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SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
1st Review Date: 6/9/98
Authority: ADD
Name: [illegible]
2nd Review Date: 6-17-98
Authority: ADD
Name: WC Layne
Classification Changed to: UNCL
Contains No DOE Classified Information
Coordinate With:
Contains UCAI?
Comments: Declassify

FEB 14 1962

File No: XW-45, 3-2
T-17951
Ref. Sym: 7321/9867

CENTRAL RECORD FILE
ACCOUNTABILITY CARD BB
FILE No. XW 45 3-2

MR. J. D. BENTON - 8125
Attn: W. A. Maupin

Re: Shipping Vibration Test of the XW-45 (TRM-186) Warhead in a H-815 Shipping Container.

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Test Summary

An XW-45 (TRM-186) warhead in a H-815 shipping container was subjected to sinusoidal resonance surveys and vibration cycling in the vertical direction which consisted of the following:

Runs No. 1 and 4, 40 minute resonance surveys (10-31-10 cps) with a 2g (0 to peak) input measured with a Model 320 Ballentine RMS voltmeter calibrated in conjunction with the accelerometers to read peak acceleration assuming sine wave acceleration.

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Run No. 2, 40 minute resonance survey (31-55-31 cps) with a 0.06 inch double amplitude input.

Run No. 3, 60 minute resonance survey (55-500-55 cps) with a 10g (0 to peak) input.

Runs No. 5, 6, 7, and 8, 10 minute cycles (10-31-10 cps) with a 2g (0 to peak input.

Runs No. 9 and 10, 10 minute cycles (31-55-31 cps) with an input of 0.06 inch double amplitude.

Runs No. 11 and 12, 15 minute cycles (55-500-55 cps) with a 10g (0 to peak) input.

Weapon component (0 to peak) accelerations were recorded during the resonance surveys only and maximums which occurred are as follows:

The XW-45 (TRM-186) warhead blast shield had a maximum acceleration of 4.5g in the longitudinal axis at 14.4 cps with a 2g input.

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The XW-45 (TRM-186) warhead support ring had maximum accelerations of 2.2g in the vertical and lateral axes at 11 cps with a 2g input.

The XW-45 (TRM-186) warhead, as requested by SCLL, was not inspected structurally at the conclusion of the test.

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
DOWNGRADING OR DECLASSIFICATION STAMP

CLASSIFICATION CHANGED TO: U	AUTHORITY: W.C. Layne
Emelda Selph 6/23/98	RECORD ID: 98SN2502
PERSON CHANGING MARKING & DATE	
PERSON VERIFYING MARKING & DATE	DATED: 6-17-98

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It was not possible to determine whether the XW-45 (TRM-186) warhead will retain its case seal because its leak rate was such that pressurization was impossible during the test.

The curled hair packing used in the H-815 shipping container appears to afford adequate damping as shown by the results of this test.

Failures of the H-815 shipping container consisted of the following:

The cover clamping ring bolt came loose during Run No. 12, because the locking feature of the lock nut was badly worn from previous usage, allowing the XW-45 (TRM-186) warhead and curled hair packing to slide partially out of the H-815 shipping container.

Various welds on the H-815 shipping container forward and aft legs fractured during the test and were not noticed until the test was completed.

Object of Test

The object of this test was to:

1. Determine the ability of the XW-45 (TRM-186) warhead to survive anticipated shipping, handling, and flight vibration while installed in the H-815 shipping container.

2. Determine whether the XW-45 (TRM-186) warhead will retain its case seal during vibration testing.

3. Evaluate the damping effect of the curled hair packing used in the H-815 shipping container during vibration testing.

Authorization for Test

This test was requested in an Environmental Test Order and letter from W. A. Maupin, 8126-1, to E. H. Copeland, 7321, dated 8-1-61. H. R. Easton, 8126-1, was the consultant.

Setup for Test

Figure 1 shows the test setup used throughout the vibration test. You will note that the H-815 shipping container was bolted to the vibration table with jig No. 1890 supplied by SCML. Normally for a flight vibration environment the container would be secured with aircraft type tie-down cables.

An XW-45 (TRM-186) warhead with a MC-1335 firing set shown in Figures 2 and 3 was installed in an H-815 shipping container to make up the unit which was tested. The list of components with their serial numbers is not available from the consultant.

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Test equipment used consisted of the MB-4 Electrodynamic Shaker, and a Model 320 Ballentine RMS voltmeter, Serial No. 1988, in conjunction with Sandia built cathode followers, Serial Nos. 121-14 and 121-15.

Instrumentation used is shown in Figures 1 through 5 and listed in Table I.

Procedure

The XW-45 (TRM-186) warhead was repressurized and its leak rate checked by H. R. Easton, 8126-1. The leak rate was found to be such that pressurization during the vibration test was not possible.

The XW-45 (TRM-186) warhead was instrumented by SCLL personnel as shown in Figures 2 and 3. The H-815 shipping container was instrumented as shown in Figures 1, 4, and 5.

The XW-45 (TRM-186) warhead in the H-815 shipping container was bolted securely to the vibration table with jig No. 1890 as requested by SCLL as shown in Figure 1. The vibration resonance surveys and cycling were made. The output of the vertical accelerometer mounted on the vibration table was used throughout the test as the input monitor. The outputs of all the accelerometers were recorded during the resonance surveys.

Results

At the request of the Livermore consultant, the XW-45 (TRM-186) warhead was not inspected for damage at the conclusion of the test before being shipped to SCLL. It was not possible to determine whether the XW-45 (TRM-186) warhead will retain its case seal because its leak rate was such that pressurization was impossible during the test.

The H-815 shipping container damage is shown in Figures 6, 7, and 8 and consisted of the following:

The cover clamping ring bolt came loose during Run No. 12, because the locking feature of the lock nut was badly worn from previous usage, allowing the XW-45 (TRM-186) warhead and curled hair packing to slide partially out of the container.

Various welds on the H-815 shipping container forward and aft legs fractured during the vibration test.

Accelerations and response ratios for Runs No. 1, 2, 3, and 4 are listed in Tables III, II, IV, and V respectively. It can be noted that the accelerations listed in Tables II and V for Runs No. 1 and 4 are not the same. It is

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possible that during Run No. 3 welds on the forward and aft legs could have fractured thus changing the response during Run No. 4. Maximum weapon component (0 to peak) accelerations measured during the resonance surveys were as follows:

The XW-45 (TRM-186) warhead blast shield accelerations were 4.5g, 2.4g, and 1.2g in the longitudinal, vertical, and lateral axes respectively at 14.4 cps with a 2g input.

The XW-45 (TRM-186) warhead support ring accelerations were 0.6g, 2.2g, and 2.2g in the longitudinal, vertical, and lateral axes respectively at 11 cps with a 2g input.

H. J. Blechinger

H. J. BLECHINGER, 7325-1

7321 Project Engineer: J. E. Bear

J. E. BEAR - 7321-5

Approved By: R. S. Hooper

R. S. HOOPER - 7321-5

HJB:7325-1:er

Distribution:
1/6A - J. D. Benton, 8125
Attn: W. A. Maupin
2/6A - J. M. Wiesen, 1442
3/6A - D. S. Bliss, 2344
4/6A - E. H. Copeland, 7321
5/6A - C. L. Johnson, 7523
6/6A - R. K. Smeltzer, 3421-3

