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425 452

HEADQUARTERS
DUGWAY PROVING GROUND
Dugway, Utah

DEC 17 1963

STEDP-EF

SUBJECT: Report of Surveillance Test (Environmental) of Grenade, Hand, Riot, DM, E21R1; U. S. Army Test and Evaluation Command Project No. 5-3-0510-01, DPGR 377

TO: Distribution List


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AS AD NO.

1. This letter transmits the final report on surveillance test of Grenade, Hand, Riot, DM, E21R1.
2. Test Results. At the Desert, Temperate, and Tropic Sites the metal grenade containers were susceptible to corrosion. The body seams of the grenade began to separate after 43 months of storage at the Arctic Site. At all the sites, the grenade detonated satisfactorily.
3. Conclusion. The Grenade, Hand, Riot, DM, E21R1 was satisfactory at all test sites.
4. Recommendations. None.

FOR THE COMMANDER:

1 Incl
as
(Report of Test)


WILLIAM S. HARMON
Director, Technical Plans
and Evaluation

CATALOGED BY DDC
AS AD No. 425452

TEST & EVALUATION COMMAND



SURVEILLANCE TEST (ENVIRONMENTAL)
OF GRENADE, HAND, RIOT, DM, E21R1
DPGR 377
USATECOM PROJECT NO. 5-3-0510-01
DECEMBER 1963

DUGWAY PROVING GROUND
DUGWAY, UTAH

DDC
DEC 26 1963
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SURVEILLANCE TEST (ENVIRONMENTAL)
OF GRENADE, HAND, RIOT, DM, E21R1
DPGR 377
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HEADQUARTERS
DUGWAY PROVING GROUND
Dugway, Utah

Report of USATECOM Project No. 5-3-0510-01

Surveillance Test (Environmental) of

Grenade, Hand, Riot, DM, E21R1

(DPGR 377)

2 March 1959 to 28 May 1963

Part I - General

A. References. See Annex A.

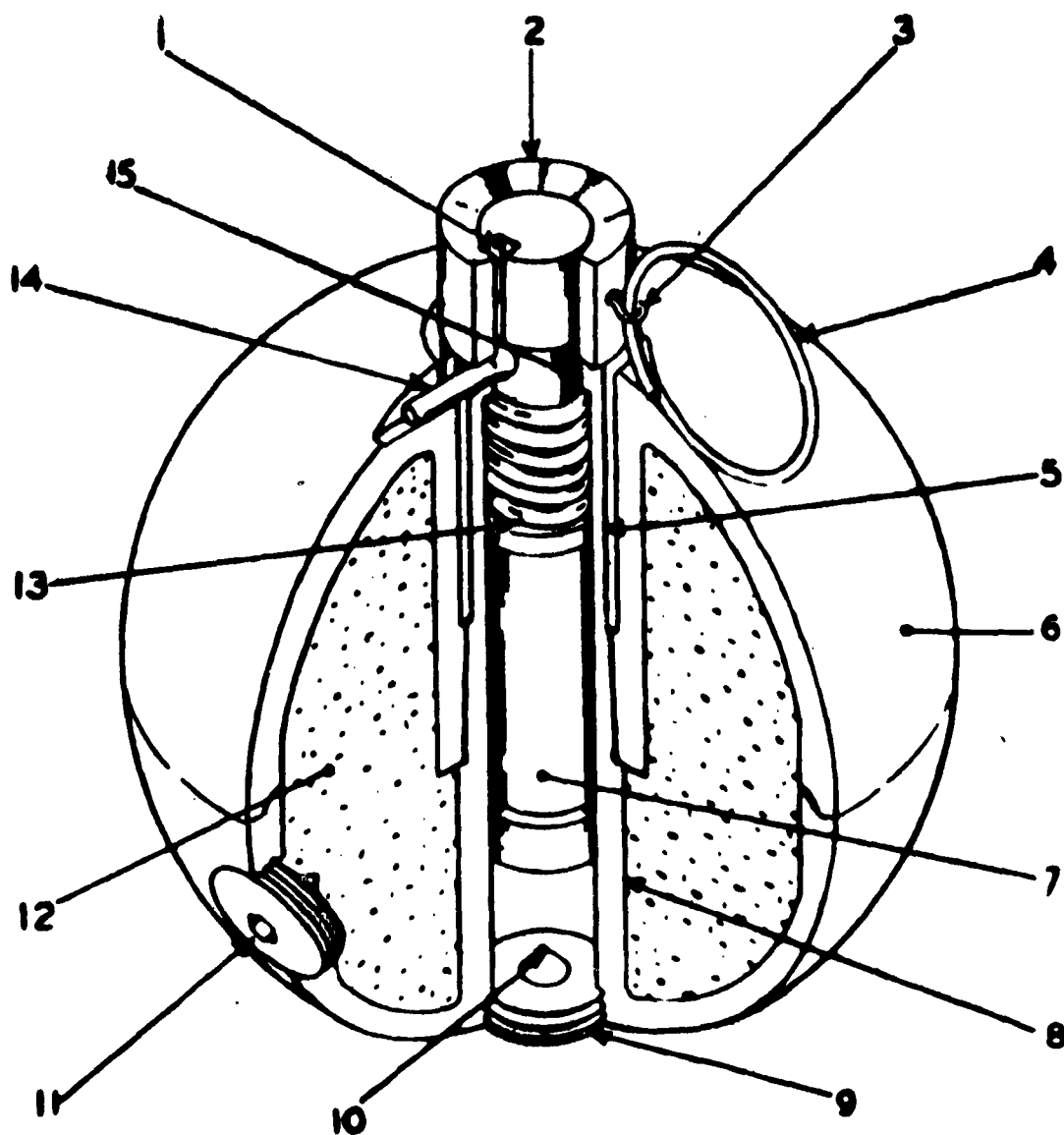
B. Authority:

1. The authority for this test is USATECOM Project No. 5-3-0510-01, contained in Supplement No. 3, Materiel Test Program, U. S. Army Test and Evaluation Command, Aberdeen Proving Ground, Maryland, 30 April 1963, CONFIDENTIAL.

2. The purpose of the test was to determine the effects of environment upon the storage and operation of the grenade in climates represented by Arctic, Desert, Temperate, and Tropic Test Sites.

C. Description of Materiel. The E21R1 grenade (Fig. 1) is a bursting type munition of approximately the same size and weight of a baseball. It is slightly less than three inches in diameter, and is composed of two molded plastic hemispheres cemented together. The agent filling is approximately 90 grams of micropulverized diphenylaminechloroarsine (DM - Adamsite).

