[redacted]

UNCLASSIFIED

1082

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW

1st Review Date 11/10/98	Determination (Circle Numbers)
Authority ☐ ADC ☒ ADD	1 Classification Retained
Name W Boyne	2 Classification Changed to U
2nd Review Date 11/16/98	3 Contains No DOE Classified Information
Authority ADD	4 Coordinate With
Name RB Craner	5 Contains UCAI? no
	6 Comments OK for Openmet

TCG-NNT-1 + Sandia Prog 437 CG

AUG 2 7 1964

File: H1161, 3-2
T-10345
Test Completed: 5-21-64

To: J. W. McKiernan - 7419

Attn: J. M. May

R A Mikkelsen

From: R. A. Mikkelsen - 7331-1

CENTRAL TECHNICAL FILE
ACCOUNTABILITY CARD BB
FILE NO. H 1161
3-2
CTR Prog. 437 3-2

RECEIVED
AUG 28 1964
CENTRAL TECH FILE

Re: Ramp Test of the H-1161 Shipping and Storage Container with the Program 437 Payload Vehicle (U)

Summary

An H-1161 shipping and storage container with the Program 437 payload vehicle was subjected to a series of simulated railroad freight car hump tests at the Area III test ramp. The object of these tests was to determine the structural adequacy of the H-1161 shipping container and the wooden shoring used to secure the H-1161 container to the freight car. Four ramp tests were run, three at simulated 6 mph freight car humps (5.3 mph ramp impact velocity) and one at a simulated 9 mph freight car hump (6.7 mph ramp impact velocity).

The maximum faired acceleration observed during the simulated 6 mph humps was 16g longitudinal with a 26 ms duration and 11 ms rise time on the ramp cart. The maximum faired acceleration during the simulated 9 mph freight car hump was 24.5g longitudinal with 20 ms duration and 9 ms rise time on the ramp cart.

During ramp tests Numbers 1 and 2 (simulated 6 mph freight car humps) damage was sustained by the wooden shoring and also by the tie-down straps which held the H-1161 in place. After the first hump the wooden shoring was strengthened and after the first and second test, the tie-down procedure was altered. During the fourth test (simulated 9 mph hump) damage was sustained by both the shoring and tie-down straps and the remaining tests were cancelled. No damage was sustained by the H-1161 shipping contained during any of the four humps.

Procedure and Results

A wooden sub-flooring was bolted to the floor of the ramp cart and the wooden shoring used to secure the H-1161 container was nailed to the sub-flooring. The H-1161 was set in place and the tie-downs were connected on the four corners. Tightened chains were used for the front two tie-downs and two-inch steel strapping was used for the back two tie-downs.

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
DOWNGRADING OR DECLASSIFICATION STAMP

CLASSIFICATION CHANGED TO: U	AUTHORITY: RB Craner
Carmela Gulley 11/9/98	RECORD ID: 99SN0414
PERSON CHANGING MARKING & DATE: W Boyne 12/16/98	DATED: 11/16/98
PERSON VERIFYING MARKING & DATE	

[redacted]

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During the first ramp test (simulated 6 mph hump), the rear tie-downs were connected from the container to eye bolts in the floor of the ramp cart. Upon impact the eye bolts broke and the forward most shoring gave way (Figure 1).

Before the second ramp test, steel plates were made and bolted to the floor of the ramp cart to replace the eye-bolts and the front shoring was reinforced (Figure 2). The second ramp was run at simulated 6 mph. Upon impact the only failure was breaking of the steel strapping.

New strapping was installed and the third ramp test was run, again at simulated 6 mph rail hump. The strapping yielded slightly but did not part.

New strapping was installed for the fourth test (simulated 9 mph hump) and blocks were placed between the center of the front and rear axles and the sub-flooring to prevent the container from freely swaying up and down on its own suspension (Figure 3). The fourth ramp test was then run (simulated 9 mph rail hump). Upon impact the rear straps broke and the front shoring gave way (Figure 3).

Because of the damage sustained during the fourth ramp, further testing was cancelled.

Three Statham Accelerometers on a tri-axial block were mounted on the floor of the ramp cart forward of the sub-floor to obtain the input shock to the container. Three Statham Accelerometers (also on a tri-axial block) were mounted on the outside of the H-1161 container as shown in Figure 4. Two Statham Accelerometers (longitudinal and vertical) were mounted on the barrel structure of the 437 payload vehical as shown in Figure 5.

Complete transducer data and typical acceleration records along with pertinent acceleration data for the test is presented in Tables I through IV. The maximum faired acceleration recorded during the first three ramps (simulated 6 mph rail hump) was 16g longitudinal with a 26 ms duration and 11 ms rise time. The maximum faired acceleration during the fourth hump (simulated 9 mph rail hump) was 24.5g longitudinal with a 20 ms duration and 9 ms rise time. All acceleration data were interpreted according to the procedure outlined in SC-4452B(M) dated February 1963.

The equipment used to amplify and record the transducer signals is described in Table V.

This test was conducted by John Sutton, 7325-2.

Division 7419 Conclusions

The first 6 mph test resulted in a sheared king pin key on a trailer wheel in addition to the broken eye bolts on the tie-down straps and the broken shoring. The trailer was replaced and the remaining tests were conducted with no further damage to the trailer. The 11 mph test was cancelled after the strengthened shoring was displaced during the 9 mph test. After completing these tests the payload vehicle was functionally checked with satsifactory results.

