTRUCTION SHEET

GENERAL: Parts will be assembled on this chart by functional groups and in numerical order within groups.

<u>COLUMN</u>	<u>DESCRIPTION</u>
1	Record one of the following: Federal Stock Number, Technical Service Part Number, Manufacturers' Part Number, or Drawing Number in this order of preference.
2	Noun Nomenclature. Self-explanatory.
3	Maintenance Level, Prescribed. Maintenance level as prescribed by the parts list under review: O/C - Operator/Crew; O - Organizational; DS - Direct Support; GS - General Support.
4	Maintenance Level, Recommended. O/C, O, DS, or GS indicate maintenance level recommended by the test agency.
5	Life. The number of hours, miles, or rounds accumulated before or since this part was replaced. An entry in this column is made for each part used followed by the appropriate life unit; i.e., M, H, or R.
6	Reason Used. The symbol "Unched" will be shown in this column if the part was used as a result of unscheduled maintenance. If the part used was the result of scheduled maintenance, the symbol "Sched" will be used. If the part was consumed to verify procedures or tools, not as a result of breakdown, the symbol "Sim" will be used.
7	Group Number, Cross Reference. Parts usage by maintenance operation is indicated by cross referencing to the group number from Column 1 of the Maintenance and Reliability Analysis Chart.
8	Remarks. If the part usage is related to any other subtest covered in the body of the test report, the paragraph number for cross reference is indicated. If an EPR is related to the part used, the EPR number will be inserted in this column.

Chart 4-2

PARTS ANALYSIS CHART

FEDERAL STOCK NUMBER	NOUN NOMENCLATURE	MAINTENANCE LEVEL				LIFE M-Miles H-Hours R-Rounds	REASON USED	CP NO CROSS REF	REMARKS
		O/C - Op Crew		Recom-mended					
		O - Org	DS - Direct						
		GS - General	Pre-scribed						
1	2	3	4	5	6	7	8		
1330-178-8515	Practice hand grenade body	0	0	300+ throws	N/A	N/A	None		
1330-585-9362	Practice hand grenade charge	None	None	1 throw	N/A	N/A	This item has been recommended for deletion as a nonessential item.		
1330-133-9276	Practice hand grenade fuze XM228	None	None	1 throw	N/A	N/A	None		
1330-097-8368	Plastic Stopper	None	None	1+ throw	N/A	N/A	This item has been recommended for deletion as a nonessential item.		
1330-183	Safety Clip	None	None	1+ throw	N/A	N/A	None		

MAINTENANCE PACKAGE LITERATURE CHART

INSTRUCTION SHEET

<u>COLUMN</u>	<u>DESCRIPTION</u>
1	Give Army or manufacturer's publication or draft manual number.
2	Number of copies received. Insert "0" if none were supplied. Use Para III i, Chapter 9, of AR 310-3 as a guide to determine those manuscripts and publications that should accompany the test item. Manuscripts and publications contained in the maintenance package should cover operations and functions through general support maintenance and should specify the categories involved.
3	Complete title.
4	Fill in date manuscript (MSS) or publication was received.
5	Fill in date test item or materiel was received.
6,7	Insert "X" in appropriate block. Minor errors on 1598 forms are not in themselves sufficient reason to term a manuscript inadequate. Evaluation <u>may</u> be ommitted if fewer than 25% of the specified maintenance operations were performed.
8	Insert date 1598 form was forwarded.
9	In addition to appropriate remarks, explain if manuscript was <u>no:</u> evaluated.

Chart 4-3

MAINTENANCE PACKAGE LITERATURE CHART

MANUSCRIPT		DATE REC'D		EVALUATION		FORM 1598	REMARKS
NUMBER	QNTY	TITLE	LIT	MATE- RIEL	AME- QUATE	DATE FWD	
1	2	3	4	5	6	8	9
TM 9-1330-201-12	1	Technical Manual, Operator and Organizational Maintenance for Grenade, Hand: Fragmentation, Delay, M33 and M67, Grenade Hand: Fragmentation, Impact, M59 (M33A1) and M68 and Grenade, Hand: Practice, Delay, XM69, May 1969	Oct69	Oct69	X	11 Dec 69	See DA Form 1598, Chart 4-4

RECORD OF COMMENTS ON PUBLICATIONS (AR 310-3)				DATE 19 December 1969
SUBJECT Draft Portion of TM 9-1330-201-12, May 1969, Technical Manual Operator and Organizational Maintenance for Grenade, Hand: Practice, Delay, XM69				
REVISION NOTES FROM United States Army Infantry Board, Fort Benning, Georgia 31905				
ITEM NR	PAGE	PARAGRAPH	LINE*	COMMENT (Exact wording of recommended change must be given)
1	4-2.1	4-4	14	<u>Comment:</u> The DTM reads "Body, Practice Hand Grenade . . . Cast Iron." <u>Recommendation:</u> The DTM should be changed to read "Body, Practice Hand Grenade . . . <u>Steel</u>." <u>Reason:</u> Change in material was made subsequent to publication of DTM.
2	4-4	4-8d	1	<u>Comment:</u> The DTM reads "The average soldier can throw the practice grenade approximately 25 . . ." <u>Recommendation:</u> The DTM should be changed to read "The average soldier can throw the practice grenade approximately <u>40</u> . . ." <u>Reason:</u> FM 23-30 states that the control grenade (M62) can be thrown 40 meters by the average soldier. The test grenade is also capable of being thrown 40 meters by the average soldier.

