[redacted]

UNCLASSIFIED

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
1st Review Date: 7/8/98
Authority: ☐ADC ☐ADD
Name: W Layne
2nd Review Date: 7/13/98
Authority: ADD
Name: R B Crane
Determination (Circle Number):
1. Classification Retained
2. Classification Changed to: U
3. Contains No DOE Classified Information
4. Coordinate With:
5. Contains UCNI? No
6. Comments: OK for Opened

DEC 20 1961

File No: TX-53, 3-2
T-18131
Date Completed: 9-21-61
RS 7321/9837

CENTRAL FILE
TX 53
3-2

MR. E. I. BRUCE - 7117
Attn: L. F. Miller

Re: Drop Tower Test of TX-53 No. 69 L (U)

A TX-53 basic case with side panels and parachute can was used for this test to determine the shock mitigating characteristics of the TX-53 when it is dropped longitudinally on its parachute can at 25 FPS. The basic case was weighted with steel weights forward and aft to simulate weight and CG of the TX-53.

The test unit was instrumented with four accelerometers sensing in the longitudinal direction; two on the forward cap of the case and two on the aft weights. The maximum faired acceleration recorded on the bomb case was 60 g.

INVENTORIED AUG 6 1964 3427.8

Reason for Test

This test was requested in an Environmental Test Order from E. I. Bruce, 7117 to E. H. Copeland, 7321, dated 9-18-61. The test was assigned to Division 7325 to be conducted on the 185 foot drop test tower.

Reference to Past Tests

Previous drop test results on the TX-53 bomb can be found in Division 7321 files under the following test numbers:

Bomb No.*	Test No.	Reference Symbol
53-L	16852	7321/9717
54-L	17292	7321/9718
55-L	17345	7321/9719
56-L	17346	7321/9720
57-L	17471	7321/9721
63-L	17542	7321/9748
61-L	17265	7321/9722

INVENTORIED SEP 14 '65 [redacted]

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
DOWNGRADING OR DECLASSIFICATION STAMP
CLASSIFICATION CHANGED TO: U
Emilda Selph 7/13/98
PERSON CHANGING MARKING & DATE
W C Layne 7/22/98
PERSON VERIFYING MARKING & DATE
AUTHORITY: R B Crane
RECORD ID: 98SN2855
DATED: 7/13/98

[redacted]

UNCLASSIFIED

Bomb No.*	Test No.	Reference Symbol
59-L	17601	7321/9749
60-L	17638	7321/9740
58-L	17675	7321/9756
65-L	17676	7321/9768
62-L	18013	7321/9800
64-L	18066	7321/9839

* In the order tests were made

Setup for Test

The bomb was outfitted with a lifting eye affixed to the forward cap of the basic case. The bomb was attached to the carriage with a wire rope sling which was cut with explosive cable cutters to drop the bomb. The bomb is shown in Figure 1 suspended from the carriage prior to the test.

The acceleration signatures were recorded on a C.E.C. Type 5-119-R recording oscillograph S.N 9071 and a C.E.C. data tape recorder Type 5-752-A, S.N. 01465. The specification of the accelerometers are given in Table I and their locations are shown in Figure 2. Details and dimensions of the TX-53 bomb are shown in Sandia Assembly Drawing No. DL 10706.

Procedure

The TX-53 used for this test was the same basic case and weights that had been used to make the drop tests of the 'Beer Barrel' nose sections. This test vehicle contained dummy weights to duplicate the true weight and C.G. of the actual TX-53. A special lifting eye was attached to the forward cap of the basic case for attaching the bomb to the carriage. When the test preparations were complete the carriage was hoisted up the tower cable to position the bomb over the concrete target at a drop height of 9.7 feet. (Figure 1) The bomb was released by cutting the wire rope support sling with explosive cable cutters.