A burster well is formed by the upper and lower slider housings which are molded as parts of the upper and lower body halves. The inside of the closure plug, which is screwed into the bottom of the burster well, is molded to form a firing pin. A C12 detonator with a delay of approximately two seconds is contained in the slider which travels from the top to the bottom of the burster well to impact on the firing pin when the safety pin is withdrawn and the grenade is thrown.



Legend:

- | | |
|-------------------------------|-------------------------------|
| 1. Channel | 8. Slider housing, lower body |
| 2. Arming sleeve | 9. Closure plug |
| 3. Safety pin | 10. Firing pin |
| 4. Safety pin ring | 11. Filling plug |
| 5. Slider housing, upper body | 12. Filling |
| 6. Grenade body | 13. Firing Spring |
| 7. Slider | 14. Retainer pin |
| 15. Spring retaining shoulder | |

Figure 1. Sectional View of Grenade, Hand, Riot, DM, E21R1

D. Background:

1. Development. The E21 Grenade (DM filled) was developed in response to a requirement stated by the U. S. Army Military Police Board, Fort Gordon, Georgia, for a more effective riot control grenade. The agent, CN, is frequently ineffective against personnel who have built up a resistance to the agent. The action of DM is more delayed, from 5 to 30 minutes, but it produces a more definite incapacitating action and has a more lasting effect. This bursting type grenade is believed to be more effective than a burning type in that personnel against whom it is used are not able to throw or kick it away. The grenade, as originally developed, was designated the E21 and had an ignition system nearly identical to the M25A1 CN Riot Grenade. The ignition system was later modified and the grenade was redesignated the E21R1.

2. Previous Testing. The E21 Grenade was subjected to chamber surveillance, rough handling, and functional suitability tests. During the detonation tests, the grenades subjected to tropic storage conditions, failed to function due to moisture which had collected in the black powder train in the slider assembly. This prevented the primer from igniting the charge. Two of the 50 grenades subjected to the rough handling test failed to detonate.

3. Modifications. Pilot lots of the E21 Grenade were manufactured, but preliminary tests indicated that the design was deficient. The arming sleeve was redesigned, the slider modified, and a retainer pin substituted for the arming spring and the safety balls. These modifications were to simplify production and to improve the functional suitability. The redesigned grenade was designated the E21R1.

E. Test Objectives. See paragraph B 2.

F. Findings. The Grenade, Hand, Riot, DM, E21R1 was found to be satisfactory. The military characteristics for the Grenade, Hand, Riot, DM, E21R1 and the extent to which the grenade satisfies the military characteristics are as follows:

1. "Be comparable to Grenade, Hand, Riot, CN, M25A1 as to distance, ease, and accuracy with which it can be projected by hand."

Satisfactory. The characteristics of the two grenades should be comparable since the weight, size, and shape of the two grenades are nearly the same.

2. "Burst approximately two seconds after initiation of the fuze, which occurs when properly thrown."

Satisfactory. The average detonation delay time for the cycles ranged from 1.8 seconds at the Desert Site to 2.5 seconds at the Arctic and Tropic Sites.

3. "Burst without causing permanent injury to personnel immediately adjacent thereto."

Not evaluated.

4. "Function reliably under all conditions of weather and temperature ranging from -65° to 125° F."

Partially evaluated. The grenades were not detonated under such extreme conditions, but were detonated at temperatures ranging from 8° F at the Arctic Site to 105° F at the Desert Site.

5. "Contain an agent which, when disseminated as an airborne cloud, will quickly incapacitate for a minimum period of one hour but will not permanently injure those who breathe it."

Not evaluated. This was not evaluated by this test program but DM was chosen because it fulfills the requirement of this military characteristic.

6. "Be suitable for storage and transportation at temperatures from -80° to + 160° F."

Partially evaluated. There were no data on temperature conditions while in transport. The grenades were found to be satisfactory under temperature conditions of -62° to 114° F while in storage.

7. "Withstand deterioration of agent filler under all conditions of exposure for periods of at least two years, and preferably five years."

Not evaluated. During the testing, no grenades were opened to examine the agent, but the agent cloud characteristics of color regularity and of size were not reported to have changed during the 49 months of testing.

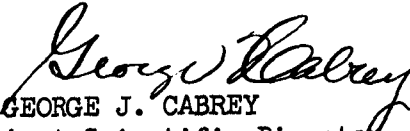
8. "Be sufficiently rugged to withstand safely, rough hauling, storage or transport, including air supply operations, without affecting the functioning characteristics."

Partially evaluated. Although the grenades were not rough hauled before testing during each cycle, the grenades did function satisfactorily after transport to the test sites.

G. Conclusions. The Grenade, Hand, Riot, DM, E21R1, performed satisfactorily at Arctic, Desert, Temperate, and Tropic Test Sites since 99 per cent functioned satisfactorily after storage ranging from 0 to 49 months.

H. Recommendations. None.

FOR THE COMMANDER:


GEORGE J. CABREY
Asst Scientific Director

For: M. A. ROTHENBERG
Scientific Director

Part II - Test Data

A. Test Sites and Dates of Test. The testing was conducted at the environmental test sites at Fort Greely, Alaska (Arctic); Yuma Proving Ground, Arizona (Desert); Edgewood Arsenal, Maryland (Temperate); and Fort Clayton, Canal Zone (Tropic).

The tests were conducted at the Arctic Site from 12 August 1959, through 8 May 1963; at the Desert Site from 27 July 1959, through 1 May 1963; at the Temperate Site from 27 August 1959, through 28 May 1963; and at the Tropic Site from 30 July 1959, through 23 April 1963. Detailed listings of dates of tests are given in Table 5, Annex B.

B. Meteorological Conditions. Meteorological data recorded during the storage of the grenade included temperature, relative humidity, dew point, windspeed and precipitation. The grenades were stored at the Arctic Site at temperatures as low as -62° F, and at the Desert Site, as high as 114° F. The relative humidity ranged from 2 per cent at 113° F at the Desert Site to 100 per cent at 86° F at the Tropic Site. Detailed meteorological data for storage periods will be furnished upon request to the Commanding Officer, Dugway Proving Ground, ATTN: STEDP-EF, Dugway, Utah.

C. Methods.

1. Initial Inspection and Storage. The 250 grenades tested at each site were transported in wooden boxes. Upon receipt of the grenade, the wooden boxes were inspected for deterioration, corrosion of metal bands and nails, and legibility of markings on the boxes. The grenades tested during Cycles 0 through 7, were stored in their wooden packaging boxes on pallets under tarpaulins at the Arctic Site, and on pallets under ventilated cover at the Desert, Temperate, and Tropic Sites. Fifty grenade containers (hermetically-sealed metal containers) were removed from the wooden boxes. These containers were inspected for dents, corrosion, and legibility of markings. These containers were then stored on pallets under tarpaulins at the Arctic Site, and on pallets under ventilated cover at the Desert, Temperate, and Tropic Sites, until they were tested in Cycles 8 and 9.