The method of shoring was again revised and a series of box car tests were conducted with satisfactory results

JSutton:7325-2:cm

Approved: E. White — E. White - 7331-1

R. R. Moore — R. R. Moore - 7419-2

Enc: Figures 1 - 5
Tables I - V

Copy to:
C. S. Williams, Jr., 1442
R. C. Gauerke, 1553
Attn: D. E. Grim
C. L. Johnson, 2123
D. S. Bliss, 2562
E. H. Copeland, 7331
Central Technical File, 3428-1

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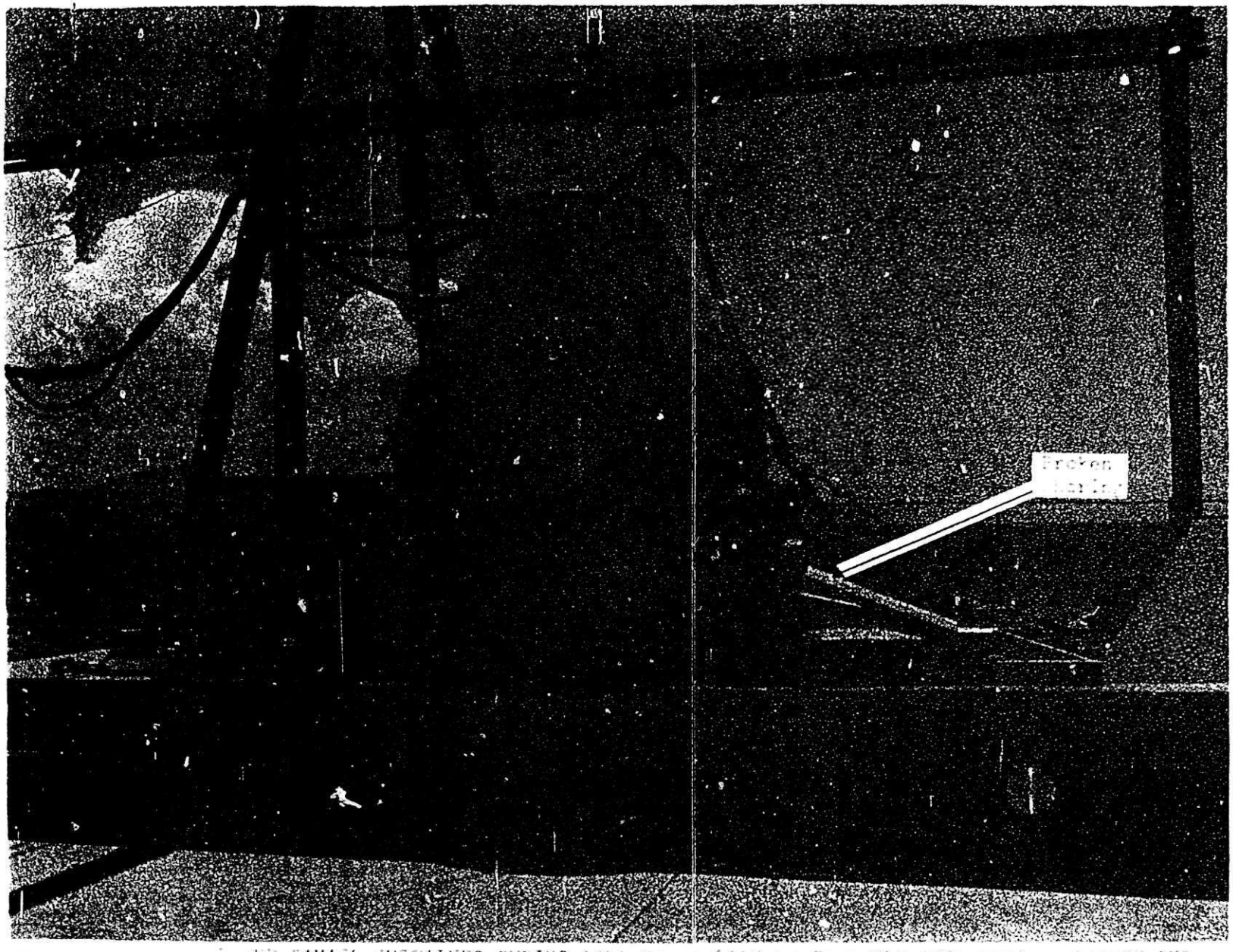

[illegible] AND DAMAGE SUSTAINED [illegible] (SIMULATED [illegible] FAIL [illegible] NEAR STRAPS AND [illegible] PARTIALLY TORE LOOSE. [illegible] SHIPPING AND STORAGE CONTAINER WITH PROGRAM 437 PAYLOAD ASSEMBLY (LENS W/H).

