

WHOLE BODY RESPONSE OF THE HYBRID III
ANTHROPOMORPHIC TEST DEVICE

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16. Abstract The objectives of this project are to obtain whole body kinematic response of the GM Hybrid-III anthropomorphic test device (GM 50X-H03) under controlled test conditions which represent realistic automotive impact environments. This report presents the raw data and analysis results of 9 tests conducted at 3 impact severity levels. The test protocol and mathematical basis for the data analysis were developed for the Whole Body Response Research program and were presented in details in that program's Final Report, no. UM-HSRI-76-3.					
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TABLE OF CONTENTS

	Page
Introduction	1
Test Description	1
Data Analysis	3
Appendix A.	A-1
Data Analysis Results	
Test No. 77B101	A-3
77B102	A-15
77B103	A-27
77B104	A-41
77B105	A-53
77B106	A-65
77B107	A-79
77B108	A-91
77B109	A-103
Appendix B.	B-1
Raw Data	
Test No. 77B101	B-3
77B102	B-15
77B103	B-27
77B104	B-39
77B105	B-51
77B106	B-63
77B107	B-75
77B108	B-87
77B109	B-99

INTRODUCTION

The Whole Body Response Research Program, conducted by HSRI and sponsored by GMRL is now in its fourth year. The objectives of the program are to generate data on the kinematic response of the human body under realistic impact environment. The test subjects were 15 unembalmed cadavers approximating the 50th percentile, and two Part 572 anthropomorphic test devices (ATD), one of which had been certified.

An additional series of tests was conducted with GM Hybrid-III ATD (GM50X-H03) as the test subject. This report presents the raw and analyzed data of the Hybrid-III series. Test procedures and mathematical analyses were either presented in detail in the Second Year Final Report on the Whole Body Response program, or will be included in the program's Final Report.

TEST DESCRIPTION

Every effort was made to position the Hybrid-III in the same constrained seating configuration as that of the cadavers and the Part 572 ATD in the previous WBR tests. This configuration is shown in Figure 1.

The instrumentation included the standard head, chest and pelvis internal triaxial accelerometers, along with the internal femur load cells, a longitudinal (A-P) chest deflection transducer and the neck transducer which measures the longitudinal (A-P) shear force, the vertical (S-I) axial force and the moment about the lateral (L-R) axis.

In addition to the above built-in transducers, the dummy was instrumented with the HSRI 3-D motion measurement 9-accelerometer package, an external thoracic triaxial accelerometer, and an external biaxial pelvic accelerometer. These external measurements will provide means for comparing cadaver response to that of the dummy, and perhaps correlating external measurements with internal ones.

Other transducers included the 4 load cells of both sides of the lap and shoulder belts and the sled deceleration pulse. All these transducers were calibrated either once before the series began, or if possible, each time before a test is made.

The conditioned signals were recorded on 3 analog tapes (1: Honeywell 7600, 2: CEC, 3: Sangamo 3500), along with a velocity probe signal, a 1000 Hz time base, and a T_0 synchronizing gate which covers the useful portion of the data. The instrumentation sheets are given in figures 2, 3 and 4. Individual measurements for each test are given in Appendix B.

The major preparations for the series were: 1) the acquisition of the additional tape recorder (Sangamo 3500) from GM along with an umbilical cable, a calibration box and the amplifiers; 2) the installation of the 9-accelerometer package on the head cap and locating the anatomical axes in relation to the instrumentation frame (results shown in Table 1), and 3) the installation of the external pelvic and thoracic accelerometers.

For each of the nine tests of this series, the protocol for setting up the test was as follows:

1. install the ATD on the sled buck,
2. install the photographic targets (balls) on the head, thorax, pelvis, femurs,
3. install the belts, adjust the dummy segments positions and orientations then tension the belts with allowance for 3-inch slack,
4. obtain anchor location and angles along with pre-test belt dimensions,
5. calibrate the transducers,
6. take set-up photos,
7. arm the sled, then fire it.

A shake-down test was conducted to debug the system, before the following 9 tests were initiated:

- 3 Low severity tests: 16 mph @ 10 g's (nominal)
- 3 Mid severity tests: 22 mph @ 10 g's (nominal)
- 3 High severity tests: 32 mph @ 20 g's (nominal).

DATA ANALYSIS

The analog data on tape was played back for digitizing. Using proper pre-digitizing analog filters, the A-to-D process resulted in digital signal, sampled at a 6400 Hz equivalent sampling rate. Anti-alias digital filters were then used before reducing the sampling rate to 1600 Hz. The signals were then digitally filtered with one of the 3 filters shown in figures 5, 6, or 7. The sled deceleration was filtered at 80 Hz (-3 db @100 hz), the head accelerations were filtered at 570 Hz (-3db @600 Hz), and all other signals were filtered at 285 Hz (-3dB @316 Hz). The filtered signals were then plotted in a strip-chart type plot to determine the usefulness of the data before the "ANALYZE" computer program is run. These charts are given in Appendix B.

Results of data analysis are given in Appendix A. For each of the 9 tests, the package of outputs consists of the following

1. A summary of peaks of measured and computed signals, followed by time plot of:
2. Sled deceleration and chest deflection
3. Neck reactions
4. Internal thorax and pelvis accelerations
5. External thorax and pelvis accelerations
6. Belt loads and femur loads
7. Head angular accelerations and velocities
8. Internal head triax accelerations readings
9. Computed head c.g. accelerations
10. Euler rates and angles of the head
11. Head c.g. inertial velocities and displacements.