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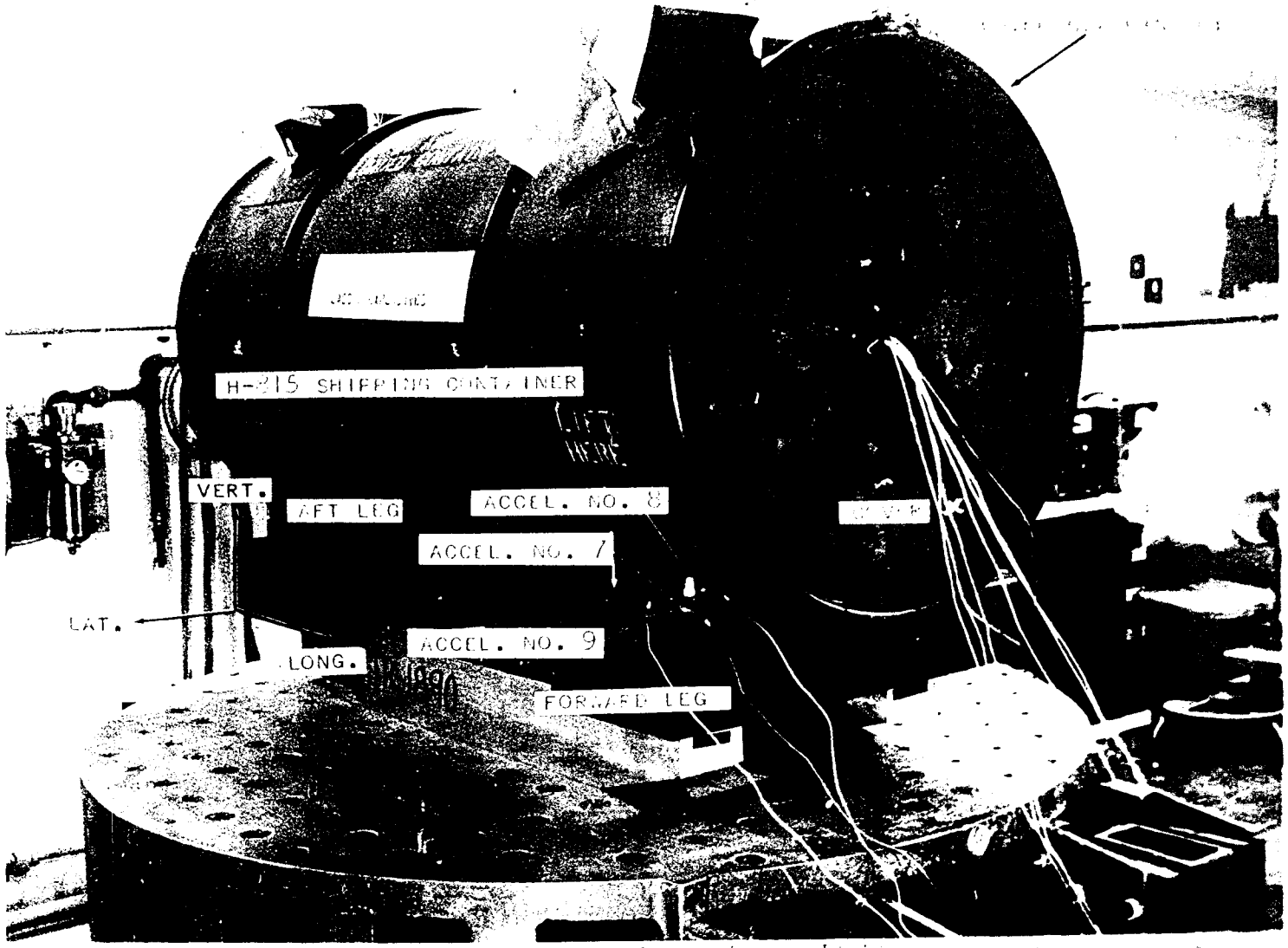

FIG. 1 SETUP FOR VIBRATION TEST AND ACCELEROMETER LOCATIONS [illegible] H-215 SHIPPING CONTAINER. [illegible] H-215 SHIPPING CONTAINER.

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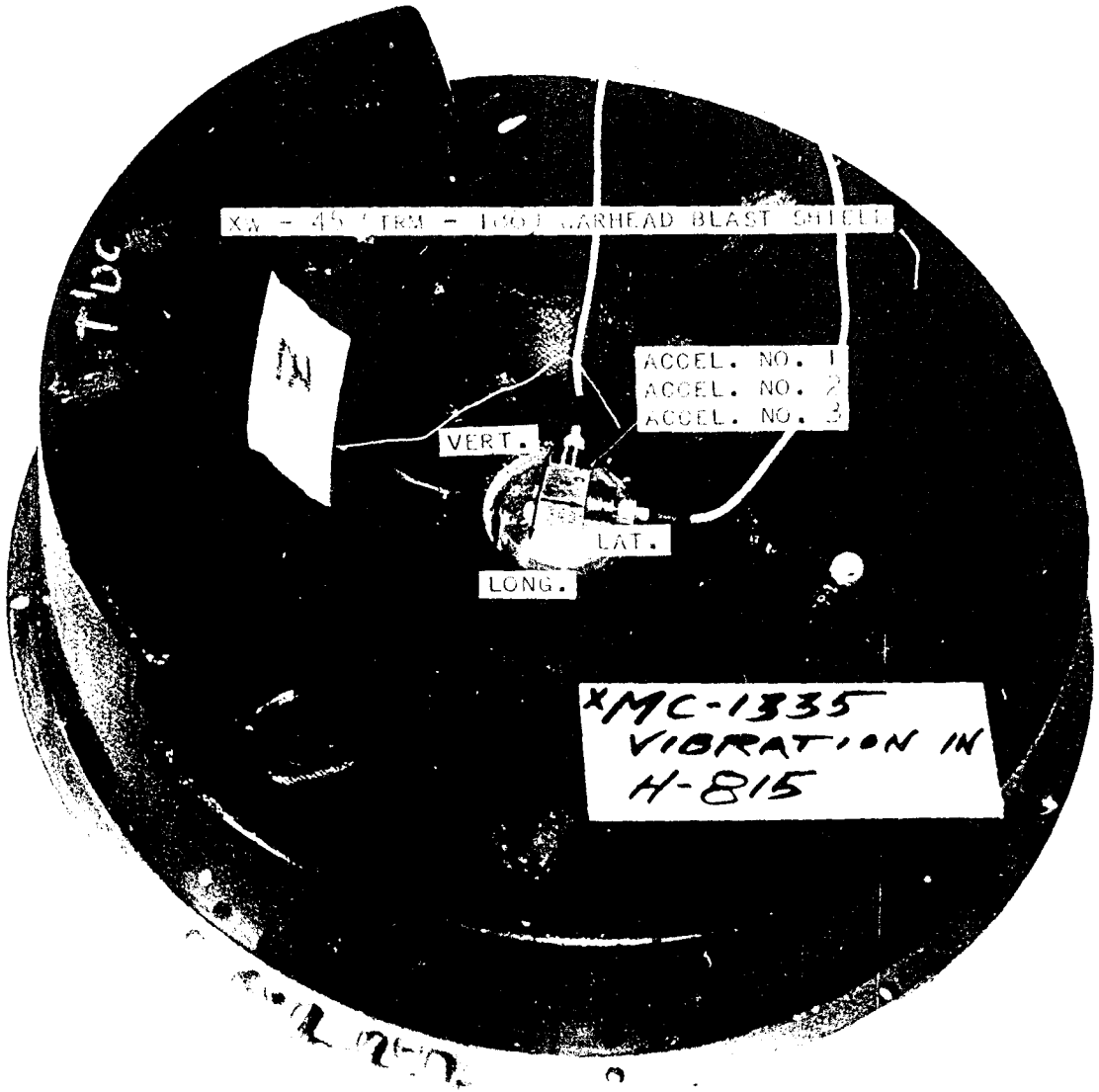
XM - 45 (TRM - 100) WARHEAD BLAST SHIELD
TBC
IN
ACCEL. NO. 1
ACCEL. NO. 2
ACCEL. NO. 3
VERT.
LAT.
LONG.
XMC-1335
VIBRATION IN
H-815

[illegible]