2. Cyclic Test Procedure. During each cyclic test, the wooden boxes, metal grenade containers, and grenades were inspected. During each cycle, 25 grenades were detonated. Test personnel tried to maintain approximately a 3 to 1 ratio of air-to-ground bursts respectively. When the grenade burst in the air, the approximate height of the burst was recorded. The detonation delay time (time between the arming sleeve release and the detonation of the grenade) and the time the agent cloud remained visible were measured and recorded. Photographs were made of the agent clouds at the time

of detonation. Photographs of typical air and ground bursts are shown in Figures 3 and 4, Annex C. The number, and, if possible, the cause of duds were recorded.

D. Results.

1. Arctic.

a. Visual Inspection. After 43 months of storage, the seams of the body hemispheres on some grenades were beginning to separate. However, these cracks did not extend into the body of the grenade, nor was any agent leakage evident.

b. Functional Tests. The number of air bursts, and the averages of height of air bursts, detonation delay time and time the agent cloud remained visible for the functioning tests are given in Table 1. Averages for the detonation delay time, and time the cloud remained visible, are based on air and ground bursts together. Complete data for these tests are given in Table 6, Annex B.

Table 1. Arctic Site - Data Summary

CYCLE	AIR BURSTS		DETONATION DELAY Average (sec)	CLOUD VISIBILITY Average (sec)
	Number	Average Height (ft)		
0	12	7	2.5	5
1	18	6	2.2	9
2	14	7	2.0	21
3	12	12	2.3	12
4	15	30	2.4	30
5	16	5	2.3	20
6	15	4	2.0	42
7	15	5	2.3	15
8	16	6	2.4	18
9	16	7	2.3	14

One grenade failed to detonate during Cycles 0 and 9. The retainer pin failed to pivot into the channel of the slider (Fig 2). It should be noted that the retainer pin is binding in the slider housing, preventing the slider from striking the pin.



Figure 2. Retainer Pin Binding in Slider Housing

2. Desert.

a. Visual Inspection. Inspection revealed rust on the metal bands and nails on the wooden boxes, and rust on the metal grenade containers. A broken retainer pin and an improperly mounted arming pin were found during Cycles 3 and 8, respectively. These grenades were destroyed.

b. Functional Tests. The number of air bursts, and the averages of height of air bursts, detonation delay time, and the time the agent cloud remained visible are given in Table 2. Averages for the detonation delay time, and time the cloud remained visible, are based on both air and ground bursts. Complete data for these tests are given in Table 7, Annex B.

Table 2. Desert Site - Data Summary

CYCLE	AIR BURSTS		DETONATION	CLOUD
	Number	Average Height (ft)	DELAY Average (sec)	VISIBILITY Average (sec)
0	10	ND ^a	2.4	23
1	10	ND	1.9	18
2	10	ND	1.9	18
3	10	ND	1.9	16
4	10	ND	1.8	25
5	11	ND	1.8	20
6	11	ND	2.0	15
7	17	ND	2.0	33
8	15	ND	2.2	36
9	14	5	2.1	11

^aNo data

Two grenades malfunctioned during the testing. During Cycle 5, one grenade failed to detonate because the retainer pin failed to pivot into the channel of the slider (Fig 2). During Cycle 7, one grenade was a dud as a result of a slider assembly failure.

3. Temperate.

a. Visual Inspection. Inspection showed no deterioration of the wooden packaging boxes, and slight rust deposits on the tear strips and bottom rims on metal grenade containers.

b. Functional Tests. The number of air bursts, and the averages of height of air bursts, detonation delay time, and time the cloud remained visible are given in Table 3. Averages for the detonation delay time and time the cloud remained visible are based on both air and ground bursts. Complete data for these tests are given in Table 8, Annex B.

One grenade in Cycles 1 and 5 malfunctioned. Both grenades had a slightly bent arming sleeve which prevented them from being ejected.

Table 3. Temperate Site - Data Summary

CYCLE	AIR BURSTS		DETONATION DELAY	CLOUD VISIBILITY
	Number	Average Height (ft)	Average (sec)	Average (sec)
0	16	8	2.2	25
1	17	5	2.2	13
2	16	5	2.2	18
3	16	5	2.3	9
4	15	6	2.2	13
5	15	8	2.2	15
6	15	12	2.2	11
7	15	7	2.1	14
8	12	6	2.4	24
9	12	6	2.2	16

4. Tropic.

a. Visual Inspection. Slight rust was found on the metal bands and nails of the wooden boxes and on the metal grenade containers. During Cycle 1, four grenades were found to have loose safety pins, and one grenade was found to have a closure plug protruding outward approximately an eighth of an inch. During Cycle 8, one grenade was found to have a 1-inch crack extending outward from the filling plug, and six grenades were found to have a black tar-like substance around the filling plug. All markings on the wooden boxes and metal containers were satisfactory.

b. Functional Tests. The number of air bursts, and the averages of height of air bursts, detonation delay time, and time the agent cloud remained visible are given in Table 4. Averages for the detonation delay time and time the cloud remained visible are based on both air and ground bursts. Complete data for these tests are given in Table 9, Annex B.

During Cycle 4, one grenade malfunctioned because the retainer pin failed to pivot into the channel of the slider (Fig 2). Two grenades malfunctioned during Cycle 9. The causes could not be determined although the duds appeared to be caused by faulty detonators.

Table 4. Tropic Site - Data Summary

CYCLE	AIR BURSTS		DETONATION	CLOUD
	Number	Average Height (ft)	<u>DELAY</u> Average (sec)	<u>VISIBILITY</u> Average (sec)
0	17	10	2.3	30
1	17	9	2.2	23
2	19	5	2.3	30
3	17	5	2.3	36
4	17	5	2.4	28
5	18	8	2.4	28
6	18	8	2.4	21
7	18	6	2.5	36
8	14	7	2.3	29
9	17	11	2.3	20

E. Discussion.

1. Cloud Visibility. The difference in the time the agent cloud remained visible between cycles and test sites can be attributed to differences in meteorological conditions, terrain features, and opinion of observers.

2. Deterioration of Body Seams at Arctic Test Site. As noted in Part II, paragraph D 1 a, splitting of body seams began to appear after 43 months of storage. This did not cause any agent leakage during the 49 month period of testing, but might render the grenade unusable after more prolonged periods of storage.