For a complete documentation of the tests, Appendix B presents 9 packages each of which consists of the following raw and pre-analysis data:

1. Belt lengths and belt anchor orientations
- 2,3,4. Setup photo - right side, left side and front
5. graphcheck of test
- 6,7. A/D sheet and strip chart of tape-1 (Honeywell)
- 8,9. A/D sheet and strip chart of tape-2 (CEC)
- 10,11. A/D sheet and strip chart of tape-3 (Sangamo)

TABLE 1

X-RAY FILM ANALYSIS

JAN 27, 1977

RUN ID: HYB-3

A=0.9550, B=0.0155

	READINGS OF X-Z PLANE			READINGS OF Y-Z PLANE		
	X	Z	D	Y	Z	D
P1- R.EYE:	5.350	-2.130	17.30	-5.440	-2.060	17.30
P2- L.EYE:	6.780	-2.030	13.50	-0.060	-2.100	19.40
P3- R.EAR:	0.890	-0.820	17.20	-4.890	-0.780	14.70
P4- L.EAR:	3.600	-0.820	11.60	2.770	-0.760	17.00
Q1- ACC. :	-3.910	0.140	14.50	-1.200	0.090	11.20
Q2- ACC. :	-1.960	0.070	11.30	3.130	0.130	12.20
Q3- ACC. :	-1.720	4.400	13.20	0.440	4.370	12.80
R1,R2,R3 :	2.563	2.642	2.952			

COORDINATES W.R.T. CAMERA			COORDINATES W.R.T. CAMERA				
	X	Y	Z		X	Y	Z
P1 :	3.675	-3.736	-1.439	Q1:	-2.855	-0.938	0.086
P2 :	5.056	-0.039	-1.444	Q2:	-1.529	2.397	0.077
P3 :	0.613	-3.556	-0.566	Q3:	-1.291	0.333	3.304
P4 :	2.791	1.915	-0.581	P:	-3.413	1.172	1.477
C :	1.702	-0.820	-0.573	CP:	-5.115	1.992	2.050

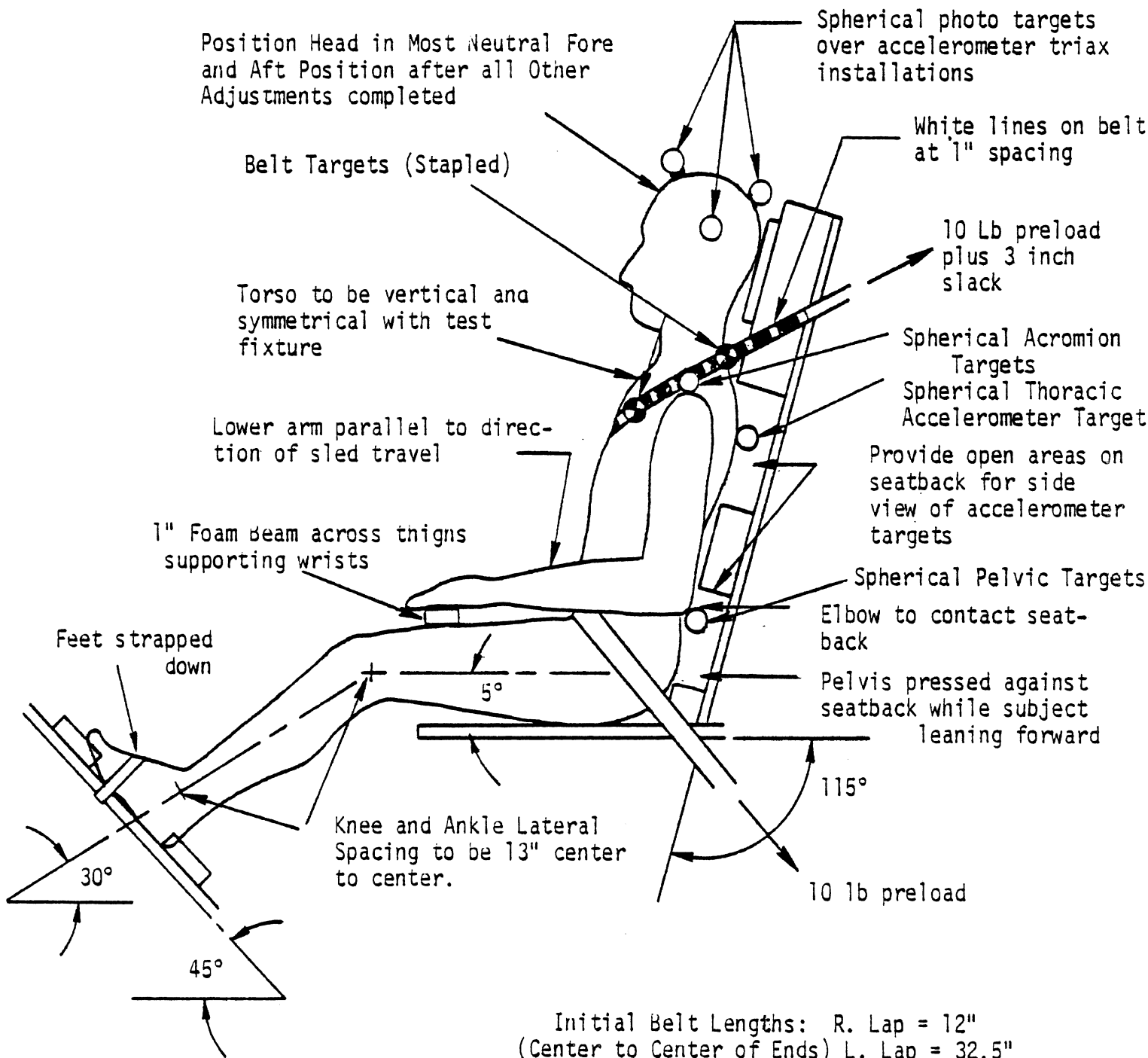
ANATOMICAL FRAME (WRT CAMERA)			ORTHOGONALITY CHECK			
	<X>	<Y>	<Z>			
<I> :	0.89277	-0.34504	-0.28966	1.0000	0.0000	0.0000
<J> :	0.35995	0.93291	-0.00189	0.0000	0.9999	-0.0000
<K> :	0.27089	-0.10258	0.95712	0.0000	-0.0000	1.0000