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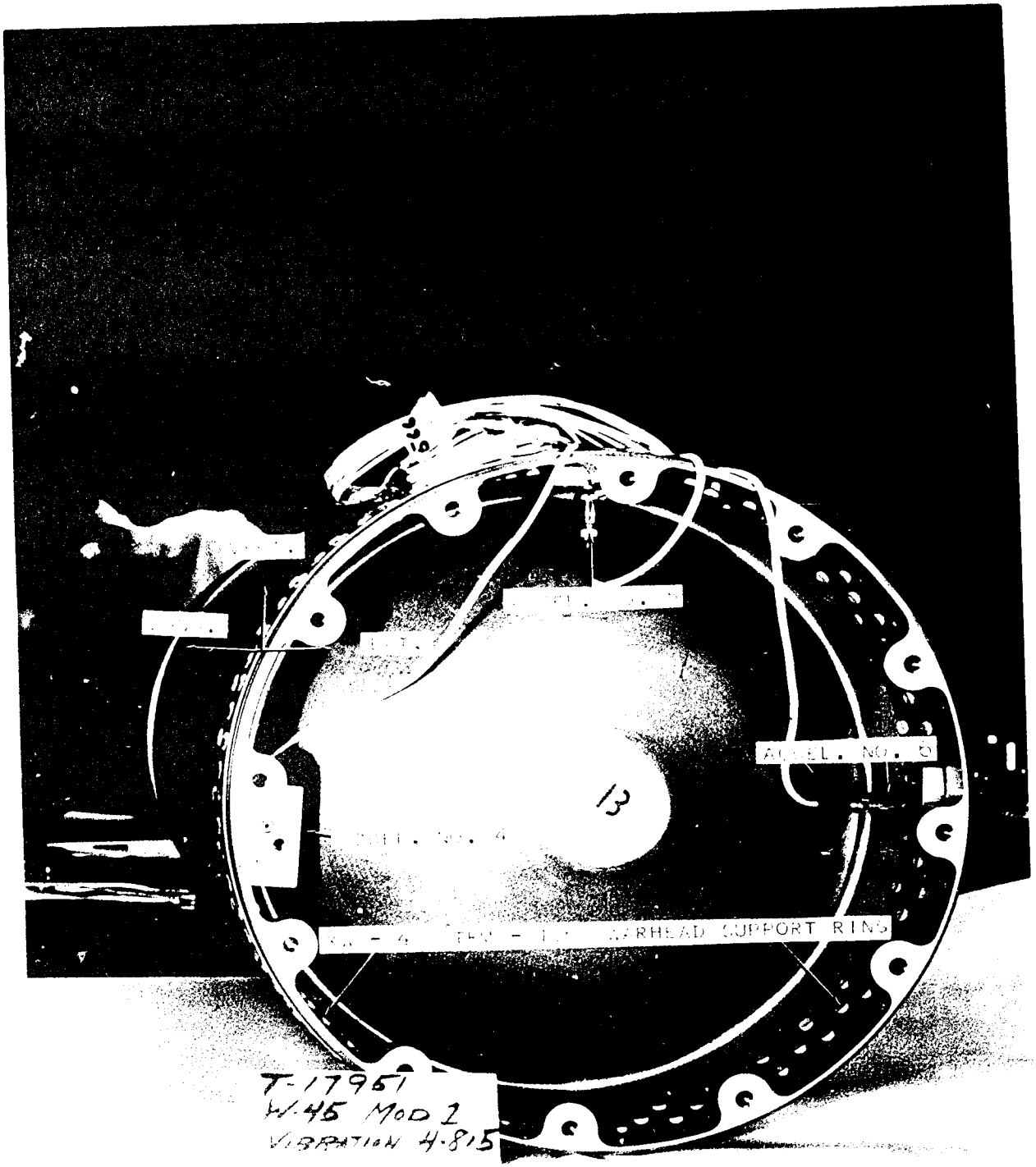

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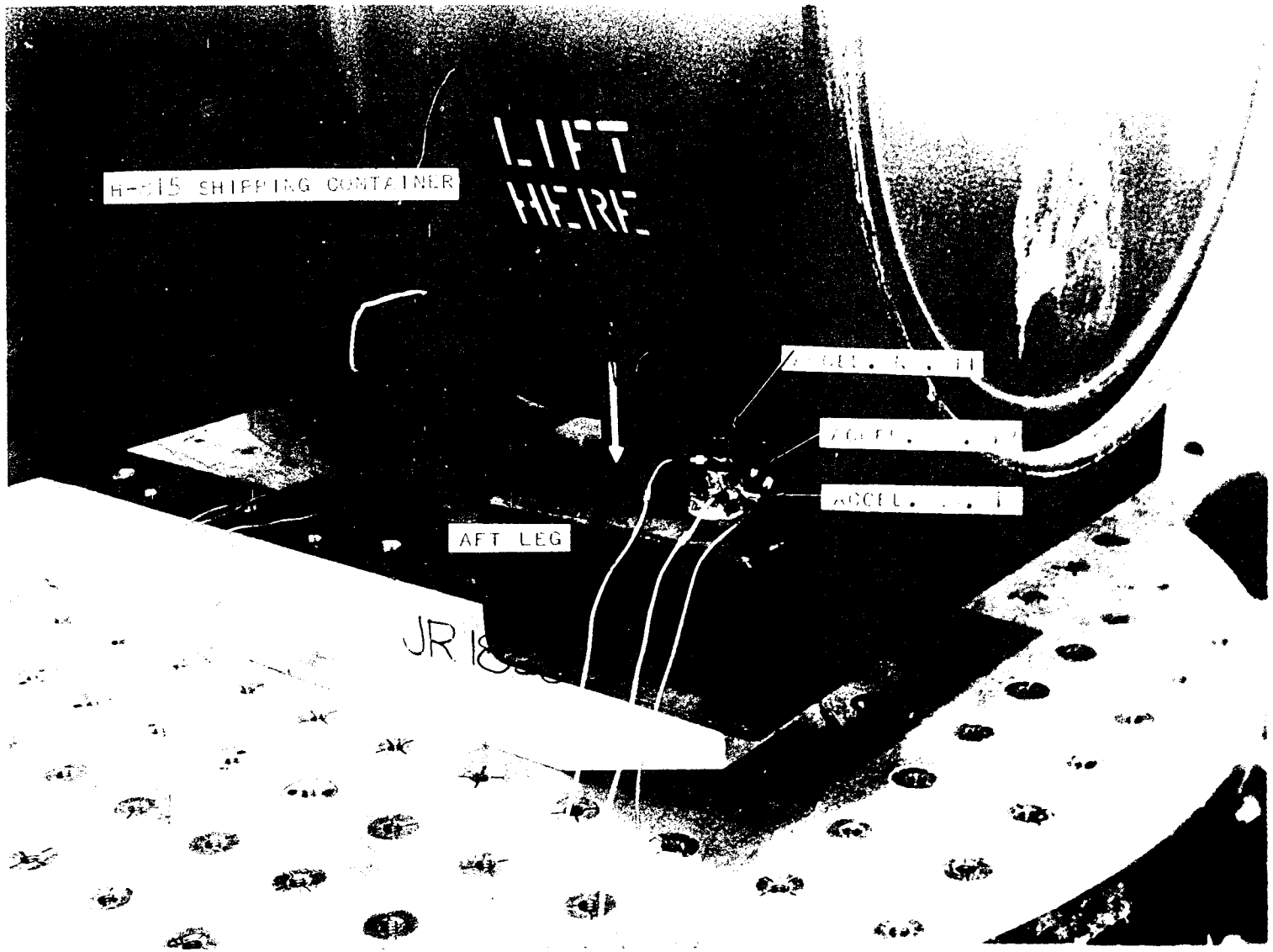
H-415 SHIPPING CONTAINER
LIFT HERE
AFT LEG
ACCEL.