Part III - Annexes

Annex A. References

Annex B. Test Data

- Table 5. Dates of Tests
- Table 6. Detonation Data - Arctic
- Table 7. Detonation Data - Desert
- Table 8. Detonation Data - Temperate
- Table 9. Detonation Data - Tropic

Annex C. Photographs

- Figure 3. Typical Air Burst
- Figure 4. Typical Ground Burst

References:

1. Dugway Proving Ground Test Plan 455, Grenade, Hand, Riot, DM, E21R1; Item 69A; 6 July 1959. UNCLASSIFIED .

2. Letter, CMLRD-EDS-S, Headquarters, U. S. Army Chemical Corps Engineering Command, Army Chemical Center, Maryland, 14 October 1958, subject: Technical Criteria for Environmental Testing of Grenade, Hand, Riot, DM, E21. UNCLASSIFIED .

3. TM 3-215, Military Chemistry and Chemical Agents, August 1956 with Change No. 1, April 1959. UNCLASSIFIED .

Table 5. Dates of Tests

CYCLE	ARCTIC	DESERT	TEMPERATE	TROPIC
0	12 Aug 59	27 Jul 59	27 Aug 59	30 Jul 59
1	19 Jan 60 20 Jan 60 21 Jan 60	16 Dec 59	19 Jan 60	6 Jan 60
2	9 Jun 60	9 May 60	6 Jun 60	2 Jun 60
3	8 Nov 60	12 Oct 60	8 Nov 60	1 Nov 60
4	10 Apr 61 11 Apr 61	14 Mar 61	11 Apr 61	28 Mar 61 29 Mar 61
5	12 Sep 61	18 Aug 61	28 Sep 61	29 Aug 61
6	13 Feb 62	16 Jan 62	15 Feb 62	30 Jan 62
7	17 Jul 62	12 Jun 62	19 Jul 62	5 Jun 62
8	15 Nov 62	17 Nov 62	8 Jan 63	27 Nov 62
9	8 May 63	1 May 63	28 May 63	23 Apr 63

Table 6-A. Detonation Data - Arctic

CYCLE NUMBER		0			1			2			3			4		
FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)		
2.8	0	5.9	2.5	1	7.8	2.1	0	10.2	2.7	0	12.0	2.3	20	27.4		
2.4	0	6.0	3.1	8	10.0	1.8	9	10.4	2.4	0	12.1	2.5	25	26.9		
2.6	3	6.2	2.2	7	12.0	1.9	6	12.5	2.3	0	13.5	2.3	30	26.7		
2.4	8	4.1	2.1	8	6.2	1.9	5	11.8	2.1	15	12.7	2.3	20	35.2		
2.4	5	4.1	2.1	12	9.5	1.8	7	12.2	2.2	10	10.6	2.4	15	34.7		
2.4	7	4.4	2.3	0	8.3	2.1	0	28.0	2.1	6	11.5	2.5	35	45.0		
Dud	Dud	Dud	2.5	0	9.0	2.0	10	15.1	2.1	5	11.0	2.1	30	31.8		
2.5	0	5.1	2.5	0	7.5	2.3	7	29.4	2.1	25	11.8	2.4	35	39.4		
2.4	0	4.4	2.2	7	8.0	2.2	10	11.5	2.3	3	11.2	2.5	40	39.4		
2.4	0	5.6	2.3	7	7.9	2.1	0	22.5	2.8	0	11.0	2.6	20	36.0		
2.4	10	4.4	2.4	8	9.5	2.1	10	24.6	2.3	25	10.6	2.3	30	26.7		
2.4	0	5.1	2.2	0	8.7	2.2	0	28.4	2.5	5	14.6	2.5	40	21.9		
2.3	4	5.3	2.3	7	9.8	2.0	7	25.8	2.3	10	11.2	2.5	40	24.8		
2.4	0	5.1	2.4	0	9.7	2.1	5	16.6	2.1	0	11.6	2.3	30	30.2		
2.4	15	4.3	2.3	6	7.3	2.2	0	25.6	2.1	20	10.0	2.2	10	36.1		
2.4	6	5.1	2.5	0	8.4	1.9	0	21.6	2.3	10	15.6	2.5	0	22.8		
2.6	0	5.5	2.4	0	8.2	1.8	6	28.8	2.2	0	18.0	2.4	0	24.6		
2.5	0	5.6	2.3	0	8.7	1.9	6	28.4	2.2	0	11.2	2.3	0	28.8		
2.4	0	4.8	2.3	6	7.7	2.0	6	16.2	2.1	12	11.1	2.3	0	21.1		
2.4	7	6.2	2.3	3	7.0	2.0	6	24.0	2.5	0	8.9	2.5	0	21.5		
2.4	5	5.5	2.5	5	8.9	2.1	0	22.0	2.4	0	8.1	2.1	0	28.5		
2.2	9	5.3	2.3	6	9.6	2.0	0	29.8	2.5	0	11.2	2.5	0	24.2		
2.5	4	6.0	2.2	5	6.9	2.1	0	29.2	2.6	0	11.3	2.4	0	30.7		
2.5	0	5.9	2.3	5	7.3	2.0	0	20.3	2.6	0	11.5	2.3	0	25.9		
2.5	0	6.2	2.2	6	8.7	2.1	0	13.9	2.4	0	11.8	2.5	0	35.6		
Average:																
2.5	7	5.3	2.2	6.3	8.5	2.0	7.1	20.8	2.3	12	11.8	2.4	30	29.8		

(continued)

Table 6-B. Detonation Data - Arctic

CYCLE NUMBER		5			6			7			8			9		
FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)		
2.4	0	18	2.4	5	44	2.2	5	12	2.4	8	15	2.5	0	10		
2.9	2	30	2.2	3	45	2.2	4	15	2.6	2	14	2.0	0	12		
2.0	0	19	2.6	2	39	2.4	7	16	2.2	0	16	2.4	0	10		
2.2	5	16	2.3	2	40	2.4	0	15	2.3	0	14	2.6	5	20		
2.3	6	17	2.6	5	43	2.4	15	22	2.4	0	15	2.4	6	15		
2.2	4	14	2.8	9	41	2.6	0	19	2.6	6	13	2.5	5	15		
2.5	3	28	2.7	0	37	2.3	0	13	2.6	3	21	2.6	0	10		
2.2	0	26	2.4	0	36	2.8	6	11	2.1	9	28	2.2	5	13		
2.6	10	23	2.7	10	45	2.4	3	15	2.3	8	26	2.2	0	10		
2.4	4	23	2.4	7	41	1.9	0	15	2.3	6	24	2.1	15	15		
2.4	0	17	2.1	2	43	1.8	3	12	2.2	4	20	2.0	0	10		
2.3	0	20	3.4	3	47	2.5	10	12	2.4	7	15	Dud	Dud	Dud		
2.2	4	28	1.7	3	44	2.2	0	11	2.4	12	18	2.0	5	15		
2.2	0	20	1.4	0	44	2.3	5	17	5.2	0	16	2.2	0	10		
2.0	0	23	1.8	2	42	2.3	0	15	2.2	10	14	2.1	4	10		
2.5	10	16	1.2	2	43	3.1	6	17	2.2	8	15	2.2	0	12		
2.3	5	13	0.9	2	42	1.8	0	11	2.4	8	19	2.1	4	10		
2.3	3	18	1.5	3	42	2.5	5	17	2.4	2	20	2.0	7	15		
2.0	0	15	2.1	0	40	2.4	5	20	2.2	3	20	2.2	5	12		
2.4	4	19	1.2	0	39	2.3	3	14	2.3	6	19	2.1	3	11		
2.4	4	19	0.9	0	38	2.0	3	12	2.5	0	21	2.5	20	23		
2.4	3	18	1.5	0	39	2.2	3	15	2.3	8	18	2.2	3	18		
2.1	0	18	1.8	0	40	1.8	0	17	2.3	2	21	2.3	2	16		
2.0	4	22	0.9	0	42	2.0	0	18	2.4	0	16	2.3	10	22		
2.4	5	28	1.4	0	43	2.3	0	14	2.2	0	20	2.6				
Average:		4.8	20.3	4	42	2.3	5	15	2.4	6	18	2.3	7	14		