Test Results

The acceleration signatures recorded on the oscillograph are included in Figure 3 and the data from this record are tabulated in Table II. The signatures were interpreted according to S.C. 4452(M), Section D, paragraph 2.1.1 dated January 1961. The sign convention used to designate direction of positive acceleration is shown in Figure 2. Accelerometers A-22 and A-23 which were mounted on the aft ballast weights, indicated a maximum faired acceleration pulse considerably larger than the acceleration recorded on the forward cap (Figure 3). This amplification of the pulse resulted from diaphragming action of the 1/4 inch thick steel plate on which the accelerometers were mounted. When the signatures were analyzed in light of the parameters (natural period, pulse wave shape and pulse duration) relative thereto the maximum faired acceleration on the aft weights should have been about 1.7 times the acceleration experienced on the forward cap.

This computation can be verified from the test record (Figure 3). If the one-fourth inch thick plate had been securely fastened to the thick (one inch) plates the diaphragmming phenomenon would have been greatly reduced. On drop tests where the vehicle is dropped on its nose the one-fourth thick plate rests on the thick plates and the diaphragmming phenomenon does not occur. The acceleration signatures measured on the aft weights do not therefore represent the response of the TX-53 and the acceleration measured on the forward cap must be taken as the response of the weapon case in this drop. The parachute can performed quite well as a shock mitigator. Figure 4 is a photograph of the bomb after the test.

C. G. Coalson

C. G. COALSON - 7321-5

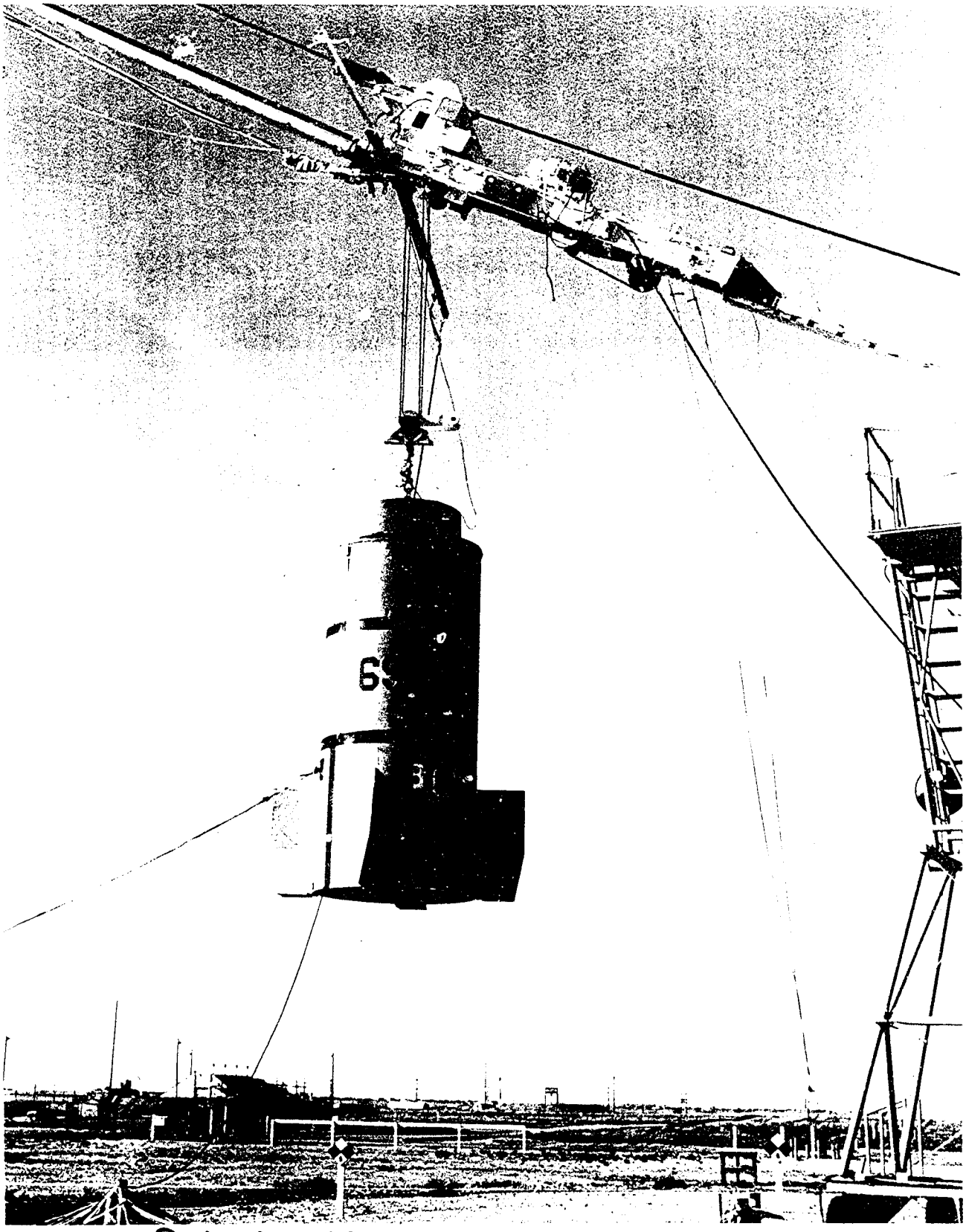
7321 Project Engineer: Dale Buchanan
DALE BUCHANAN - 7321-5