INSTRUMENT FRAME (WRT CAMERA)			ORTHOGONALITY CHECK			
	<X>	<Y>	<Z>			
<E1>:	0.21562	-0.81527	-0.53744	1.0000	0.0605	0.0548
<E2>:	0.71171	0.46254	-0.52870	0.0605	1.0000	0.0536
<E3>:	0.72603	-0.28712	0.62485	0.0548	0.0536	1.0000

```

*****
*
* RUN ID:HYB-3          JAN 27, 1977  *
*
* PQ1= 2.563, PQ2= 2.642, PQ3= 2.952 *
* CPI= -5.848, CPJ= 0.014, CPK= 0.373 *
*
* PERTURBATIONS: E1,E2,E3
* INSTRUMENTATION MATRIX WRT ANATOMICAL * 0.0404 0.0400 0.0378
*           <I>           <J>           <K>           * ORTHOGONALITY CHECK
*
* <E1>: 0.59764 -0.70362 -0.38438 * 1.0000 -0.0000 -0.0000
*
* <E2>: 0.59742 0.71054 -0.37178 * -0.0000 1.0000 -0.0000
*
* <E3>: 0.53471 -0.00744 0.84500 * -0.0000 -0.0000 1.0000
*
*****

```



Initial Belt Lengths: R. Lap = 12"
 (Center to Center of Ends) L. Lap = 32.5"
 Shoulder = 42"

Femur Target Spacing:

Right Side = in.
 Left Side = in.

Belt Sequence:
 (Out from Subject)

L. Lap, R. Lap, Shoulder

Belt End Orientation:
 (Ref. To Subject)

Away, Away, Toward

FIGURE 1. POSITIONING AND TARGETING DIAGRAM

FIGURE 2: INSTRUMENTATION DATA SHEET

TEST NO: 77B101		DESCRIPTION		Account No:										
through: 77B109		#100 - Checkout run (High Severity) (See other inst. data sheet)		DATE: 1-28-77	BY: JB									
SUBJECT: Hybrid III		#101 - #103: Lo Severity (16.5 mph, 10 G)		TAPE REEL # 138										
number: GM50X H03		#104 - #106: Mid Severity (22 mph, 10 G)		RECORDER: 7600										
FACILITY: Sled		#107 - #109: High Severity (33 mph, 20 G)		REC. SPEED: 30										
CH #	SET UP DATA			TRANSDUCER			CALIBRATION			OUTPUT				
	input	ampl. #	gain	umbil. #	excit. volts	MFR.	S/N	voltage	gain	value	±	units/volt	units	CH #
1	Head Q ₁ -A	5	100	5	10	Endevco	AA41				-	42.2	G	1
2	Head Q ₁ -B	6	100	6	10	Endevco	AC22				-	33.4	G	2
3	Head Q ₁ -C	7	100	7	10	Endevco	AC38				-	42.5	G	3
4	Head Q ₂ -C	8	100	8	10	Endevco	AC41				-	38.3	G	4
5	Head Q ₂ -A	9	100	9	10	Endevco	AD07				-	37.1	G	5
6	Head Q ₂ -B	10	100	10	10	Endevco	AD46				-	42.5	G	6
7	Head Q ₃ -B	11	100	11	10	Endevco	AD47				-	40.9	G	7
8	Head Q ₃ -C	12	100	12	10	Endevco	AD94				-	34.1	G	8
9	Head Q ₃ -A	13	100	13	10	Endevco	AE97				-	40.2	G	9
10	Internal Pelvis P-A	19	200	19	10	Endevco	CM75				-	25.6	G	10
11	Internal Pelvis R-L	20	200	20	10	Endevco	CM88				+	25.7	G	11
12	Internal Pelvis I-S	21	200	21	10	Endevco	CM76				+	25.8	G	12
13	Gate									280 msec		1.	V	13
14	Velocity									12"/pulse		1.	V	14