(concluded)

Table 7-A. Detonation Data - Desert

CYCLE NUMBER	1			2			3			4		
	FUZE DELAY (sec)	HEIGHT OF BURST ^a (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST ^a (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST ^a (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST ^a (ft)	CLOUD VISIBILITY (sec)
2.2	2.0	--	11.9	2.0	--	12.6	1.8	--	15.8	1.8	--	18.0
3.2	2.2	--	18.9	1.8	--	20.8	2.0	--	9.0	1.8	--	24.0
3.0	2.2	--	15.5	1.8	--	24.2	2.0	--	18.0	1.6	--	30.0
3.5	2.0	--	18.5	2.0	--	19.8	2.1	--	17.0	1.6	--	22.0
	2.0	--	24.5	1.8	--	14.0	1.8	--	22.0	1.8	--	30.0
2.5	2.0	--	18.5	1.8	--	17.6	1.8	--	15.0	1.6	--	26.0
2.5	1.8	--	20.9	2.0	--	22.2	2.0	--	17.0	1.8	--	22.0
2.5	2.0	--	22.8	1.8	--	12.6	1.6	--	17.0	1.6	--	40.0
2.2	1.8	--	19.5	2.0	--	12.2	2.0	--	20.0	1.8	--	31.0
3.2	1.8	--	22.5	1.8	--	12.0	1.8	--	19.0	1.8	--	31.0
2.5	1.8	--	18.5	1.8	--	15.0	1.8	--	13.0	1.8	--	25.0
2.5	1.8	--	36.5	1.8	--	28.0	2.0	--	15.0	1.8	--	27.0
2.2	1.8	--	19.8	1.8	--	17.0	1.8	--	18.0	1.6	--	26.0
2.3	2.0	--	25.1	2.0	--	15.2	2.0	--	15.0	1.8	--	25.0
2.2	2.0	--	23.7	1.8	--	18.0	2.0	--	15.0	1.6	--	28.0
2.2	1.8	--	20.3	2.0	--	19.2	2.0	--	15.0	1.6	--	22.0
1.8	2.0	--	25.8	1.8	--	17.8	1.8	--	13.0	1.8	--	30.0
2.2	1.8	--	25.2	2.0	--	26.0	2.0	--	15.0	2.0	--	26.0
2.2	2.0	--	23.4	1.8	--	19.6	2.1	--	16.0	2.0	--	20.0
2.2	2.0	--	19.3	1.8	--	20.8	2.0	--	15.0	1.8	--	24.0
2.2	1.8	--	18.4	1.8	--	18.6	2.0	--	16.0	2.0	--	21.0
1.8	1.8	--	16.6	2.0	--	20.4	2.0	--	11.0	2.0	--	27.0
2.3	2.0	--	17.3	1.8	--	15.2	2.1	--	15.0	2.0	--	19.0
2.2	2.0	--	19.1	1.8	--	21.6	2.0	--	13.0	2.0	--	22.0
2.3	2.0	--	15.2	1.8	--	18.4	Dud	--	Dud	1.8	--	24.0
Average:												
2.4	1.9	17.8	18.0	1.9	18.0	15.6	1.8	15.6	1.8	25.4		

^aNo Data (superscript applicable throughout this table). (continued)