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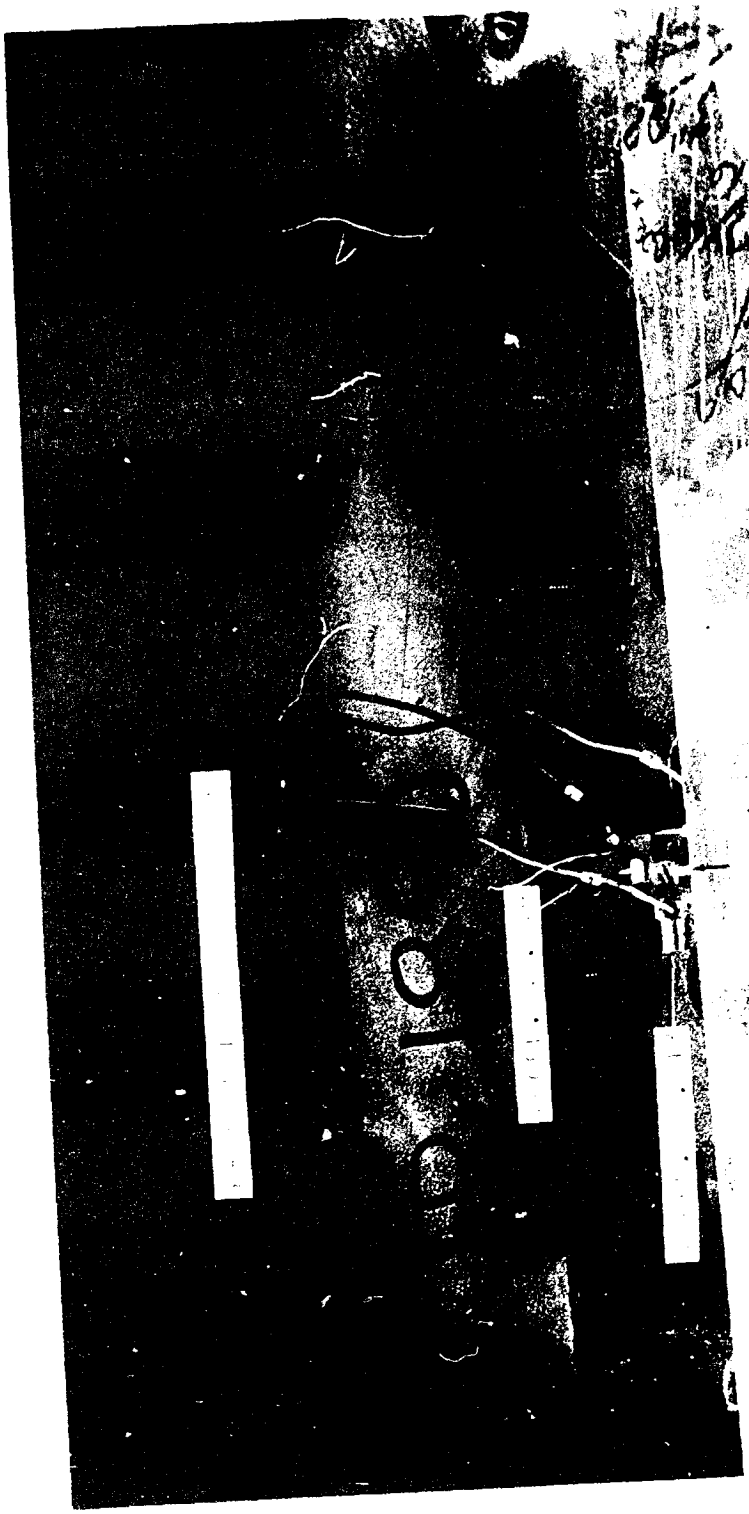

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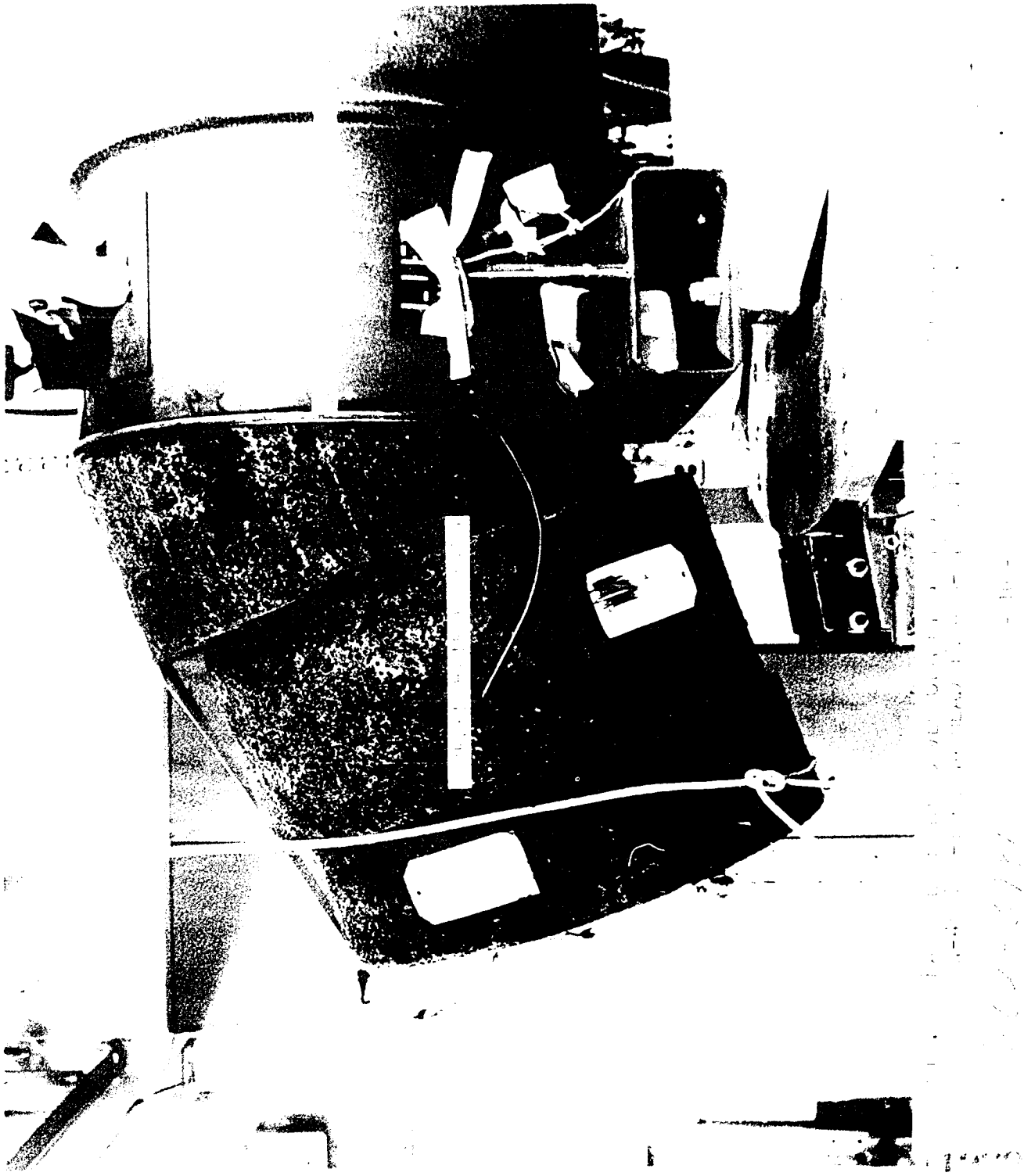