* Reference to line number within the paragraph or subparagraph.

APPENDIX V. REFERENCES

1. Draft Proposed SDR for a Practice Hand Grenade with Impact Detonating Fuze.
2. USATECOM Reg 70-24, Research and Development.
3. USATECOM Reg 385-6, Verification of Safety of Materiel During Testing.
4. USATECOM Reg 750-15, Maintenance of Supplies and Equipment.
5. USAIB Project No 2746, Service Test of Grenade, Hand, Fragmentation, T54 w/Fuze, Grenade, Hand, T1011E1 (Modified), DA Project 504-19-004.
6. USAIB Project No 3196, Approved Plan of Service Test of Practice Hand Grenade, XM52, with Fuze, XM225, August 1967.
7. USAIB Project No 3210, Letter Report of Safety Evaluation of Clip Device for Fuze, Grenade, Hand, M204A2, USATECOM Project No 8-7-2000-01.
8. MTP 3-3-030, Service Test Grenades, Hand, H. E.
9. MTP 4-3-059, Fuzes, Hand Grenade.
10. FM 23-4, Individual and Miscellaneous Weapons.
11. FM 23-30, w/ch 1, 2, and 3, Grenades and Pyrotechnics.
12. DTM 9-1330-201-12, Grenade, Hand: Fragmentation, Delay, M33 and M67, Grenade, Hand: Fragmentation, Impact, M59 (M33A1) and M68 and Grenade, Hand; Practice, Delay, XM69.
13. Letter, AMSTE-BC, USATECOM, 3 Oct 69, Subject: "Service Test of XM69 Grenade, Hand, Practice, XM69, USATECOM Project No 8-MC-013-069-003/004."
14. Letter, ATIT-SCL, USCONARC, to USAIS, 28 Oct 69, Subject: "Deletion of Components to Hand Grenade, Practice."
15. Message, STEBC-SA, USAIB, 12 Nov 69, Subject: "Interim Report of Service Test of XM69 Practice Hand Grenade, USATECOM Project No 8-MC-013-069-004."

APPENDIX VI. ABBREVIATIONS

1. AMC - Army Materiel Command
2. App - Appendix
3. DTM - Draft Technical Manual
4. FM - Field Manual
5. FSN - Federal Stock Number
6. M61 - Hand Grenade, M61
7. M62 - Hand Grenade, Practice, M62
8. M67 - Hand Grenade, M67
9. M213 - Delay Fuze, M213
10. NCO - Noncommissioned Officer
11. No - Number
12. Ref - Reference
13. Reg - Regulation
14. USAIB - US Army Infantry Board
15. USAIS - US Army Infantry School
16. USATC - US Army Training Center
17. USATECOM - US Army Test and Evaluation Command
18. w - With
19. XM69 - Hand Grenade, Practice, XM69
20. XM228 - Fuze, Hand Grenade, XM228

APPENDIX VII. DISTRIBUTION

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13. ABSTRACT		
A Service Test of the XM69 Practice Hand Grenade (XM69) (with XM228 fuze) was conducted by the US Army Infantry Board (USAIB) at Fort Benning, Georgia, from 3 November to 8 November 1969. The purpose of the test was to determine, under actual or simulated field conditions, the suitability of the XM69 and its associated reusable spare parts for use as a training item by the US Army. Specific test phases to which the XM69 was subjected were physical characteristics, safety, functional suitability, reliability, durability, maintainability, human factors, and value analysis. The performance of the XM69 was compared to the M57 fragmentation hand grenade and the M62 practice hand grenade in applicable subtests. There were no deficiencies or shortcomings found during testing. It was found during the Value Analysis subtest that the powder charge and plastic plug were nonessential items. The test grenade, if cleaned of all foreign matter after each throw, can be reused a minimum of 300 times. An interim report of test was submitted to Headquarters, US Army Test and Evaluation Command on 12 November 1969 giving tentative results and recommendations. This final report reflects the same results and recommendations. USAIB concluded that the XM69 Practice Hand Grenade is suitable for US Army use, and recommended that the powder charge and plastic plug be deleted as components to the XM69.		

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
XM69 Practice Hand Grenade M67 Fragmentation Hand Grenade M61 Fragmentation Hand Grenade M62 Practice Hand Grenade M205A2 Practice Delay Fuze XM228 Practice Delay Fuze Black powder charge Plastic stopper Safety clip						

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