[redacted]

J #C Nonel

1085

[redacted]

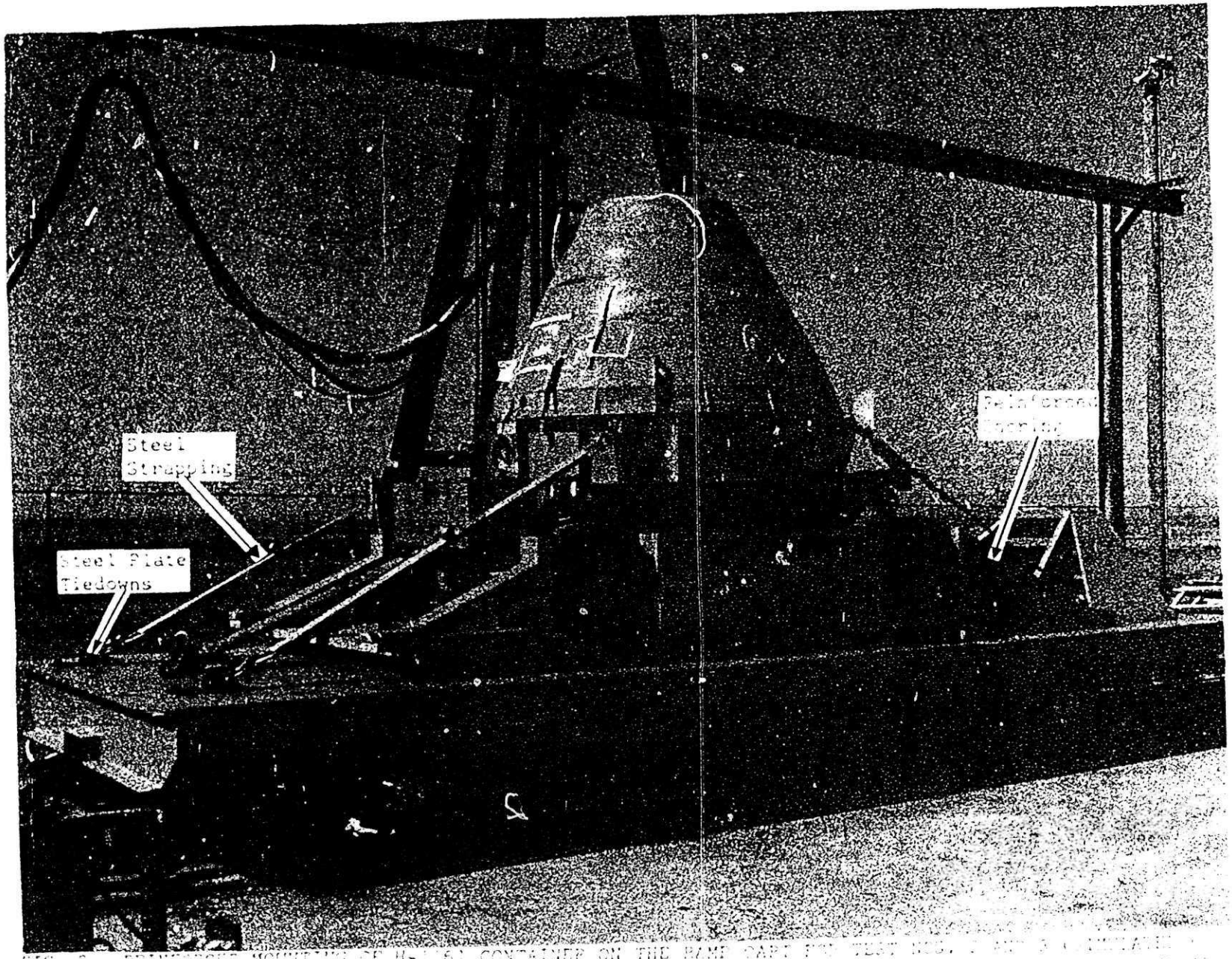

FIG. 2 REINFORCED MOUNTING OF H-1161 CONTAINER ON THE RAMP CART FOR TEST NOS. [illegible] MPH RAIL HUMP). RAMP TEST OF H-1161 SHIPPING AND STORAGE CONTAINER WITH [illegible] ASSEMBLY (LESS W/H).

[redacted]