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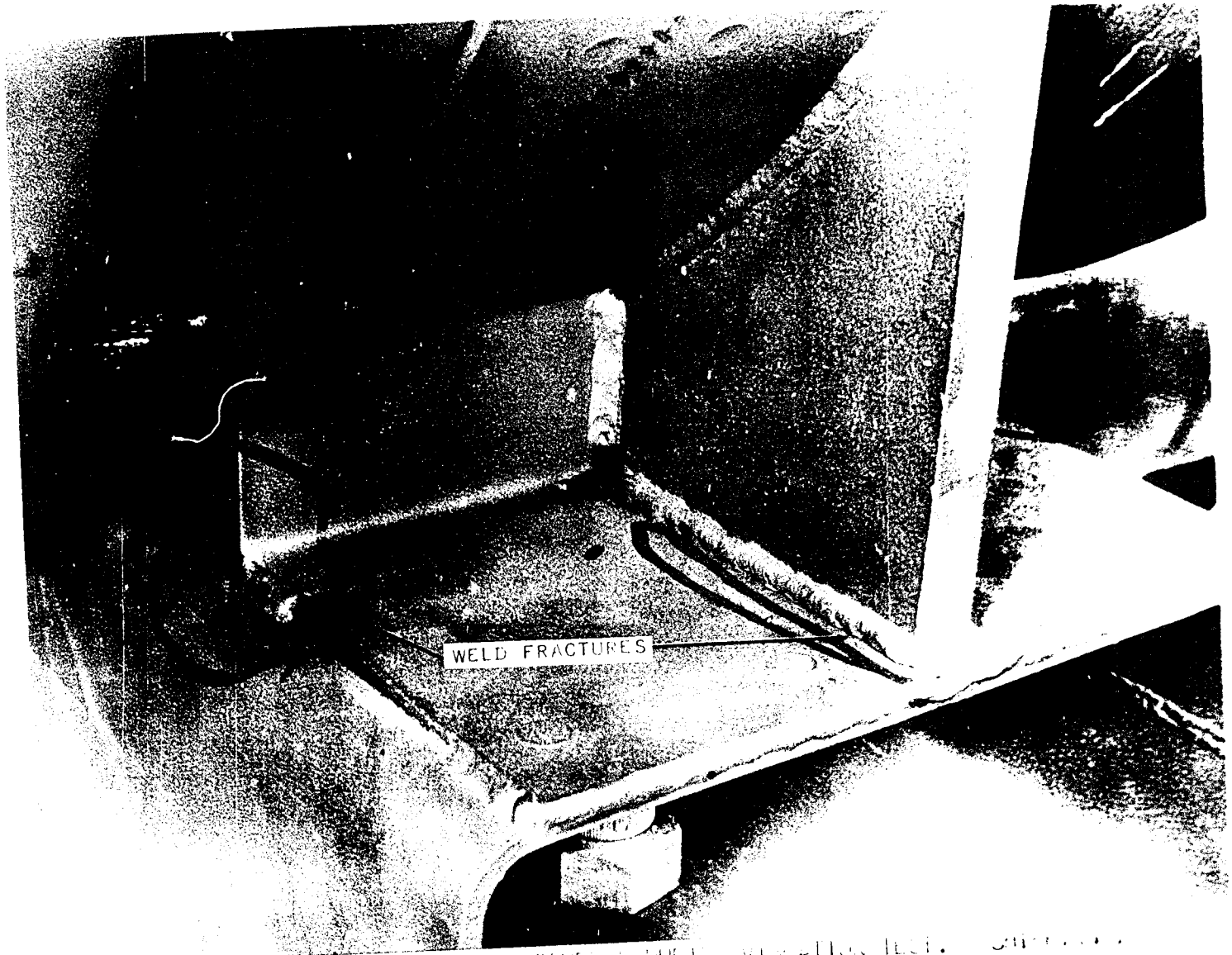

FIG. 7 TYPICAL WELD FRACTURE WHICH OCCURRED DURING VIBRATION TEST. [illegible] TEST OF THE XW-45(TRM-186) WARHEAD IN A H-815 SHIPPING CONTAINER.

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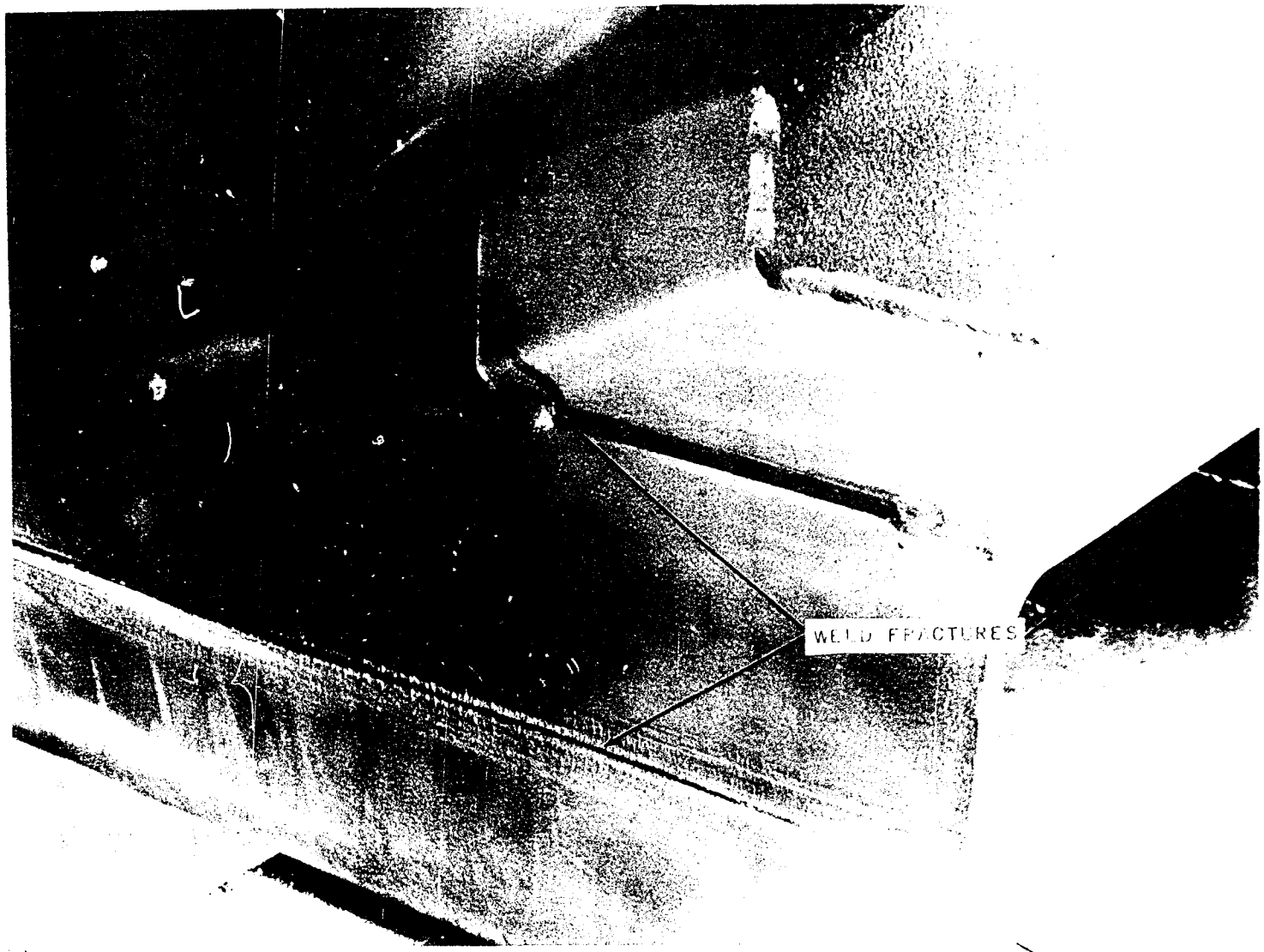

FIG. 8 TYPICAL WELD FRACTURE WHICH OCCURRED DURING VIBRATION TEST. SHIPPING [illegible] TEST OF THE XW-45(TRM-186) WARHEAD IN A H-815 SHIPPING CONTAINER.

PROJECT NO. [illegible]
REF. [illegible]

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RS 7321/9367

TABLE I

Instrumentation
Shipping Vibration Test of the XW-45 (TRM-186) Warhead
in an H-815 Shipping Container

Accel. No.	Location	Direction*	Type or Model No.	Serial No.	Nat. Freq. (kcps)	Fig. Ref.
1	XW-45 (TRM-186) Warhead Blast Shield	Long.	Columbia 508-TX	127	20	2
2	XW-45 (TRM-186) Warhead Blast Shield	Vert.	Columbia 508-TX	127	20	2
3	XW-45 (TRM-186) Warhead Blast Shield	Lat.	Columbia 508-TX	127	20	2
4	XW-45 (TRM-186) Warhead Support Ring	Long.	Clevite 5C1-S	1496	20	3
5	XW-45 (TRM-186) Warhead Support Ring	Vert.	Clevite 5C1-S	1672	20	3
6	XW-45 (TRM-186) Warhead Support Ring	Lat.	Clevite 5C1-S	1454	20	3
7	H-815 Shipping Container Forward Leg	Long.	Endevco 2213	9827	35	1
8	H-815 Shipping Container Forward Leg	Vert.	Endevco 2213	7876	35	1
9	H-815 Shipping Container Forward Leg	Lat.	Endevco 2213	9816	35	1
10	H-815 Shipping Container Aft Leg	Long.	Endevco 2213	9809	35	4
11	H-815 Shipping Container Aft Leg	Vert.	Endevco 2213	K840	35	4
12	H-815 Shipping Container Aft Leg	Lat.	Endevco 2213	AC33	35	4
13	Table Input	Long.	Endevco 2213	7686	35	5
14	Table Input	Vert.	Endevco 2213	7415	35	5
15	Table Input	Lat.	Endevco 2213	M856	35	5

*Directions are with respect to the inflight orientation.