FIGURE 4. INSTRUMENTATION DATA SHEET

TEST NO: 77B101		DESCRIPTION		Account No:										
through: 77B109		#100 - Checkout Run (High severity)		DATE: 1-28-77	BY: JB									
SUBJECT: Hybrid III		#101 - #103: Lo Severity (16.5 mph, 10 G)		TAPE REEL # 118 GM										
number: GM50X H03		#104 - #106: Mid Severity (22 mph, 10 G)		RECORDER: Sangamo 3500										
FACILITY: Sled		#107 - #109: High Severity (33 mph, 20 G)		REC. SPEED: 60 ips										
CH #	SET UP DATA			TRANSDUCER			CALIBRATION			OUTPUT				
	input	ampl. #	gain	umbil. #	excit. volts	MFR.	S/N	voltage	gain	value	±	units/volt	units	CH #
1	Internal Head P-A	1		GM 1	10	Endevco	CT 27	1.0		100 G	+	100.	G	1
2	Internal Head R-L	2		GM 2	10	Endevco	CJ 43	1.0		100 G	-	100.	G	2
3	Internal Head I-S	3		GM 3	10	Endevco	CJ 60	1.0		100 G	-	100.	G	3
4	Neck Shear Force P-A	4		GM 4	10	GM	NTT 022 F _x	1.0		1000. #	+	1000.	#	4
5	Neck Axial Force I-S	5		GM 5	10	GM	NTT 022 F _y	1.0		1000. #	+	1000.	#	5
6														6
7	Neck Moment (.345")	6		GM 6	10	GM	NTT 022 M	1.0		200 ft lb	+	200.	ft lb	7
8	Chest Deflection	7		GM 7	10	Fluke Stringa pot		1.0		3 in.	+	3.	in	8
9	Internal Chest P-A	8		GM 8	10	Endevco	CM 44	1.0		100 G	+	100.	G	9
10	Internal Chest R-L	9		GM 9	10	Endevco	CM 60	1.0		100 G	+	100.	G	10
11	Internal Chest I-S	10		GM 10	10	Endevco	CM 69	1.0		100 G	-	100.	G	11
12	Gate									280 msec		1.	V	12
13	Time Base									100 Hz		1.	V	13
14														14