Approved By: R. S. HOOPER - 7321-5

CGC:7325-2:mw

DISTRIBUTION:
1/10A - E. I. Bruce, 7117
2/10A - J. M. Wiesen, 1442
3/10A - D. S. Bliss, 2344
4/10A - W. L. Stevens, 7162
5/10A - D. M. Bruce, 7162
6/10A - E. H. Copeland, 7321
7/10A - C. L. Johnson, 7523
8/10A - L. C. Horpedahl, W-1, LASL, Attn: S. D. Huffman
9/10A - R. S. Gauler, GMX-3, LASL, Attn: D. F. Mitchell
10/10A - R. K. Smeltzer, 3421-3

#2188



D#61-10278

FIG. 1 TX-53 BOMB NO. 69-L RIGGED TO THE TOWER CARRIAGE PRIOR TO THE TEST. DROP TOWER TEST OF TX-53.

T - 18131
R.S. 7321/9837

UNCLASSIFIED

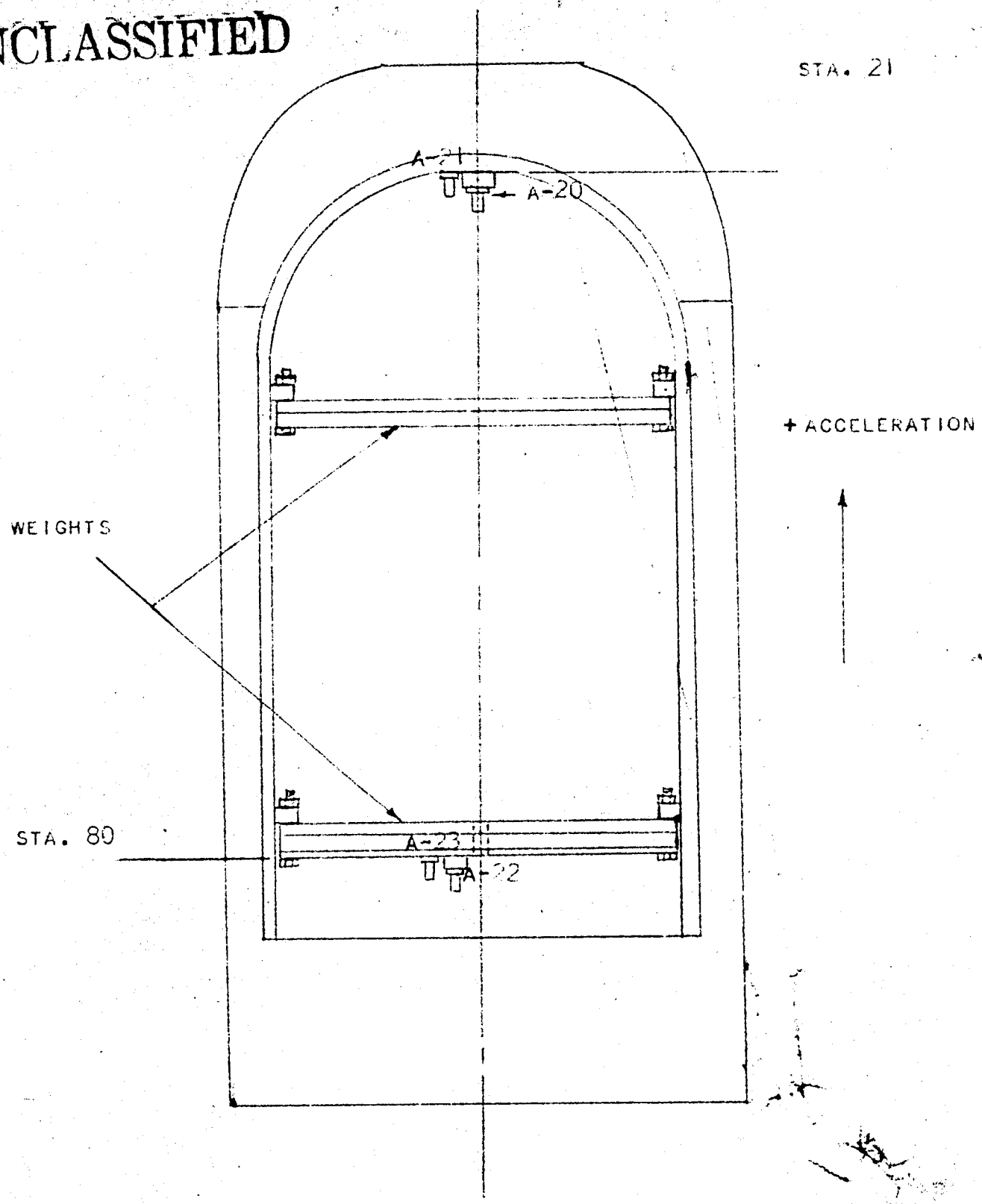


FIG. 2 LOCATION OF ACCELEROMETERS AND DIRECTION OF POSITIVE ACCELERATION ON DROP NO. 69-L. DROP TOWER TEST OF TX-53.
T - 18131
R.S. 7321/9837

UNCLASSIFIED

ACCEL. DIR. NO.	LOCATION	CAL. STEP
A-20	LONG. FWD.CAF (ON BLOCK)	100G
A-23	LONG. AFT. WEIGHTS	100G
A-21	LONG. FWD. CAF	100G
A-22	LONG. AFT. WTS.(ON BLOCK)	100G