D#7 none

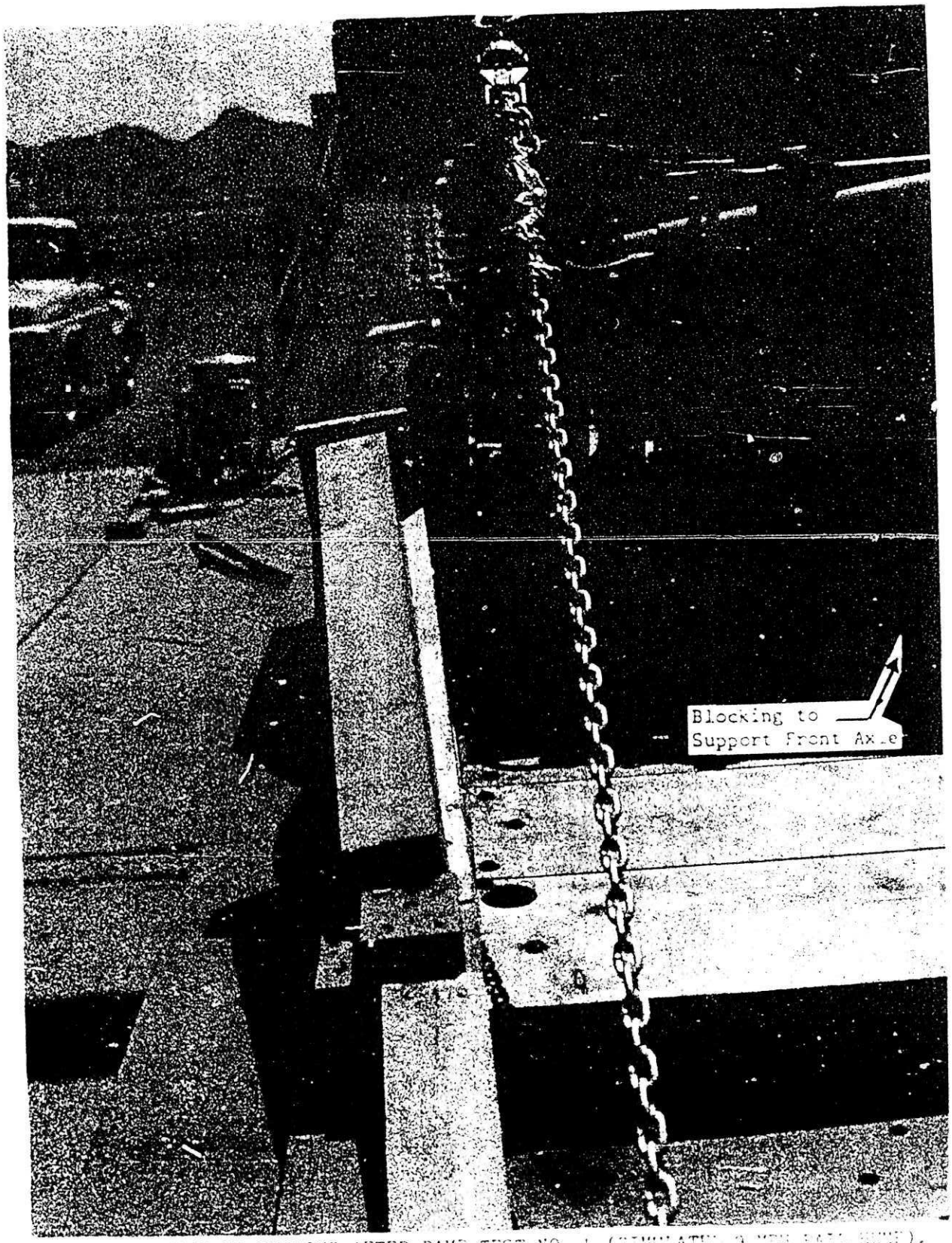

FIG. 3 DAMAGE TO SHOPING AFTER RAMP TEST NO. 4 (SIMULATED 9 MPH RAIL HUMP). RAMP TEST OF H-1361 SHIPPING AND STORAGE CONTAINER WITH PROGRAM 437 PAYLOAD ASSEMBLY (LESS W/H).

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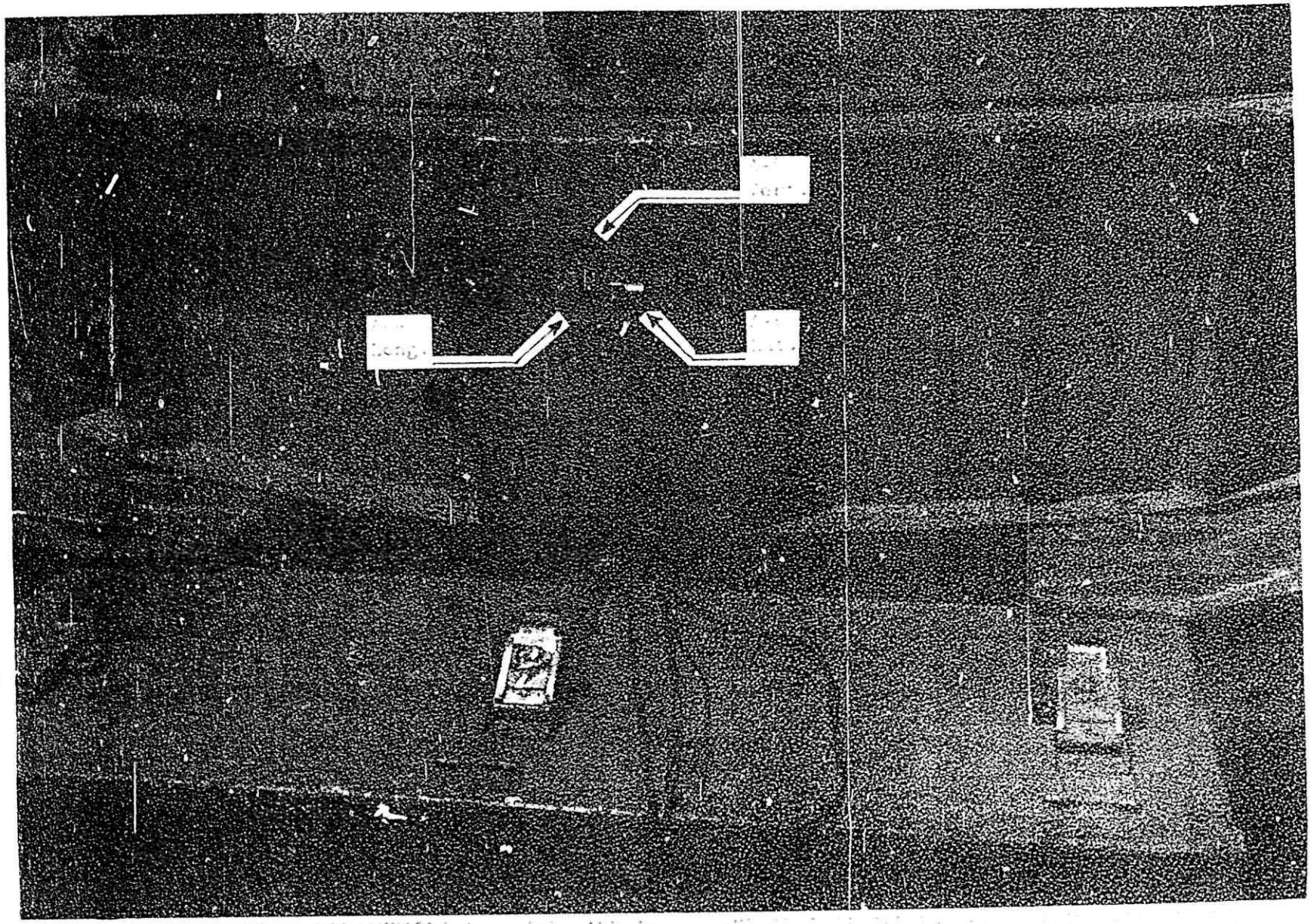