SAMPLING= 1600 HZ, NCOF=56

1

01/20LP.050000C54

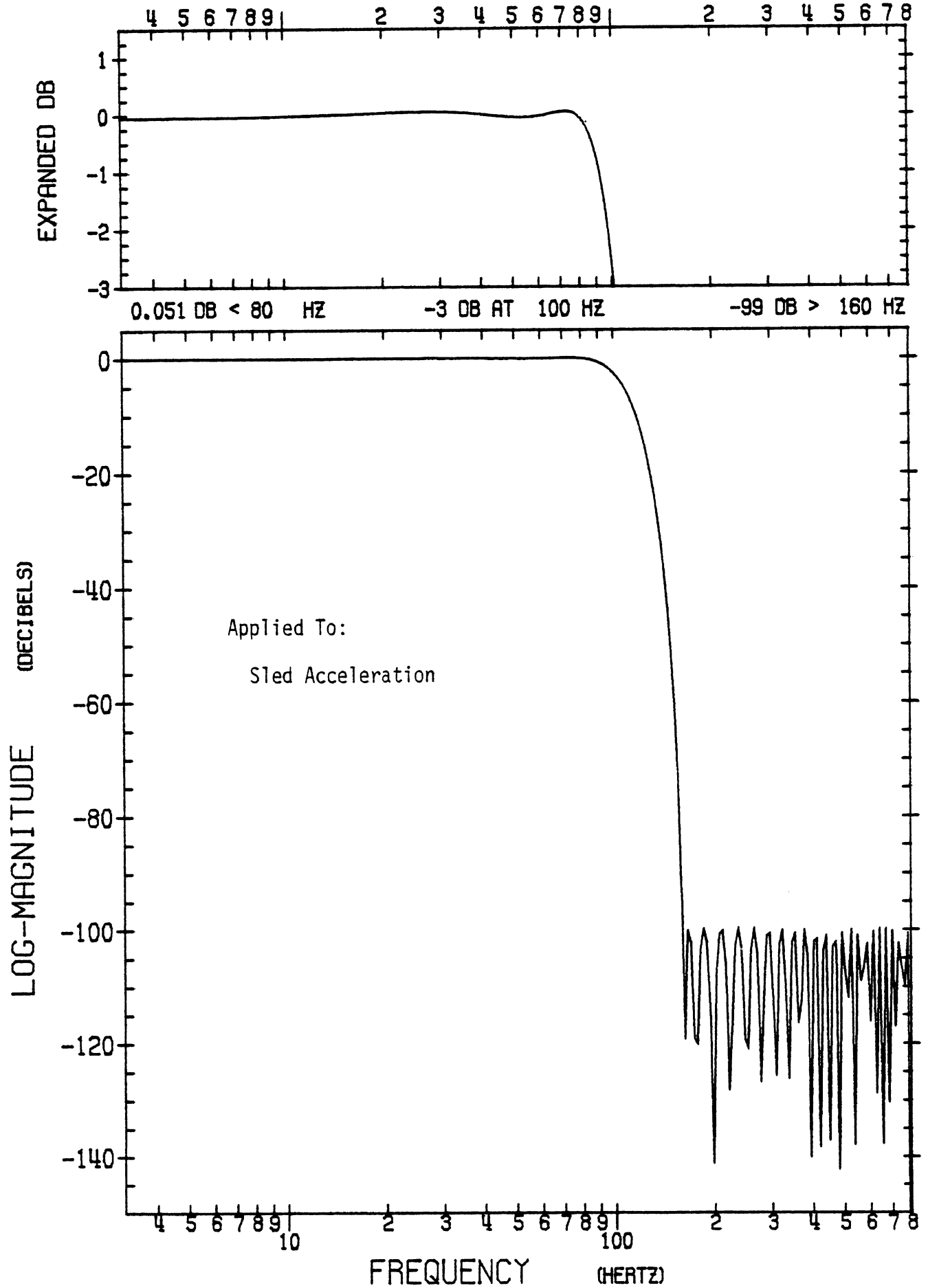


Figure 5. 80-Hz Low-Pass Digital Filter

SAMPLING= 1600 HZ, NCOF=34

12

12/20LP.178180C34

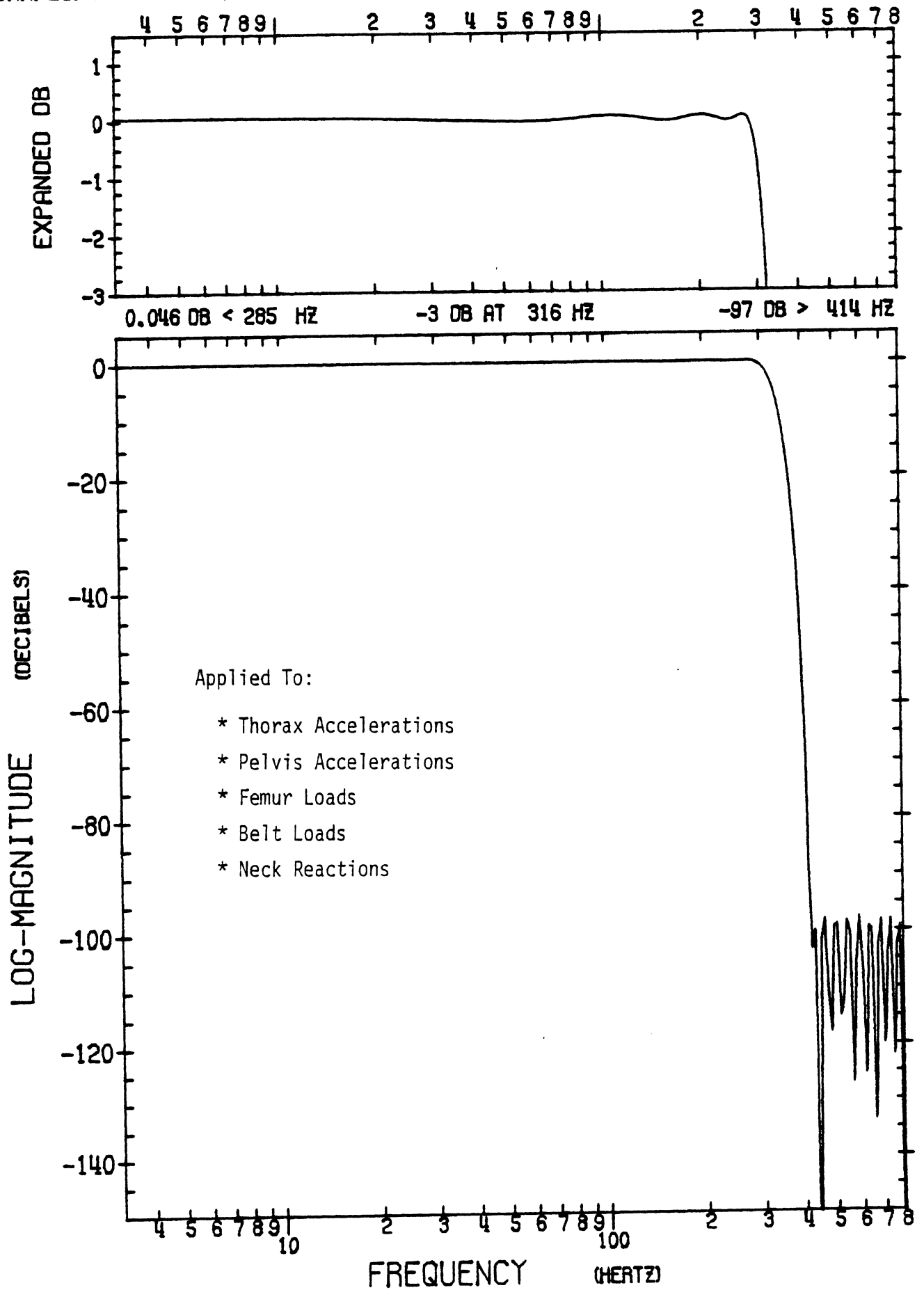


Figure 6. 285-Hz Low-Pass Digital Filter

SAMPLING= 1600 HZ, NCOF=30