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TABLE II

Run No. 1 - 40-Minute Resonance Survey (10-31-10 cps) - Vertical Orientation Table Input (2 g's, 0 to Peak)
Shipping Vibration Test of the XW-45 (TRM-196) Warhead in an H-815 Shipping Container

Item No.	Location	Direction*	Acceleration (g's, 0 to Peak) with Respective Response Ratios (RR) Frequency (cps) 7 g's	7 RR	13 g's	13 RR	15 g's	15 RR	20 g's	20 RR	25 g's	25 RR	31 g's	31 RR	25 g's	25 RR	20 g's	20 RR	16.5 g's	16.5 RR	16 g's	16 RR	[illegible] g's	[illegible] RR	[illegible] g's	[illegible] RR
1	[illegible]	Long.	1.6	0.5	.6	0.3	2.0	1.0	1.1	0.5	0.5	0.2	0.5	0.2	0.6	0.3	1.2	0.6	1.6	0.8	2.0	1.4	[illegible]	[illegible]	*	[illegible]
2	[illegible]	Vert.	1.	.5	0.9	.4	1.6	0.8	1.1	0.6	0.7	0.4	0.6	0.3	0.7	0.4	1.1	0.6	1.5	0.8	2.0	1.0	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	Lat.	1.4	.7	1.0	0.5	.7	0.4	0.4	0.2	0.4	0.2	0.2	0.1	0.4	0.2	0.4	0.2	0.8	0.4	1.0	0.5	1.2	0.6	[illegible]	[illegible]
4	[illegible]	Long.	.3	.2	0.4	0.2	0.5	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.1	+	0.6	0.3	0.6	0.3	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	Vert.	[illegible]	0.4	1.8	0.9	1.7	0.8	1.1	0.6	0.8	0.4	0.5	0.2	0.8	0.4	1.2	0.6	1.5	0.8	1.8	[illegible]	2.2	1.1	[illegible]	[illegible]
6	[illegible]	Lat.	1.5	0.8	0.5	0.2	0.7	0.4	0.3	0.2	0.3	0.2	0.4	0.2	0.3	0.2	0.3	0.2	0.5	0.2	0.8	0.4	1.1	0.5	1.8	[illegible]
7	H-815 Rear Leg	Long.	.1	+	0.1	+	0.2	0.1	0.2	0.1	0.1	+	0.1	+	0.1	+	0.2	0.1	0.4	0.2	0.3	[illegible]	.2	0.1	[illegible]	[illegible]
8	H-815 Rear Leg	Vert.	1.0	1.	1.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0	2.1	1.0	2.0	1.0	2.0	1.0	2.1	1.0	1.0	1.0	2.1	1.	[illegible]	[illegible]
9	H-815 Rear Leg	Lat.	0.4	0.2	0.1	+	0.2	0.1	0.2	0.1	0.1	+	0.1	+	0.1	+	0.1	+	0.3	0.2	0.3	0.2	0.3	0.2	[illegible]	[illegible]
10	H-815 Aft Leg	Long.	0.4	0.2	0.2	0.1	0.3	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.1	+	0.2	0.1	0.5	0.2	0.3	0.2	0.3	0.2	[illegible]	[illegible]
11	H-815 Aft Leg	Vert.	1.0	1.	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0	1.0	2.1	1.0	1.0	1.0	1.0	1.0	1.0	[illegible]
12	H-815 Aft Leg	Lat.	0.3	0.2	0.1	+	0.2	0.1	0.1	+	0.1	+	0.1	+	0.1	+	0.1	+	0.2	0.1	0.3	0.2	0.2	0.1	0.3	[illegible]
13	Table Input	Long.	0.1	+	0.1	+	+	-	0.1	+	0.1	+	0.1	+	0.1	+	0.1	+	0.1	+	0.1	+	0.1	+	[illegible]	[illegible]
14	Table Input	Vert.	2.0	-	2.0	-	2.0	-	2.0	-	2.0	-	2.0	-	2.0	-	2.0	-	2.0	-	2.0	-	2.0	-	2.0	-
15	Table Input	Lat.	0.3	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.1	+	0.2	0.1	0.1	+	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.3	[illegible]

*Directions are with respect to the inflight orientation.

"+" = Less than 0.1.

RR = Response ratio = $\frac{\text{acceleration on component}}{\text{input acceleration in direction of vibration}}$.

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TABLE III

Run No. 2 - 45-Minute Resonance Survey - Vertical Orientation - Table Input, 0.06-inch Double Amplitude (31-55-31 cps)
Shipping Vibration Test of the XW-45 (TRM-186) Warhead in an H-815 Shipping Container

Acceleration (g's, 0 to Peak) with Respective Response Ratios (RR)

Data No.	Location	Direction*	Frequency (cps) 31 g's	RR	35 g's	RR	40 g's	RR	45 g's	RR	50 g's	RR	55 g's	RR	50 g's	RR	45 g's	RR	40 g's	RR	35 g's	RR	31 g's	RR
1	Blast Shield, XW-45	Long.	0.4	0.1	0.3	0.1	0.1	+	0.1	+	0.1	+	0.6	0.1	0.1	+	0.1	+	0.1	+	0.2	0.1	0.3	0.1
2	Blast Shield, XW-45	Vert.	0.7	.2	0.6	0.2	0.3	0.1	0.2	+	0.2	+	0.6	0.1	0.2	+	0.2	+	0.3	0.1	0.6	0.2	0.6	0.2
3	Blast Shield, XW-45	Lat.	0.1	+	0.1	+	0.1	+	0.1	+	0.1	+	0.5	0.1	0.1	+	0.1	+	0.1	+	0.1	+	0.1	+
4	Support Ring, XW-45	Long.	0.2	0.1	0.2	0.1	0.1	+	0.1	+	0.1	+	0.3	+	0.2	+	0.1	+	0.1	+	0.1	+	0.2	.1
5	Support Ring, XW-45	Vert.	1.1	0.4	1.2	0.3	0.5	0.1	0.5	0.1	0.5	0.1	0.5	0.1	0.5	0.1	0.5	0.1	0.5	+	1.1	+	1.2	0.4
6	Support Ring, XW-45	Lat.	0.2	0.1	0.2	0.1	0.1	+	0.1	+	0.1	+	0.3	+	0.2	+	0.2	+	0.1	+	0.2	0.1	0.2	.1
7	H-815 Fwd Leg	Long.	0.7	0.1	0.5	0.1	0.5	0.1	1.3	0.2	7.0	0.9	12.5	1.4	7.7	1.0	5.0	0.8	2.7	0.6	2.3	0.6	1.3	0.4
8	H-815 Fwd Leg	Vert.	3.[illegible]	1.0	4.3	1.1	5.3	1.1	7.9	1.3	15.5	2.1	22.8	2.5	25.0	3.3	11.0	1.8	6.6	1.4	5.3	1.4	3.6	1.2
9	H-815 Fwd Leg	Lat.	0.1	+	0.2	0.1	0.3	0.1	1.0	0.2	3.9	0.5	10.7	1.2	10.4	1.4	4.7	0.8	2.6	0.5	2.1	0.6	1.2	0.4
10	H-815 Aft Leg	Long.	0.3	0.1	0.7	0.2	0.7	0.1	1.7	0.3	6.9	0.9	14.4	1.6	14.0	1.9	5.4	0.9	3.1	0.6	2.4	0.6	1.2	0.4
11	H-815 Aft Leg	Vert.	3.[illegible]	1.0	4.[illegible]	1.1	5.3	1.1	7.8	1.3	11.9	1.6	26.5	2.9	20.4	2.7	11.3	1.8	7.4	1.5	5.4	1.5	3.6	1.2
12	H-815 Aft Leg	Lat.	0.1	+	0.2	0.1	0.3	0.1	1.0	0.2	3.3	0.4	10.9	1.2	9.5	1.3	4.7	0.8	3.0	0.6	2.2	0.6	1.1	0.4
13	Table Input	Long.	0.1	+	0.2	0.1	0.3	0.1	0.6	0.1	2.6	0.4	8.6	1.0	5.2	0.7	1.9	0.3	1.0	0.2	0.8	0.2	0.4	0.1
14	Table Input	Vert.	2.[illegible]	-	3.7	-	4.8	-	6.1	-	7.5	-	9.1	-	7.5	-	6.1	-	4.8	-	3.7	-	2.9	-
15	Table Input	Lat.	0.2	0.1	0.3	0.1	0.3	0.1	0.5	0.1	1.3	0.2	5.1	0.6	4.0	0.5	1.9	0.3	1.1	0.2	0.9	0.2	0.5	0.2

*Directions are with respect to the inflight orientation.