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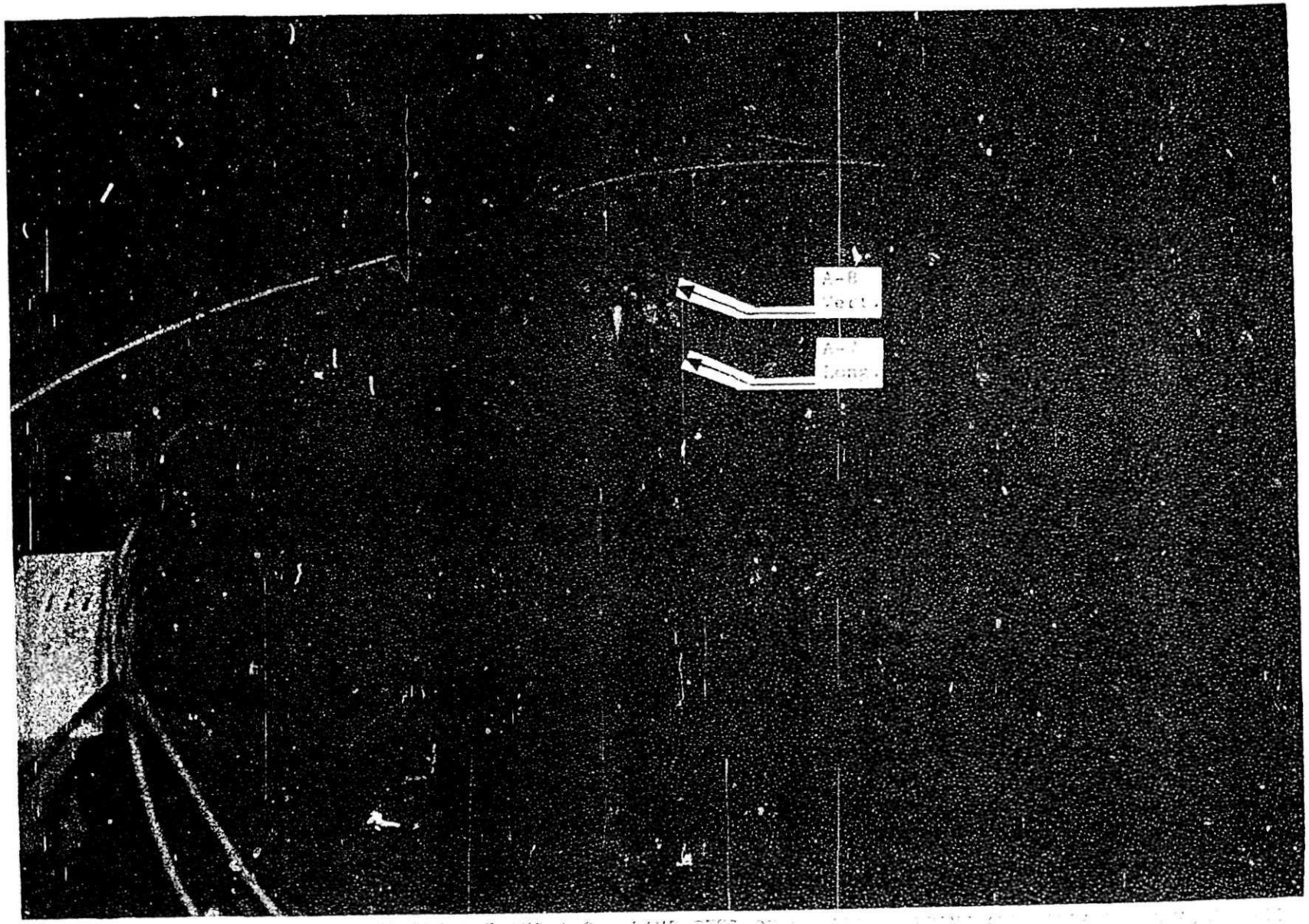