18

18/20LP.356359C30

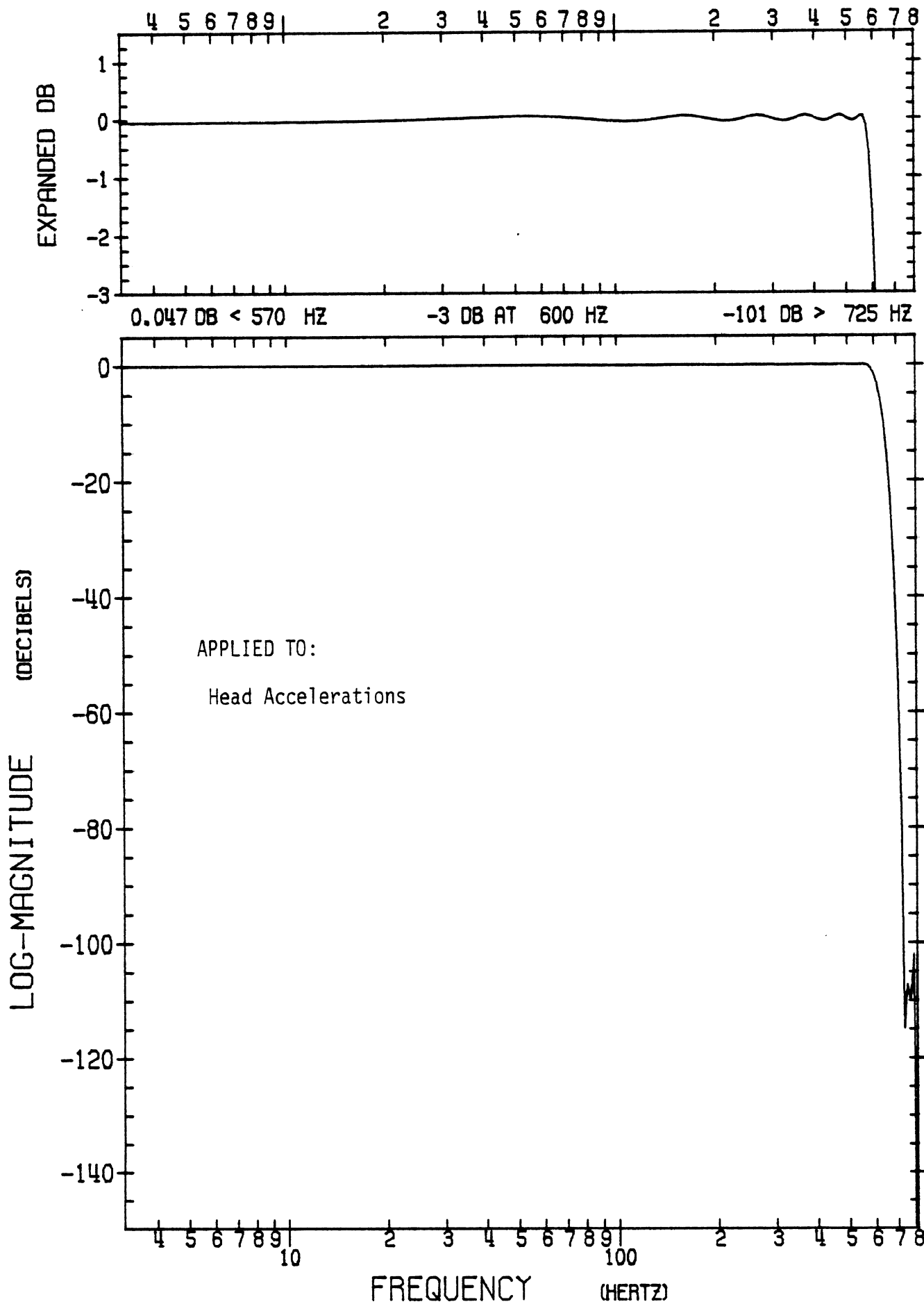


Figure 7. 570-Hz Low-Pass Digital Filters

Appendix A.

DATA ANALYSIS RESULTS

WHOLE BODY RESPONSE

SUMMARY

TEST NO.: 77B101

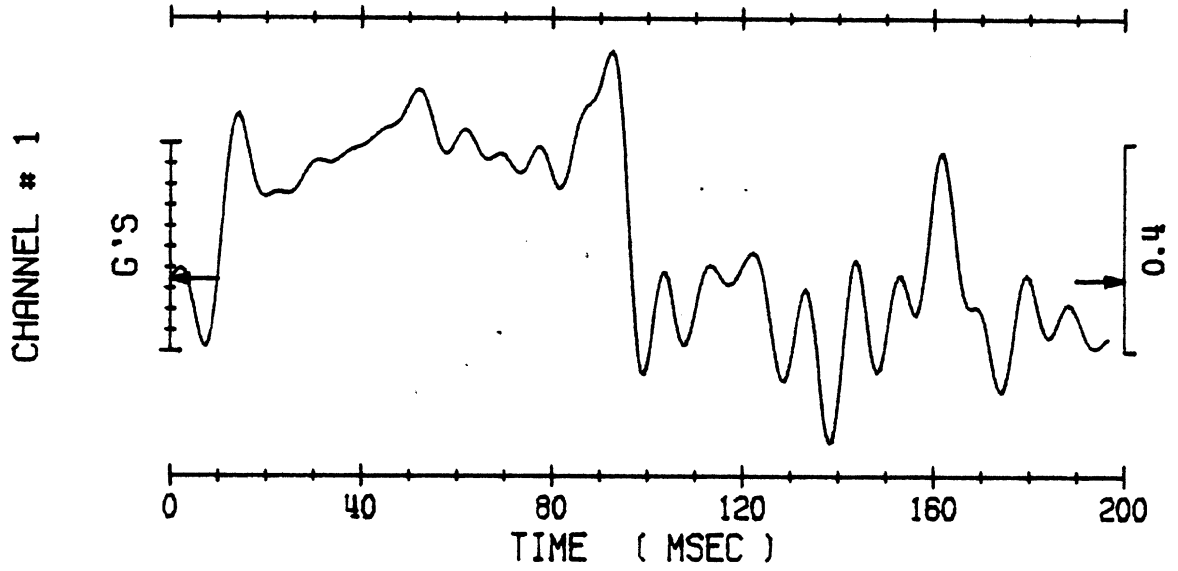
=====
 ??? G-LEVEL
 87. MS LONG
 ??? MPH DV
 (16.2 ACTUAL)