1000 CYCLE TIMING

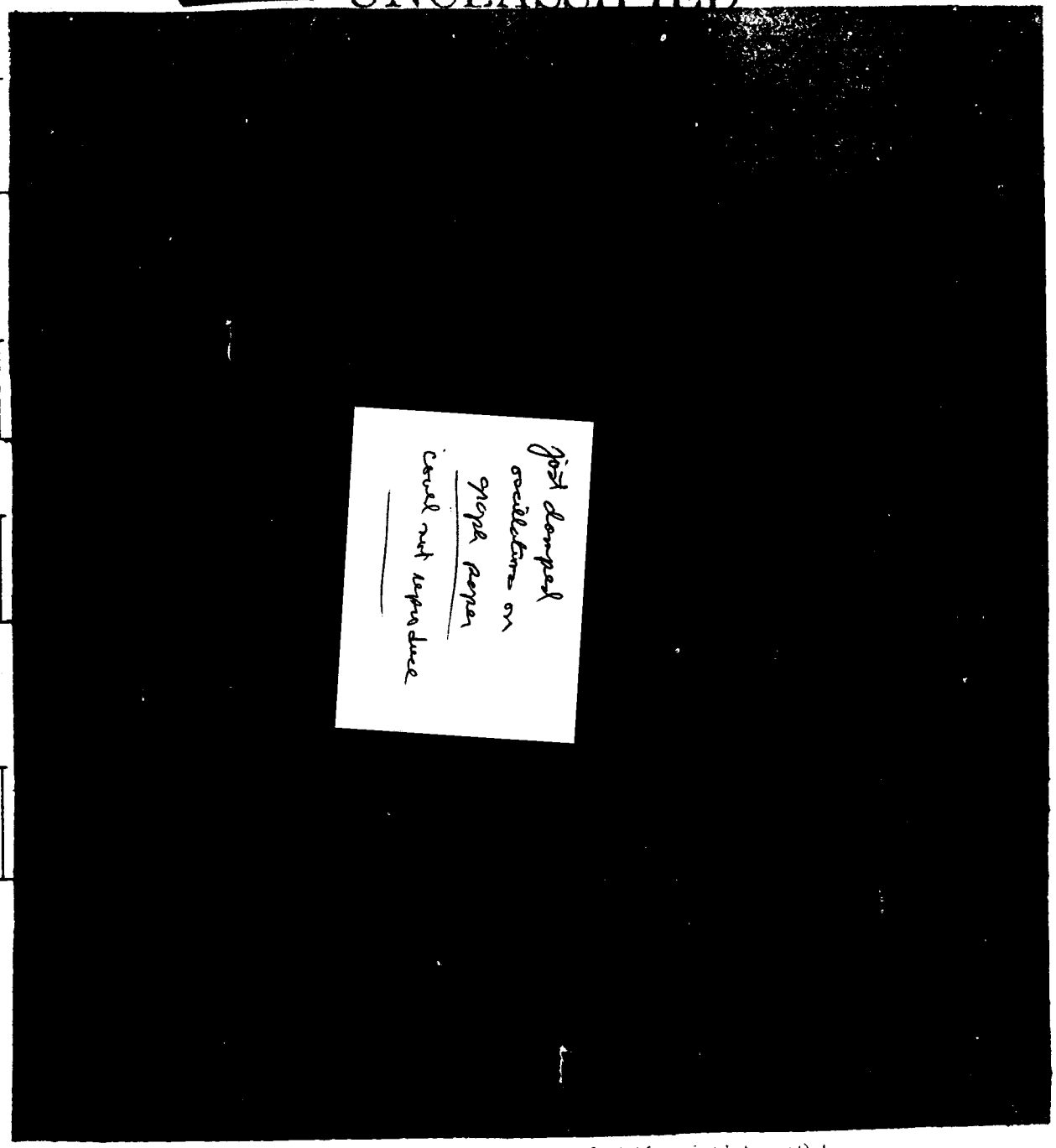


FIG. 3 ACCELERATION SIGNATURE FROM DROP TEST NO. 69-L. DROP TOWER TEST OF TX-53.