FIG. 5 MOUNTING OF ACCELEROMETERS A-7 AND A-8. RAMP TEST OF [illegible]
[illegible] ASSEMBLY [illegible]

D#64-2987

[redacted]

[redacted]

[redacted] TABLE I

PROJECT NO.	PAGE	OF
1090 T-10345		

RAMP TEST NO. 1 OF H-1161 SHIPPING AND STORAGE CONTAINER WITH THE PROGRAM 437 PAYLOAD ASSEMBLY (LESS W/H)

TEST CONDITIONS

Run No.	
Impact Velocity	5.5 mph
Simulating	6 mph [illegible]
Temp. Condition	Ambient
Orientation	

LEGEND
PD - PULSE DURATION
RT - RISE TIME
MFP - MAXIMUM FAIRED PULSE
A - ACCELEROMETER

COMMENTS

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TRANSDUCER INFORMATION						TEST DATA				
No.	Location & Orientation	Model	S/N	fn and Range	Fig. Ref.	MAX (+) g	MAX (-) g	MFP g	RT (ms)	PD (ms)
A-1	Ramp Cart Longitudinal	A69-TC	287	1800cps 100g		18	3	6	12	26
A-2	Ramp Cart Vertical	A69-TC	3615	1800cps 100g		10	10	—	—	—
A-3	Ramp Cart Lateral	A69-TC	3659	1800cps 100g		11	11	—	—	—
A-4	Outside H-1161 Container Longitudinal	A69-TC	6645	1800cps 100g	4	25	15	4	10	25
A-5	Outside H-1161 Container Vertical	A69-TC	3521	1800cps 100g	4	22	18	—	—	—
A-6	Outside H-1161 Container Lateral	A69-TC	3608	1800cps 100g	4	15	22	—	—	—
A-7	On Barrel Structure of 437 Payload Vehicle-Long.	A69-TC	3676	1800cps 100g	5	12	12	-4	4	11
A-8	On Barrel Structure of 437 Payload Vehicle-Vert.	A69-TC	3666	1800cps 100g	5	6	4	—	—	—

[redacted] UNCLASSIFIED

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TABLE II

RAMP TEST NO. 2 OF H-1161 SHIPPING AND STORAGE CONTAINER WITH THE PROGRAM 437 PAYLOAD ASSEMBLY (LESS W/H)

PROJECT NO.	PAGE	OF
T-10345		

1091

TEST CONDITIONS	
Run No.	
Impact Velocity	
Simulating	
Temp. Condition	Ambient
Orientation	

COMMENTS

UNCLASSIFIED

LEGEND
PD - PULSE DURATION
RT - RISE TIME
MFP - MAXIMUM FAIRED PULSE
A - ACCELEROMETER

TRANSDUCER INFORMATION						TEST DATA				
No.	Location & Orientation	Model	S/N	fn and Range	Fig. Ref.	MAX (+) g	MAX (-) g	MFP g	RT (ms)	PD (ms)
A-1	Ramp Cart Longitudinal	A69-TC	287	1800cps 100g		19	6	14	10	—
A-2	Ramp Cart Vertical	A69-TC	3615	1800cps 100g		11	11	—	—	—
A-3	Ramp Cart Lateral	A69-TC	3659	1800cps 100g		15	17	—	—	—
A-4	Outside H-1161 Container Longitudinal	A69-TC	6645	1800cps 100g	4	19	17	11	17	37
A-5	Outside H-1161 Container Vertical	A69-TC	3521	1800cps 100g	4	30	13	—	—	—
A-6	Outside H-1161 Container Lateral	A69-TC	3608	1800cps 100g	4	22	24	—	—	—
A-7	On Barrel Structure of 437 Payload Vehicle-Long.	A69-TC	3676	1800cps 100g	5	12	13	12	13	24
A-8	On Barrel Structure of 437 Payload Vehicle-Vert.	A69-TC	3666	1800cps 100g	5	9	6	—	—	—

[redacted]

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[redacted]

TABLE III

RAMP TEST NO. 3 OF H-1161 SHIPPING AND STORAGE CONTAINER WITH THE PROGRAM 437 PAYLOAD ASSEMBLY (LESS W/H)

PROJECT NO.	PAGE	OF
T-10345		

TEST CONDITIONS

n No.	3
pacity	4.8
mulating	6 mph [illegible]
mp. ndition	Ambient
ientation	

EGEND
PD - PULSE DURATION
RT - RISE TIME
MFP - MAXIMUM FAIRED PULSE
A - ACCELEROMETER

COMMENTS

UNCLASSIFIED

TRANSDUCER INFORMATION						TEST DATA				
No.	Location & Orientation	Model	S/N	In and Range	Fig. Ref.	MAX (+) g	MAX (-) g	MFP g	RT (ms)	PD (ms)
A-1	Ramp Cart Longitudinal	A69-TC	287	1800cps 100g		15	4	14		24
A-2	Ramp Cart Vertical	A69-TC	3615	1800cps 100g		10	7	—		
A-3	Ramp Cart Lateral	A69-TC	3659	1800cps 100g		17	18	—	—	—
A-4	Outside H-1161 Container Longitudinal	A69-TC	6645	1800cps 100g	4	17	2	[illegible]		51
A-5	Outside H-1161 Container Vertical	A69-TC	3521	1800cps 100g	4	18	18	—	—	—
A-6	Outside H-1161 Container Lateral	A69-TC	3608	1800cps 100g	4	11	11	—	—	—
A-7	On Barrel Structure of 437 Payload Vehicle-Long.	A69-TC	3676	1800cps 100g	5	5	11	—	—	40
A-8	On Barrel Structure of 437 Payload Vehicle-Vert.	A69-TC	3666	1800cps 100g	5	5.8	2	—	—	[illegible]