"+" = less than 0.1.

RR = Response ratio = $\frac{\text{component acceleration}}{\text{input acceleration in direction of vibration}}$.

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TABLE IV

Run No. [illegible] - 60-Minute Resonance Survey (55-500-55 cps) - Vertical Orientation - Table Input (10 g's, 0 to Peak)
Shipping Vibration Test of the W-45 (TRM-186) Warhead in an H-815 Shipping Container

Acceleration (g's, 0 to Peak) with Respective Response Ratios (RR)
Frequency (cps)

Case No.	Location	Direction*	55 g's	55 RR	[illegible] g's	RR	[illegible] g's	RR	[illegible] g's	RR	[illegible] g's	RR	[illegible] g's	RR	125 g's	125 RR	150 g's	150 RR	175 g's	175 RR	200 g's	200 RR
1	Blast Shield, W-45	Long.	0.3	+	0.3	+	0.2	+	0.2	+	[illegible]	+	0.1	+	0.1	+	0.1	+	0.1	+	+	-
2	Blast Shield, W-45	Vert.	0.4	+	[illegible]	+	[illegible]	0.1	0.6	0.1	0.4	+	0.3	+	0.1	+	0.2	+	0.2	+	0.1	+
3	Blast Shield, W-45	Lat.	0.3	+	0.2	+	0.1	+	0.2	+	0.2	+	0.2	+	0.2	+	0.1	+	0.1	+	+	-
4	Support Ring, W-45	Long.	0.3	+	[illegible]	+	0.1	+	0.3	+	0.2	+	0.1	+	0.1	+	0.1	+	0.1	+	0.1	+
5	Support Ring, W-45	Vert.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.1	1.2	0.1	1.6	0.1	0.2	+	0.1	+	0.1	+	0.1	+
6	Support Ring, W-45	Lat.	[illegible]	+	[illegible]	+	[illegible]	+	[illegible]	0.1	[illegible]	0.1	0.2	+	0.2	+	0.1	+	0.1	+	+	-
7	H-815 Fwd Leg	Long.	[illegible]	[illegible]	[illegible]	4.9	[illegible]	1.7	[illegible]	1.3	[illegible]	1.6	[illegible]	2.0	30.0	3.0	5.0	0.5	4.0	0.4	3.0	0.3
8	H-815 Fwd Leg	Vert.	[illegible]	[illegible]	[illegible]	7.5	[illegible]	[illegible]	[illegible]	1.4	[illegible]	1.6	34.0	3.4	45.0	4.5	5.0	0.5	12.0	1.2	7.5	0.8
9	H-815 Fwd Leg	Lat.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.8	13.0	1.3	24.0	2.4	4.0	0.4	2.7	0.3	2.4	0.2
10	H-815 Aft Leg	Long.	[illegible]	[illegible]	[illegible]	3.6	[illegible]	1.2	[illegible]	1.1	[illegible]	[illegible]	32.0	3.2	39.0	3.8	4.5	0.4	5.0	0.5	3.0	0.3
11	H-815 Aft Leg	Vert.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.7	[illegible]	1.6	[illegible]	2.7	23.0	2.3	67.0	6.7	10.0	1.0	8.0	0.8	4.0	0.4
12	H-815 Aft Leg	Lat.	[illegible]	[illegible]	[illegible]	2.5	[illegible]	[illegible]	[illegible]	0.6	[illegible]	1.2	5.5	0.5	37.0	3.7	5.0	0.5	4.4	0.4	2.0	0.2
13	Table Input	Long.	[illegible]	[illegible]	[illegible]	1.1	[illegible]	[illegible]	[illegible]	0.2	[illegible]	0.3	2.7	0.3	10.0	1.0	1.4	0.1	0.6	0.1	0.6	0.1
14	Table Input	Vert.	[illegible]	+	[illegible]	+	[illegible]	-	[illegible]	+	[illegible]	-	[illegible]	-	10.0	-	10.0	-	10.0	-	10.0	-
15	Table Input	Lat.	[illegible]	[illegible]	[illegible]	1.1	[illegible]	[illegible]	2.0	0.2	[illegible]	0.4	3.3	0.3	15.0	1.5	1.7	0.2	1.0	0.1	1.0	0.1

Case No.	225 g's	225 RR	250 g's	250 RR	275 g's	275 RR	300 g's	300 RR	325 g's	325 RR	[illegible] g's	RR	[illegible] g's	RR	[illegible] g's	RR	[illegible] g's	RR	[illegible] g's	RR
1	0.1	+	+	-	+	-	+	-	0.1	+	+	+	+	+	+	+	+	+	+	+
2	0.1	+	+	-	+	-	0.2	+	0.3	+	+	-	0.1	+	+	+	[illegible]	+	[illegible]	+
3	+	-	0.1	+	+	-	0.1	+	0.2	+	+	-	+	-	+	+	+	+	+	+
4	+	-	0.1	+	0.1	+	0.1	+	0.1	+	0.1	+	0.1	+	[illegible]	+	[illegible]	+	[illegible]	[illegible]
5	0.1	+	0.1	+	+	-	+	-	+	-	0.1	+	+	-	[illegible]	+	[illegible]	+	[illegible]	[illegible]
6	+	-	+	-	0.1	+	+	-	0.1	+	+	-	[illegible]	+	+	+	[illegible]	+	[illegible]	[illegible]
7	6.0	0.6	5.0	0.5	2.0	0.2	6.0	0.6	4.0	0.4	2.0	0.2	3.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	4.0	0.4	4.0	0.4	6.0	0.8	6.0	0.6	4.6	0.5	3.0	0.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	1.4	0.1	1.6	0.2	2.0	0.2	0.9	0.9	3.7	0.4	2.0	0.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	6.6	0.7	5.6	0.9	5.0	0.5	4.6	0.5	3.5	0.4	2.5	0.2	3.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	5.0	0.5	5.0	0.5	3.0	0.3	2.3	0.2	7.0	0.7	3.0	0.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	1.4	0.1	1.4	0.1	2.0	0.2	1.6	0.2	2.7	0.3	1.0	0.1	2.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13	1.0	0.1	1.0	0.1	0.4	+	0.4	+	0.5	0.1	0.6	0.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	[illegible]	-	[illegible]	+	[illegible]	+	[illegible]	
15	1.7	0.2	1.3	0.1	0.7	0.1	0.7	0.1	0.6	0.1	0.8	0.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Acceleration (g's, 0 to Peak) with Respective Response Ratios (RR)
Frequency (cps)