Table 7-B. Detonation Data - Desert

CYCLE NUMBER	5				6				7				8				9						
	FUZE DELAY (sec)	HEIGHT OF BURST ^a (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST ^a (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST ^a (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST ^a (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST ^a (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST ^a (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST ^a (ft)	CLOUD VISIBILITY (sec)		
1.8	--	14	8.9	1.8	--	38	2.1	--	2.5	--	35.9	2.4	2	9	2.4	2	9	2.4	2	9	2.4	2	9
1.8	--	21	16.0	1.9	--	22	1.4	--	2.3	--	40.6	2.2	4	11	2.2	4	11	2.2	4	11	2.2	4	11
1.6	--	28	22.8	1.8	--	26	2.0	--	2.5	--	30.6	2.0	0	8	2.0	0	8	2.0	0	8	2.0	0	8
1.8	--	25	18.2	1.8	--	30	2.0	--	2.2	--	35.0	2.2	8	14	2.2	8	14	2.2	8	14	2.2	8	14
1.6	--	22	16.0	2.1	--	Dud	Dud	--	2.3	--	32.9	2.3	0	11	2.0	0	11	2.0	0	11	2.0	0	11
1.8	--	27	14.0	2.0	--	26	2.1	--	2.4	--	37.7	2.0	6	9	2.0	6	9	2.0	6	9	2.0	6	9
1.8	--	16	13.6	2.0	--	29	2.1	--	2.3	--	24.5	2.1	0	9	2.1	0	9	2.1	0	9	2.1	0	9
1.8	--	21	10.1	2.0	--	32	2.0	--	2.3	--	35.9	2.1	4	7	2.1	4	7	2.1	4	7	2.1	4	7
1.8	--	23	14.7	2.1	--	26	2.0	--	2.2	--	37.6	2.0	4	10	2.0	4	10	2.0	4	10	2.0	4	10
1.6	--	17	12.8	1.8	--	22	2.1	--	2.2	--	26.4	2.1	2	16	2.1	2	16	2.1	2	16	2.1	2	16
1.8	--	34	17.3	2.1	--	40	2.0	--	2.2	--	38.5	2.2	8	13	2.2	8	13	2.2	8	13	2.2	8	13
1.8	--	20	12.3	2.0	--	28	2.0	--	2.2	--	32.2	2.1	0	10	2.1	0	10	2.1	0	10	2.1	0	10
2.0	--	21	13.7	2.0	--	32	2.3	--	2.1	--	25.7	2.3	0	10	2.3	0	10	2.3	0	10	2.3	0	10
1.8	--	15	14.9	1.8	--	15	2.2	--	2.3	--	46.0	2.1	0	7	2.1	0	7	2.1	0	7	2.1	0	7
1.8	--	31	13.8	2.1	--	38	2.1	--	2.3	--	31.3	2.3	0	10	2.2	0	10	2.2	0	10	2.2	0	10
1.8	--	16	15.4	2.0	--	38	2.1	--	2.1	--	32.7	2.1	0	10	2.3	0	10	2.3	0	10	2.3	0	10
1.8	--	14	10.6	2.1	--	48	2.0	--	2.0	--	65.0	2.0	0	10	2.2	0	10	2.2	0	10	2.2	0	10
1.8	--	19	15.5	2.1	--	56	2.1	--	2.3	--	31.9	2.1	0	12	2.1	0	12	2.1	0	12	2.1	0	12
1.6	--	20	15.8	2.1	--	38	2.1	--	2.3	--	32.0	2.3	0	14	2.0	0	14	2.0	0	14	2.0	0	14
1.8	--	17	13.4	1.9	--	28	1.9	--	2.2	--	44.9	2.2	3	15	2.1	3	15	2.1	3	15	2.1	3	15
1.8	--	13	14.0	1.4	--	34	2.1	--	2.0	--	30.5	2.0	3	10	2.0	3	10	2.0	3	10	2.0	3	10
1.6	--	9	14.9	2.1	--	41	2.0	--	2.2	--	35.1	2.2	6	9	2.0	6	9	2.0	6	9	2.0	6	9
1.8	--	11	15.5	2.0	--	28	2.0	--	2.0	--	39.4	2.0	2	13	2.1	2	13	2.1	2	13	2.1	2	13
1.8	--	13	13.9	2.1	--	43	2.0	--	2.3	--	38.7	2.3	7	11	2.1	7	11	2.1	7	11	2.1	7	11
Dud	--	Dud	13.3	2.0	--	43	2.3	--	Dud	--	Dud	Dud	4	12	2.1	4	12	2.1	4	12	2.1	4	12
Average:																							
1.8		19.5	14.5	2.0		33.4	2.0		2.2		35.9	2.2	4.5	10.8	2.1	4.5	10.8	2.1	4.5	10.8	2.1	4.5	10.8

(concluded)

Table 8-A. Detonation Data - Temperate

CYCLE NUMBER	1			2			3			4					
	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)			
2.2	0	25	15.2	2.2	0	17.0	2.2	0	4.0	2.1	0	11.2			
2.2	4	19	15.6	2.1	4	13.0	3.0	8	3.3	2.2	4	10.3			
2.0	2	24	15.8	2.2	4	12.0	3.5	4	4.4	2.4	4	11.7			
2.1	20	28	18.2	2.4	4	12.0	2.2	6	5.1	2.3	8	10.7			
2.2	0	24	15.2	2.4	4	21.0	2.5	6	4.7	2.5	3	13.0			
2.1	0	20	10.8	2.1	0	15.0	2.3	8	6.6	2.4	0	13.1			
2.2	0	26	18.0	2.1	0	12.0	2.3	4	8.0	2.3	8	10.4			
2.2	15	33	9.2	2.1	0	14.0	2.3	4	11.1	2.5	0	13.5			
2.1	12	25	6.3	2.2	6	18.0	2.4	4	9.5	2.1	0	14.2			
2.2	0	31	Dud	2.0	4	17.0	2.3	5	11.1	2.3	0	17.1			
2.2	15	21	12.6	2.2	4	19.0	2.3	4	15.2	2.2	12	14.5			
2.1	3	27	18.3	2.1	4	18.0	2.2	8	14.5	2.0	4	11.9			
2.2	0	15	14.8	2.2	5	23.0	2.0	0	12.2	2.1	0	11.0			
2.2	2	26	13.1	2.1	5	13.0	2.2	0	9.5	2.0	10	10.8			
2.0	0	20	15.1	2.2	3	18.0	2.2	6	11.2	2.0	8	12.0			
2.0	0	29	8.2	2.3	3	19.0	2.2	4	12.1	2.1	0	13.1			
2.2	10	27	8.0	2.4	10	17.0	1.9	4	10.2	2.1	4	15.0			
2.2	0	28	10.2	2.2	6	17.0	2.4	4	11.1	2.1	6	11.2			
2.2	3	26	8.2	2.1	8	20.0	2.6	0	9.1	2.2	4	11.3			
2.2	2	29	11.2	2.1	5	25.0	2.2	0	9.7	2.2	0	12.1			
2.1	2	23	14.8	2.2	0	19.0	2.1	0	6.1	2.1	4	11.6			
2.2	6	23	12.9	2.1	4	18.0	2.2	0	7.8	2.1	0	13.7			
2.2	12	25	19.2	2.2	3	21.0	2.5	0	7.7	2.2	4	10.9			
2.2	10	25	10.8	2.1	1	20.0	2.3	4	10.5	2.1	0	17.2			
2.1	5	28	13.9	2.2	4	25.0	2.7	0	8.8	2.2	6	18.7			
Average:	2.2	7.7	25	2.2	5.2	12.7	2.2	4.8	18.0	2.3	5.2	8.9	2.2	5.9	12.8

(continued)