[redacted]

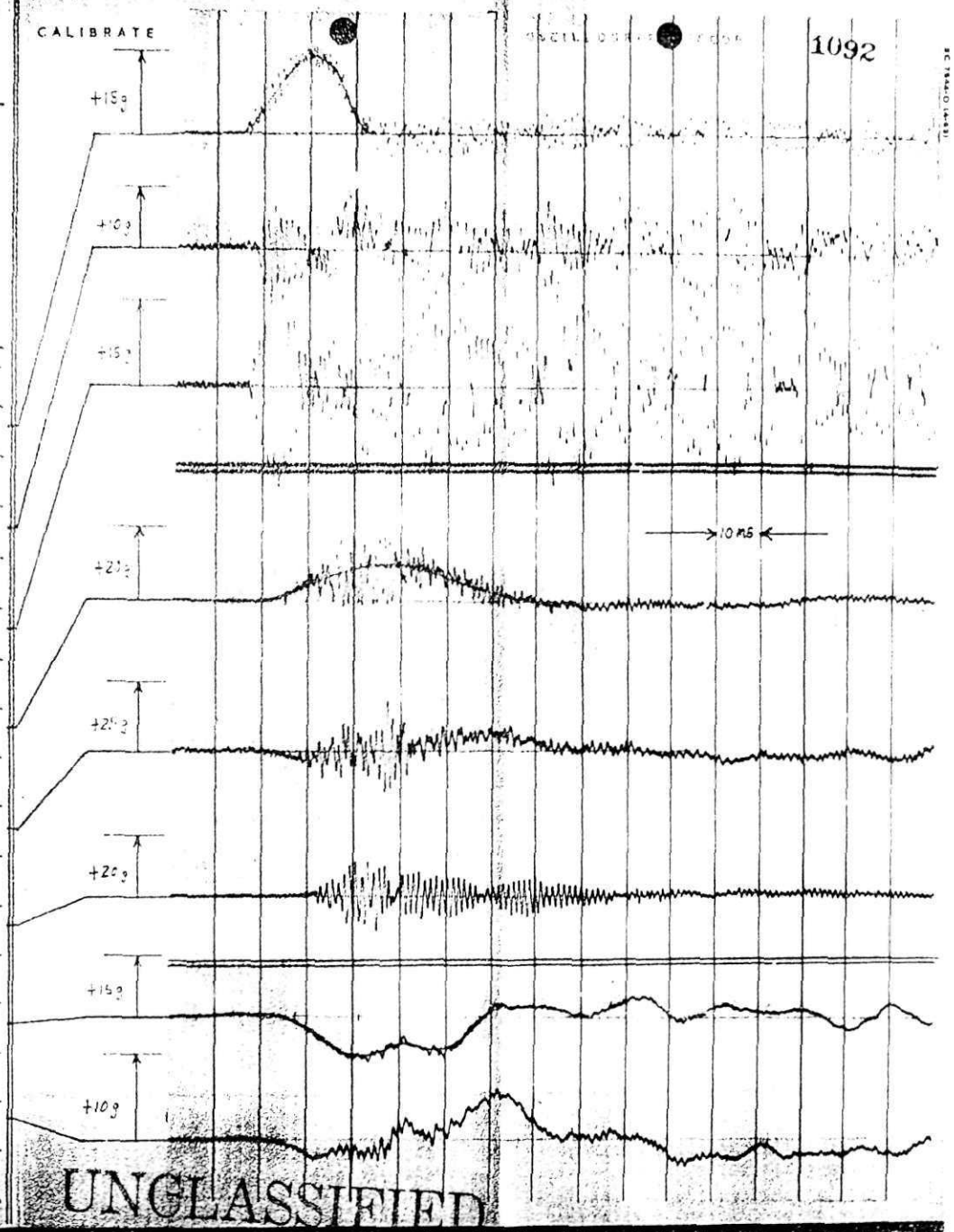

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TABLE IV

RAMP TEST NO. 4 OF H-1161 SHIPPING AND STORAGE CONTAINER WITH THE PROGRAM 437 PAYLOAD ASSEMBLY (LESS W/H)

PROJECT NO.	PAGE	OF
T-10345		

TEST CONDITIONS	
Run No.	4
Impact Velocity	6.7 mph
Simulating	9 mph Bascar hump
Temp. Condition	Ambient
Orientation	