	SHOULDER BELT		LAP BELT		FEMURS	
	UPPER	LOWER	LEFT	RIGHT	LEFT	RIGHT
PEAK FORCES:	1001.	858.	1130.	634.	-276.	-262.
(LBS) @ (MS)	77.1	77.1	85.8	92.1	16.4	26.4
NECK FORCES:	AP= 225. LBS		SI= 225. LBS		MOM= 850. IN-LB	
	@ 104. MS		@ 85. MS		@ 90. MS	

	RESULTANT PEAK	(A-P)		(L-R)		(S-I)	
		MIN	MAX	MIN	MAX	MIN	MAX
IN THORAX ACC:	20.	-4.	15.	-0.	1.	-5.	5.
(G'S) @ (MS)	69.5	125.2	85.1	80.8	50.5	126.6	79.0
GSI=	49	DEFLECTION= 0.43 IN @ 90. MS					
IN PELVIS ACC:	16.	-1.	15.	-4.	1.	-1.	7.
(G'S) @	92.6	124.5	89.3	98.8	62.8	62.6	102.9
EX THORAX ACC:	24.	-22.	4.	-1.	1.	-7.	7.
(G'S) @	69.6	68.6	118.0	53.7	79.9	66.6	105.5
GSI=	68						
EX PELVIS ACC:	24.	-22.	2.	0.	0.	-2.	5.
(G'S) @	92.7	89.2	118.9	0.0	0.0	68.9	91.4
.....							
HEAD ANG ACC :	1768.	-258.	285.	-1416.	1737.	-116.	151.
(RAD/S/S) @	65.8	139.9	77.5	92.7	65.6	121.5	90.9
HEAD ANG VEL :	38.8	-1.7	2.0	-1.8	38.8	-0.5	1.9
(RAD/S) @	85.1	68.3	90.1	44.9	85.0	139.0	104.3
EULER ANGLES :			12.3		79.2		21.2
(DEGREES) @			129.3		127.0		142.1
.....							
HEAD C.G. ACC:	34.	-23.	2.	-3.	3.	-30.	1.
(G'S) @	82.6	103.6	37.8	69.4	130.1	85.8	112.8
HEAD C.G. HIC=	170						
HEAD C.G. VEL:	487.	-368.	20.	-43.	3.	-176.	83.
(IN/S) @	186.4	110.1	50.1	91.8	47.1	92.9	155.9
HEAD C.G. DIS:			-26.2		-2.2		-6.1
(IN) @			155.1		145.1		120.9