Table 8-B. Detonation Data - Temperature

CYCLE NUMBER	5				6				7				8				9				
	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)
2.2	8	16.1	10.6	1.9	9	10.6	2.0	0	9	2.2	0	23.0	2.1	7	19.5	2.1	4	23.5	2.1	4	19.1
2.0	4	12.0	12.4	2.1	6	12.4	2.1	10	10	2.0	0	23.5	2.0	0	19.1	2.0	0	25.0	2.1	0	12.2
2.2	12	16.4	13.5	2.1	24	13.5	2.2	10	11	2.4	6	42.0	2.4	11	16.6	2.2	3	37.0	2.2	3	16.6
2.1	9	13.1	4.0	2.3	0	4.0	2.2	0	19	2.2	0	11	2.2	0	19.0	2.2	0	24.0	2.2	0	19.0
2.1	12	12.4	13.5	2.2	18	13.5	2.1	4	11	2.0	4	24.0	2.0	4	13.8	2.2	3	24.0	2.2	3	13.8
2.1	15	10.8	8.5	2.2	24	8.5	2.0	12	8	2.0	0	25.0	1.9	0	17.0	2.2	2	26.0	2.2	0	17.4
2.2	11	11.1	9.3	2.2	0	9.3	2.0	0	17	2.3	10	21.0	2.3	10	16.0	2.2	0	21.0	2.2	0	16.0
2.2	6	15.3	10.7	2.0	18	10.7	2.2	7	17	2.5	0	23.7	2.5	7	18.4	2.1	5	23.7	2.1	5	18.4
2.0	4	17.1	9.8	2.1	21	9.8	2.1	10	12	2.5	7	23.7	2.5	7	11.9	2.2	10	25.0	2.2	10	11.9
2.3	4	15.2	12.1	2.3	6	12.1	2.3	10	12	2.5	10	23.7	2.5	10	15.1	2.1	4	41.0	2.1	4	15.1
2.0	8	18.0	18.0	2.3	3	18.0	1.8	10	14	2.5	5	25.0	2.5	5	18.4	2.2	10	25.0	2.2	10	18.4
2.3	8	17.5	8.5	2.2	0	8.5	2.2	6	20	2.4	8	31.0	2.4	8	18.9	2.1	3	31.0	2.1	3	18.9
2.1	6	13.1	13.1	2.3	0	13.1	2.0	12	20	2.3	3	28.0	2.3	3	12.2	2.2	0	28.0	2.2	0	12.2
2.4	8	16.8	8.1	2.2	12	8.1	2.5	2	13	2.8	4	27.0	2.8	4	13.0	2.3	0	27.0	2.3	0	13.0
2.4	6	15.8	12.0	2.3	9	12.0	2.0	1	11	2.0	1	11	2.5	3	10.4	2.3	0	27.0	2.3	0	10.4
2.3	0	16.1	10.5	2.3	9	10.5	2.1	4	17	2.1	4	17	2.3	0	16.7	2.1	0	17.0	2.1	0	16.7
2.4	0	13.5	15.1	2.4	18	15.1	2.0	7	12	2.6	2	20.0	2.6	2	16.0	3.5	0	20.0	3.5	0	16.0
2.2	0	16.1	13.1	2.3	6	13.1	1.5	2	16	2.5	5	26.0	2.5	5	17.5	2.2	0	26.0	2.2	0	17.5
2.1	0	14.8	13.3	2.4	3	13.3	2.2	12	17	3.0	0	18.0	3.0	0	14.6	2.1	0	18.0	2.1	0	14.6
2.0	0	15.0	10.1	2.3	0	10.1	2.0	0	18	2.4	0	19.0	2.4	0	13.7	2.2	4	19.0	2.2	4	13.7
2.1	0	18.5	10.0	2.2	0	10.0	1.9	0	20	2.7	0	16.0	2.7	0	16.7	2.2	0	16.0	2.2	0	16.7
Dud	Dud	Dud	9.9	2.1	0	9.9	2.2	0	18	2.6	0	14.0	2.6	0	16.0	2.2	0	14.0	2.2	0	16.0
2.0	0	17.1	9.5	2.1	0	9.5	2.1	0	9	2.3	0	21.0	2.3	0	17.5	2.2	0	21.0	2.2	0	17.5
2.0	0	18.0	11.1	2.2	0	11.1	2.1	0	12	2.4	0	20.0	2.4	0	14.6	2.2	0	20.0	2.2	0	14.6
2.3	0	17.1	8.0	2.2	0	8.0	2.2	0	15	2.1	0	19.0	2.1	0	13.7	2.2	0	19.0	2.2	0	13.7
Average:	2.2	8.1	15.4	2.2	12.4	11.0	2.1	7.3	14	2.4	5.7	24.3	2.4	5.7	16.0	2.2	5.5	24.3	2.2	5.5	16.0

(concluded)

Table 9-A. Detonation Data - Tropic

CYCLE NUMBER	1			2			3			4		
	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)
2.3	45	0	32.8	2.4	0	39.0	2.7	0	30.6	2.4	0	32.7
2.5	0	0	23.8	2.2	2	30.0	2.7	0	34.3	2.4	12	21.1
2.3	6	0	18.5	2.3	4	33.0	2.4	2	42.6	2.3	6	35.5
2.3	0	20	7.2	2.3	0	34.0	2.2	8	34.5	2.3	3	37.7
2.3	0	0	25.5	2.5	10	51.2	2.3	6	40.9	2.4	3	20.0
2.3	0	4	31.3	2.3	10	44.5	2.3	8	36.7	2.4	3	36.7
2.3	20	12	32.1	2.2	3	39.3	2.2	0	33.7	2.2	2	29.3
2.4	20	10	20.6	2.2	0	26.3	2.3	8	32.3	2.4	5	31.5
2.5	20	8	14.4	2.2	3	31.2	2.3	12	29.0	2.4	0	22.7
2.4	0	10	23.6	2.2	0	35.0	2.2	4	32.4	2.3	0	24.5
2.2	8	0	21.0	2.5	2	28.6	2.2	2	48.2	2.3	5	26.7
2.1	4	3	25.3	2.5	8	28.0	2.3	6	33.2	2.3	4	35.3
2.3	6	8	28.4	2.3	4	21.0	2.3	4	34.4	2.5	0	27.9
2.2	4	6	17.5	2.3	5	30.3	2.3	4	41.2	2.4	0	26.1
2.3	4	4	23.7	2.3	0	21.8	2.2	4	38.2	2.4	4	29.3
2.2	0	0	20.7	2.4	10	22.0	2.2	0	35.3	2.3	4	24.4
2.2	4	4	21.6	2.4	0	21.2	2.4	0	33.4	2.4	8	38.1
2.2	0	8	16.5	2.2	4	20.0	2.2	0	35.0	Dud	Dud	Dud
2.3	5	12	27.8	2.2	4	28.4	2.3	4	45.0	2.2	7	40.8
2.3	8	0	22.5	2.3	5	29.3	2.2	4	59.6	2.4	5	18.4
2.2	8	8	22.4	2.3	4	26.4	2.2	4	29.4	2.4	0	32.4
2.2	4	0	36.8	2.2	3	26.8	2.3	4	31.8	2.3	2	31.4
2.4	3	15	14.3	2.1	6	28.4	2.3	0	30.2	2.4	9	14.0
2.2	5	20	18.8	2.6	2	28.8	2.1	0	37.4	2.4	2	24.7
2.4	4	4	30.0	2.4	1	22.0	2.3	3	31.4	2.3	0	30.9
Average:	9.9	29.9	23.0	2.2	9.2	29.9	2.3	4.7	29.9	2.3	5.1	27.6
2.3				2.3	4.7	29.9	2.3	5.1	36.4	2.4	4.9	27.6

(continued)