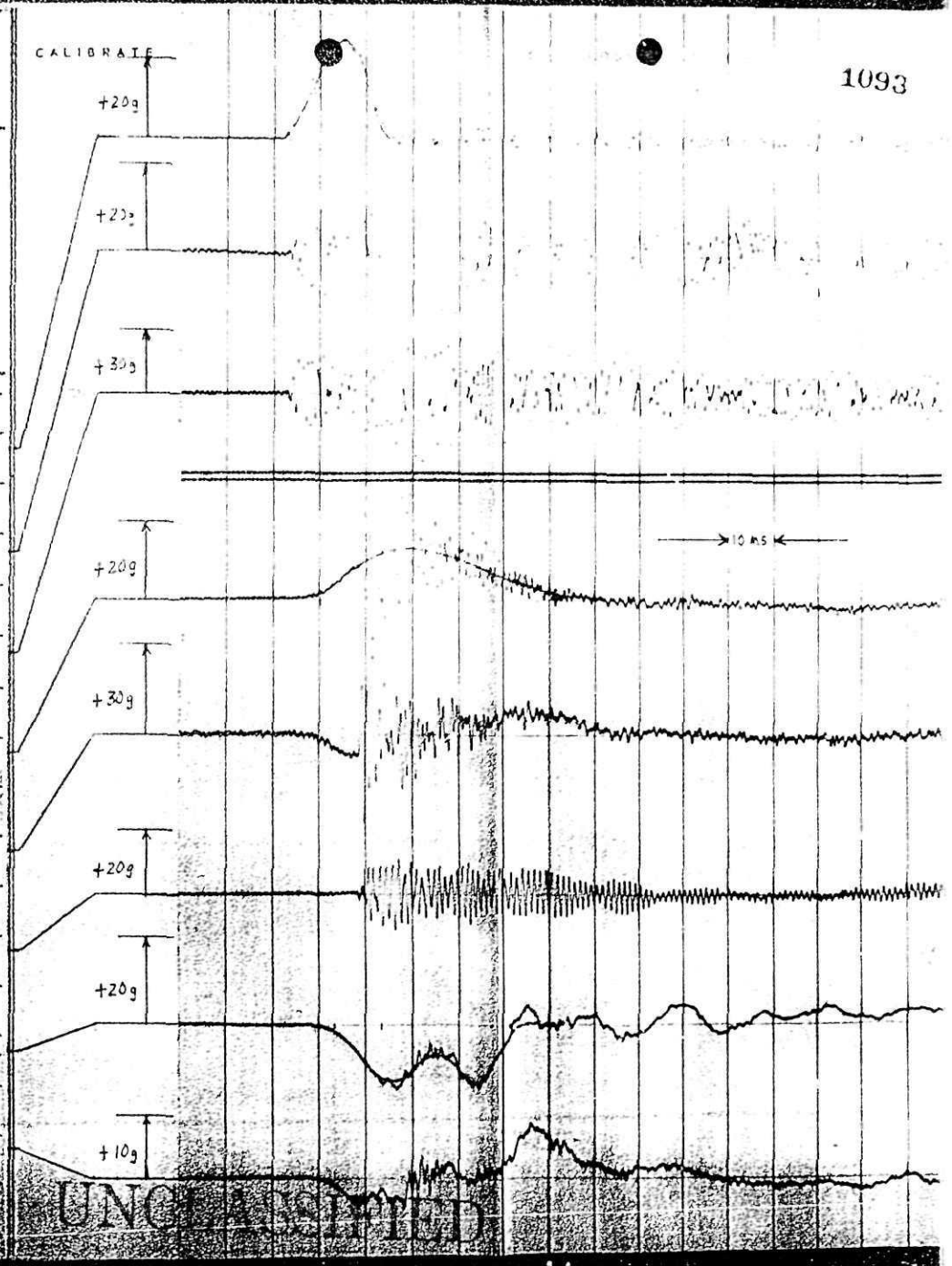
COMMENTS

UNCLASSIFIED

LEGEND
PD = PULSE DURATION
RT = RISE TIME
MFP = MAXIMUM FAIRED PULSE
A = ACCELEROMETER

TRANSDUCER INFORMATION						TEST DATA				
No.	Location & Orientation	Model	S/N	In and Range	Fig. Ref.	MAX (+) g	MAX (-) g	MFP g	RT (ms)	PD (ms)
A-1	Ramp Cart Longitudinal	A69-TC	287	1800cps 100g		28	6	24	1	20
A-2	Ramp Cart Vertical	A69-TC	3615	1800cps 100g		22	18	—		—
A-3	Ramp Cart Lateral	A69-TC	3659	1800cps 100g		32	48	—	—	—
A-4	Outside H-1161 Container Longitudinal	A69-TC	6645	1800cps 100g	4	28	11	14	13	51
A-5	Outside H-1161 Container Vertical	A69-TC	3521	1800cps 100g	4	29	26	—	—	—
A-6	Outside H-1161 Container Lateral	A69-TC	3608	1800cps 100g	4	11	11	—	—	—
A-7	On Barrel Structure of 437 Payload Vehicle-Long.	A69-TC	3676	1800cps 100g	5	4	15	-13	10	39
A-8	On Barrel Structure of 437 Payload Vehicle-Vert.	A69-TC	3666	1800cps 100g	5	9	4	—	—	—

[redacted]



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T-10345

TABLE V

TEST EQUIPMENT USED IN RAMP TEST OF THE H1161 SHIPPING AND STORAGE CONTAINER WITH THE PROGRAM 437 PAYLOAD ASSEMBLY (LESS W/H)

Equipment	Model	Property Number
Beckman Universal EPUT and Timer	5230 PR	S-126532
CEC Carrier Amplifier System	C-3	S-86875
CEC Recording Oscillograph	519P4-36MD	S-122933