Case No.	Location	Direction*	[illegible] g's	RR	[illegible] g's	RR	[illegible] g's	RR	[illegible] g's	RR	[illegible] g's	RR	[illegible] g's	RR	[illegible] g's	RR	90 g's	90 RR	80 g's	80 RR	70 g's	70 RR	60 g's	60 RR	55 g's	55 RR
1	Blast Shield, W-45	Long.	+	-	+	-	+	-	0.1	+	0.1	+	0.1	+	0.1	+	0.2	+	0.2	+	0.1	+	0.2	+	0.6	0.1
2	Blast Shield, W-45	Vert.	+	-	0.2	+	0.1	+	[illegible]	+	0.1	+	0.3	+	0.3	+	0.5	0.1	0.4	+	0.4	+	0.5	0.1	0.6	0.1
3	Blast Shield, W-45	Lat.	+	-	0.2	+	0.1	+	0.2	+	0.1	+	0.3	+	0.3	+	0.5	0.1	0.4	+	0.4	+	0.5	0.1	0.6	0.1
4	Support Ring, W-45	Long.	0.1	+	0.1	+	0.1	+	0.1	+	0.1	+	0.4	+	0.4	+	0.3	+	0.2	+	0.2	+	0.4	+	0.4	+
5	Support Ring, W-45	Vert.	0.1	+	+	-	0.1	+	0.1	+	0.2	+	0.5	0.1	0.8	0.1	1.0	0.1	1.0	0.1	1.0	0.1	1.0	0.1	0.8	0.1
6	Support Ring, W-45	Lat.	+	-	+	-	+	-	0.1	+	0.2	+	0.4	+	0.4	+	0.7	0.1	1.0	0.1	0.3	+	0.5	0.1	0.5	0.1
7	H-815 Fwd Leg	Long.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.2	4.5	0.4	27.0	2.7	62.0	6.2	48.0	4.8	27.0	2.7	18.0	1.8	27.0	2.7	83.0	8.3	14.0	1.4
8	H-815 Fwd Leg	Vert.	[illegible]	[illegible]	6.6	[illegible]	[illegible]	[illegible]	[illegible]	0.5	3.7	0.4	110.0	11.0	87.0	8.7	45.0	4.5	21.0	2.1	38.0	3.8	138.0	13.8	15.0	1.5
9	H-815 Fwd Leg	Lat.	[illegible]	0.4	2.4	0.2	2.0	0.2	3.6	0.4	[illegible]	1.9	5.2	0.5	41.0	4.1	19.0	1.9	11.0	1.1	18.0	1.8	65.0	6.5	9.0	0.9
10	H-815 Aft Leg	Long.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.3	4.7	0.5	44.0	4.4	82.0	8.2	89.0	8.9	45.0	4.5	43.0	4.3	22.0	2.2	86.0	8.6	72.0	7.2
11	H-815 Aft Leg	Vert.	[illegible]	[illegible]	2.3	0.2	[illegible]	0.4	[illegible]	[illegible]	[illegible]	6.6	107.0	10.7	113.0	11.3	63.0	6.3	58.0	5.8	29.0	2.9	135.0	13.5	94.0	9.4
12	H-815 Aft Leg	Lat.	[illegible]	0.2	1.6	0.2	[illegible]	0.2	[illegible]	0.4	38.0	3.8	67.0	6.7	80.0	8.0	46.0	4.6	39.0	3.9	195.0	19.5	85.0	8.5	82.0	8.2
13	Table Input	Long.	1.0	0.1	1.7	0.1	[illegible]	+	1.3	0.1	11.0	1.1	27.0	2.7	24.0	2.4	13.0	1.3	13.0	1.3	6.0	0.6	24.0	2.4	25.0	2.5
14	Table Input	Vert.	10.0	+	[illegible]	+	[illegible]	+	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-	10.0	-
15	Table Input	Lat.	1.3	0.1	[illegible]	0.1	[illegible]	0.1	1.7	0.2	15.0	1.5	27.0	2.7	29.0	2.9	15.0	1.5	13.0	1.3	7.4	0.7	28.0	2.8	29.0	2.9

*Directions are with respect to the inflight orientation.

"+" = Less than 0.1.

RR = Response ratio = Component acceleration / Input acceleration in direction of vibration.

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TABLE V

Run No. 4 - [illegible]-Minute Resonance Survey (10-31-10 cps) - Vertical Orientation - Table Input (2 g's, 0 to Peak)
Shipping Vibration Test of the XW-45 (TRM-186) Warhead in an H-815 Shipping Container

Acceleration (g's, 0 to Peak) with Respective Response Ratios (RR)

Item No.	Location	Direction*	Frequency (cps) 32 g's	RR	17 g's	RR	16 g's	RR	28 g's	RR	25 g's	RR	31 g's	RR	25 g's	RR	20 g's	RR	15 g's	RR	13 g's	RR	11 g's	RR
1	Blast Shield, XW-45	Long.	[illegible]	[illegible]	0.8	0.4	0.4	0.2	0.4	0.2	0.2	0.1	0.2	0.1	0.3	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2
2	Blast Shield, XW-45	Vert.	1.8	[illegible]	1.1	[illegible]	0.9	0.4	0.9	0.4	0.5	0.2	0.4	0.2	0.5	0.2	0.8	0.4	0.9	0.4	1.0	0.5	1.2	0.6
3	Blast Shield, XW-45	Lat.	1.1	0.6	0.8	0.4	0.5	0.2	0.2	0.1	0.1	+	+	-	0.1	+	0.1	+	0.5	0.2	0.5	0.2	0.6	0.3
4	Support Ring, XW-45	Long.	[illegible]	[illegible]	0.6	[illegible]	[illegible]	0.2	0.2	0.1	0.1	+	0.1	+	0.1	+	0.2	0.1	0.4	0.2	0.4	0.2	0.6	0.3
5	Support Ring, XW-45	Vert.	1.4	[illegible]	1.3	0.6	1.4	0.7	1.1	0.6	0.8	0.4	0.6	0.3	0.8	0.4	1.1	0.6	1.5	0.8	1.2	0.6	2.2	1.1
6	Support Ring, XW-45	Lat.	2.2	1.1	0.7	0.4	0.7	0.4	0.4	0.2	0.3	0.2	0.1	+	0.4	0.2	0.4	0.2	0.6	0.3	0.8	0.4	0.8	0.4
7	B-815 Foot Leg	Long.	1.[illegible]	0.5	0.5	0.2	0.7	0.4	0.3	0.2	0.4	0.2	0.8	0.4	0.5	0.2	0.4	0.2	0.5	0.2	0.5	0.2	0.4	0.2
8	B-815 Foot Leg	Vert.	3.1	1.6	2.3	1.2	2.5	1.2	2.3	1.2	2.5	1.2	2.9	1.4	2.6	1.3	2.3	1.2	2.3	1.2	2.2	1.1	2.1	1.0
9	B-815 Foot Leg	Lat.	1.0	0.5	0.4	0.2	0.5	0.2	0.3	0.2	0.5	0.2	0.8	0.4	0.5	0.2	0.3	0.2	0.5	0.2	0.5	0.2	0.3	0.2
10	B-815 Aft Leg	Long.	1.3	0.6	0.7	0.4	0.8	0.4	0.4	0.2	0.7	0.4	0.9	0.4	0.7	0.4	0.5	0.2	0.7	0.4	0.6	0.3	0.4	0.2
11	B-815 Aft Leg	Vert.	2.3	1.2	2.0	1.0	2.0	1.0	2.0	1.0	2.3	1.2	2.4	1.2	2.3	1.2	2.1	1.0	2.0	1.0	1.8	0.9	1.7	0.8
12	B-815 Aft Leg	Lat.	0.8	0.4	0.6	0.3	0.5	0.2	0.4	0.2	0.8	0.4	1.0	0.5	0.8	0.4	0.5	0.2	0.4	0.2	0.4	0.2	0.3	0.2
13	Table Input	Long.	0.3	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.3	0.2	0.3	0.2	0.2	0.1	0.2	0.1	0.3	0.1	0.1	+
14	Table Input	Vert.	2.0	-	2.0	-	2.0	-	2.0	-	2.0	-	2.0	-	2.0	-	2.0	-	2.0	-	2.0	-	2.0	-
15	Table Input	Lat.	0.4	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.3	0.2	0.4	0.2	0.3	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.1	+

*Directions are with respect to the inflight orientation.

"+" = Less than 0.1.

RR = Response ratio = $\frac{\text{component acceleration}}{\text{input acceleration in direction of vibration}}$.

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