Table 9-B. Detonation Data - Tropic

CYCLE NUMBER	5				6				7				8				9				
	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)	FUZE DELAY (sec)	HEIGHT OF BURST (ft)	CLOUD VISIBILITY (sec)
2.5	8	45.2	22.0	2.5	0	39.0	2.8	0	26.2	2.4	0	26.2	2.3	5	26.2	2.4	0	13.6	2.4	0	13.6
2.4	1	47.0	22.2	2.4	5	38.5	3.1	0	37.5	2.1	0	37.5	2.1	2	37.5	2.2	8	22.3	2.2	8	22.3
2.6	3	30.1	18.0	2.4	7	41.0	3.5	4	24.8	2.2	0	24.8	2.2	0	24.8	2.4	15	18.7	2.4	15	18.7
2.3	0	25.0	15.2	2.4	5	47.0	2.3	0	27.6	2.3	0	27.6	2.3	0	27.6	2.4	0	31.0	2.4	0	31.0
2.4	0	35.1	23.1	2.3	6	40.7	2.2	4	30.6	2.2	8	30.6	2.2	8	30.6	Dud	Dud	Dud	Dud	Dud	Dud
2.5	4	33.6	27.7	2.4	0	46.8	2.5	5	34.5	2.4	0	34.5	2.4	0	34.5	2.4	12	23.0	2.4	12	23.0
2.4	30	21.5	12.4	2.2	8	11.5	3.1	8	32.7	2.4	8	32.7	2.4	8	32.7	1.6	25	18.9	1.6	25	18.9
2.5	0	29.4	29.7	2.4	0	23.4	2.4	3	28.4	2.4	3	28.4	2.4	7	28.4	3.3	0	19.4	3.3	0	19.4
2.3	0	25.1	15.7	2.4	3	27.1	2.3	15	30.7	2.3	3	30.7	2.3	3	30.7	2.4	8	24.6	2.4	8	24.6
2.4	3	18.6	27.2	2.3	7	33.2	2.3	2	37.4	2.4	5	37.4	2.4	5	37.4	2.2	16	16.1	2.2	16	16.1
2.4	6	50.7	22.5	2.4	8	32.5	2.4	14	22.8	2.1	0	22.8	2.1	0	22.8	Dud	Dud	Dud	Dud	Dud	Dud
2.2	2	31.6	14.2	2.2	10	58.7	2.3	9	22.5	2.3	8	22.5	2.3	8	22.5	2.2	0	19.0	2.2	0	19.0
2.4	9	24.6	25.8	2.3	3	39.1	2.4	4	29.8	2.2	12	29.8	2.2	12	29.8	2.2	0	21.3	2.2	0	21.3
2.7	10	17.6	18.8	2.5	3	39.3	2.4	0	40.1	2.2	6	40.1	2.2	6	40.1	2.3	16	14.6	2.3	16	14.6
2.3	5	19.1	18.4	2.4	30	31.9	2.8	3	32.8	2.2	8	32.8	2.2	8	32.8	2.3	5	18.2	2.3	5	18.2
2.5	0	39.6	24.4	2.4	10	46.5	2.3	7	27.8	2.4	10	27.8	2.4	10	27.8	2.2	6	20.6	2.2	6	20.6
2.4	0	40.2	24.1	2.4	5	34.1	2.4	3	23.2	2.4	0	23.2	2.4	0	23.2	2.1	3	20.5	2.1	3	20.5
2.2	5	22.1	21.6	2.4	0	37.0	2.4	5	25.6	2.3	10	25.6	2.3	10	25.6	2.2	8	24.4	2.2	8	24.4
2.1	7	26.4	20.0	2.4	4	49.0	2.4	3	28.4	2.2	0	28.4	2.2	0	28.4	2.0	6	23.3	2.0	6	23.3
2.4	10	31.2	18.0	2.4	10	26.8	2.5	3	28.9	2.3	0	28.9	2.3	0	28.9	2.3	13	11.5	2.3	13	11.5
2.2	12	9.0	16.7	2.4	3	33.7	2.5	7	31.1	2.5	5	31.1	2.5	5	31.1	2.3	16	14.2	2.3	16	14.2
2.3	14	18.1	18.7	2.3	8	38.4	2.4	0	16.8	2.2	0	16.8	2.2	0	16.8	2.4	0	21.3	2.4	0	21.3
2.6	4	21.2	20.0	2.4	0	21.1	2.3	5	35.1	2.3	0	35.1	2.3	0	35.1	2.0	2	18.3	2.0	2	18.3
2.5	0	24.2	19.6	2.5	0	33.6	2.5	10	26.2	2.3	0	26.2	2.3	0	26.2	2.1	12	12.5	2.1	12	12.5
2.4	8	34.3	23.0	2.3	0	33.1	2.4	0	25.8	2.3	0	25.8	2.3	0	25.8	2.2	20	18.1	2.2	20	18.1
Average:	2.4	7.8	28.8	2.4	7.5	36.1	2.5	6	29.1	2.3	7	29.1	2.3	7	29.1	2.3	11	19.6	2.3	11	19.6

(concluded)

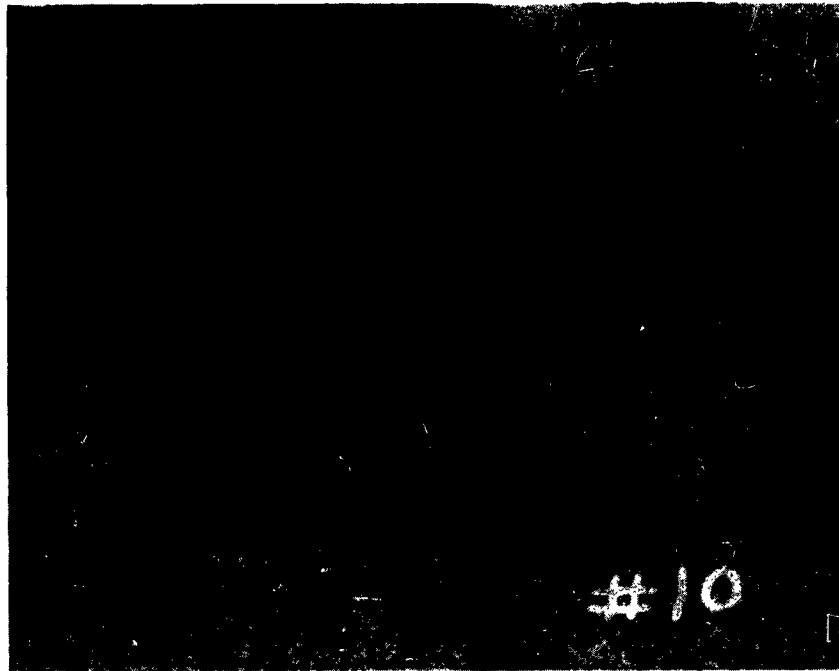


Figure 3. Typical air burst



Figure 4. Typical ground burst

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