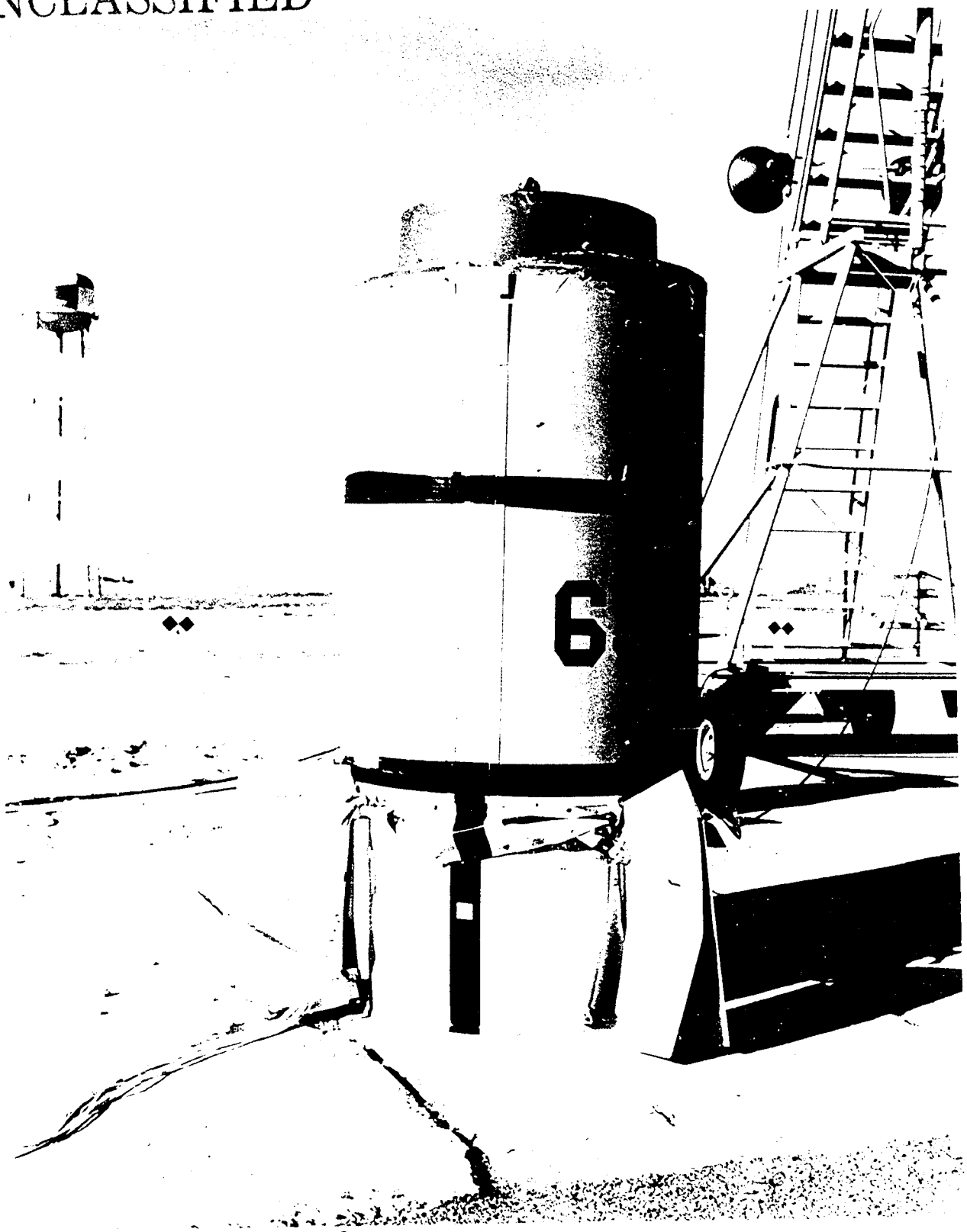
T - 18131
R.D. 7321/9837

2190

#2191

[redacted]

UNCLASSIFIED



D#61-10280

FIG. 4 TX-53 BOMB NO. 69-L AFTER THE DROP TEST.
DROP TOWER TEST OF TX-53.

T - 18131
F.S. 7321/9837

UNCLASSIFIED

[redacted]

TABLE I

Accel. No.	Location	Direction	Model No.	Serial No.	Range (±g)	Nat. Freq. (cps)	Figure Reference
A-20	Fwd cap (on block)	Long	A5A-200-350	5534	200	1050	2
A-21	Fwd cap	Long	A5A-200-350	6019	200	910	2
A-22	Aft Weights (on block)	Long	A5A-200-350	1670	200	1100	2
A-23	Aft weights	Long	A5A-200-350	1665	200	1120	2

TABLE II

DROP TOWER TEST OF TX-53 NO. 69-1

Accel. No.	Location	Max. Faired Pulse (g)	Pos. Pk. (g)	Neg. Pk. (g)	Pulse Duration (ms)	Rise Time (ms)
A-20	Long. Fwd cap (on block)	60	120	55	14.0	3.5
A-23	Long. Aft weights	122	135	128	8.8	4.8
A-21	Long. Fwd cap	58	112	30	14.2	3.3
A-22	Long Aft weights (on block)	110	118	143	9.5	4.8

UNCLASSIFIED
[redacted]
UNCLASSIFIED
[redacted]
2192