FILE: 22

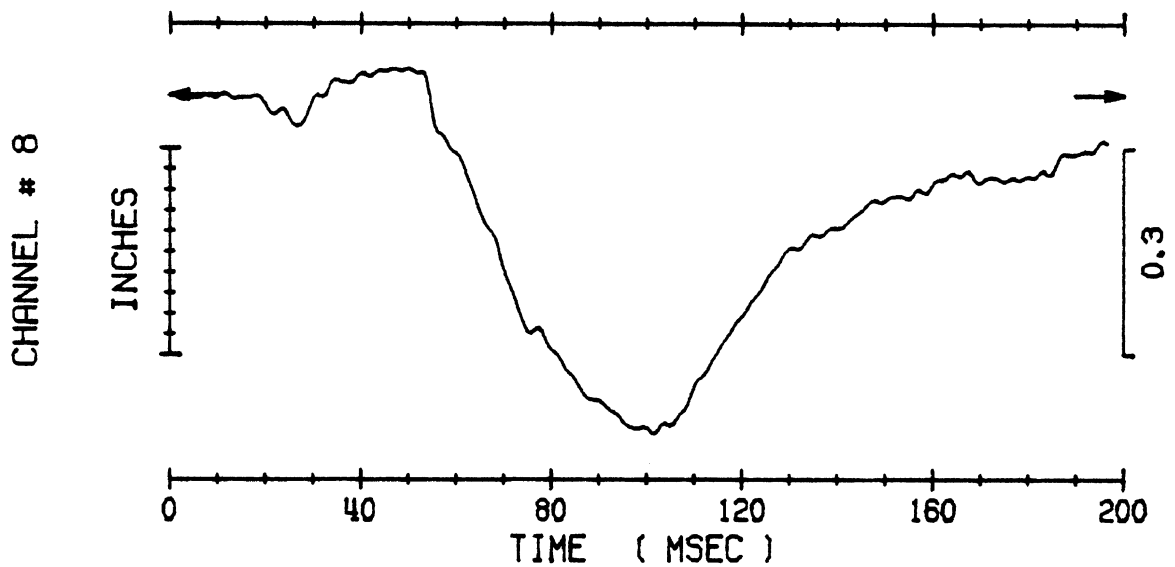
77B101-2: HYB-3L



SLED DECELERATION

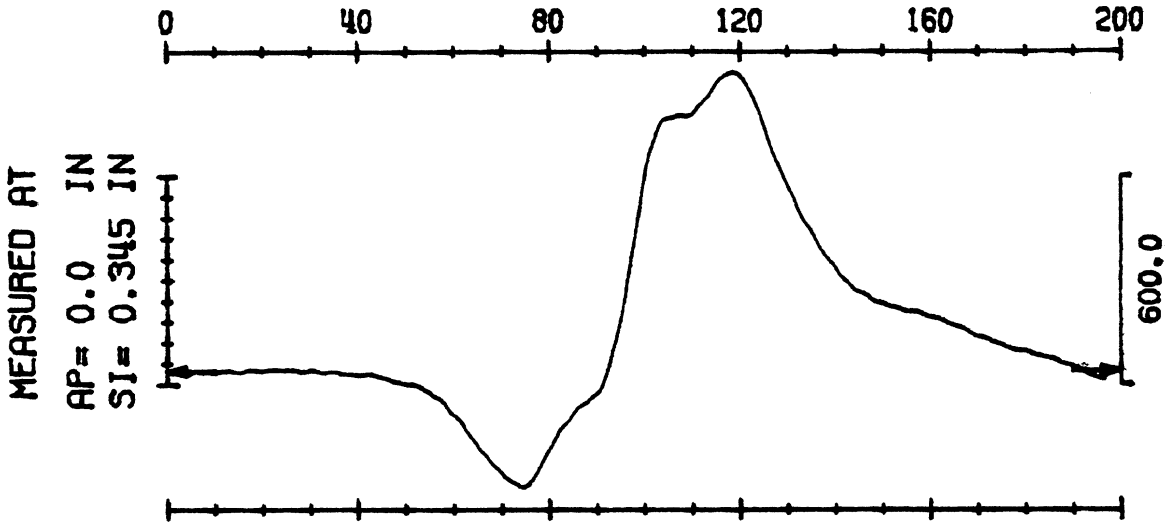
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77B101-3: HYB-3L



A-P CHEST DEFLECTION

MOMENT



NECK REACTIONS



TIME (MSEC)

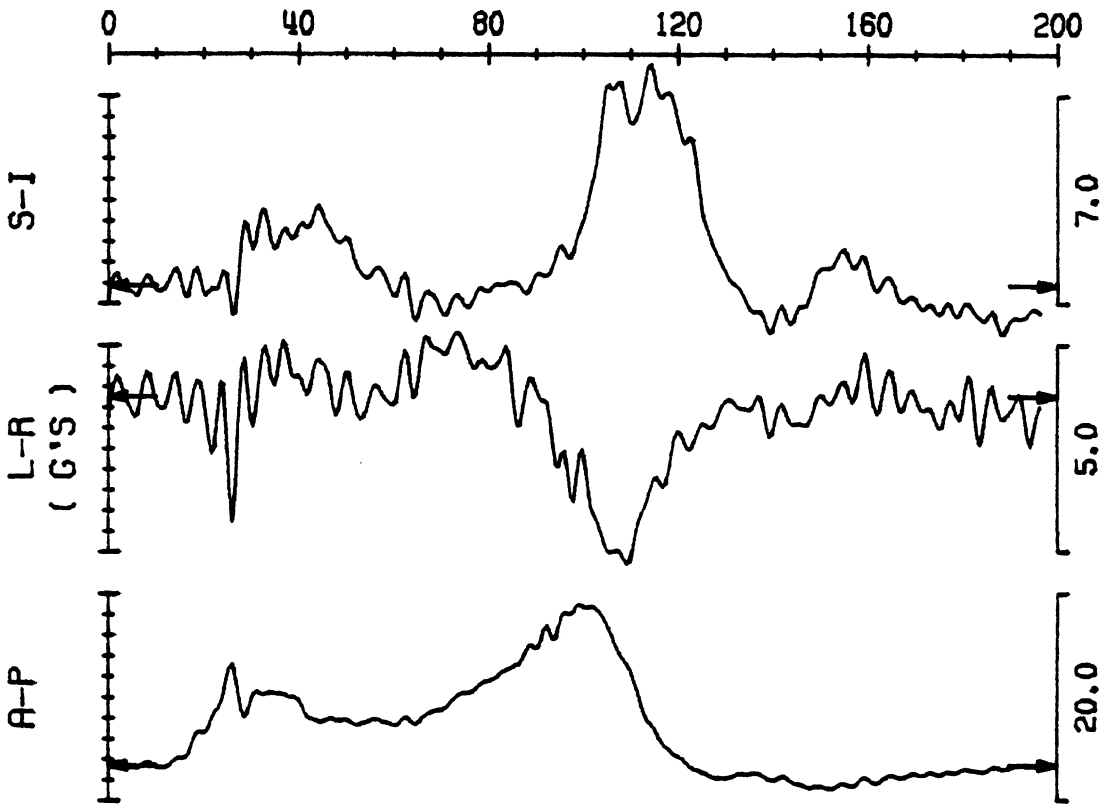
MEASURED FORCES

FILE: 28

77B101-1: HYB-3L

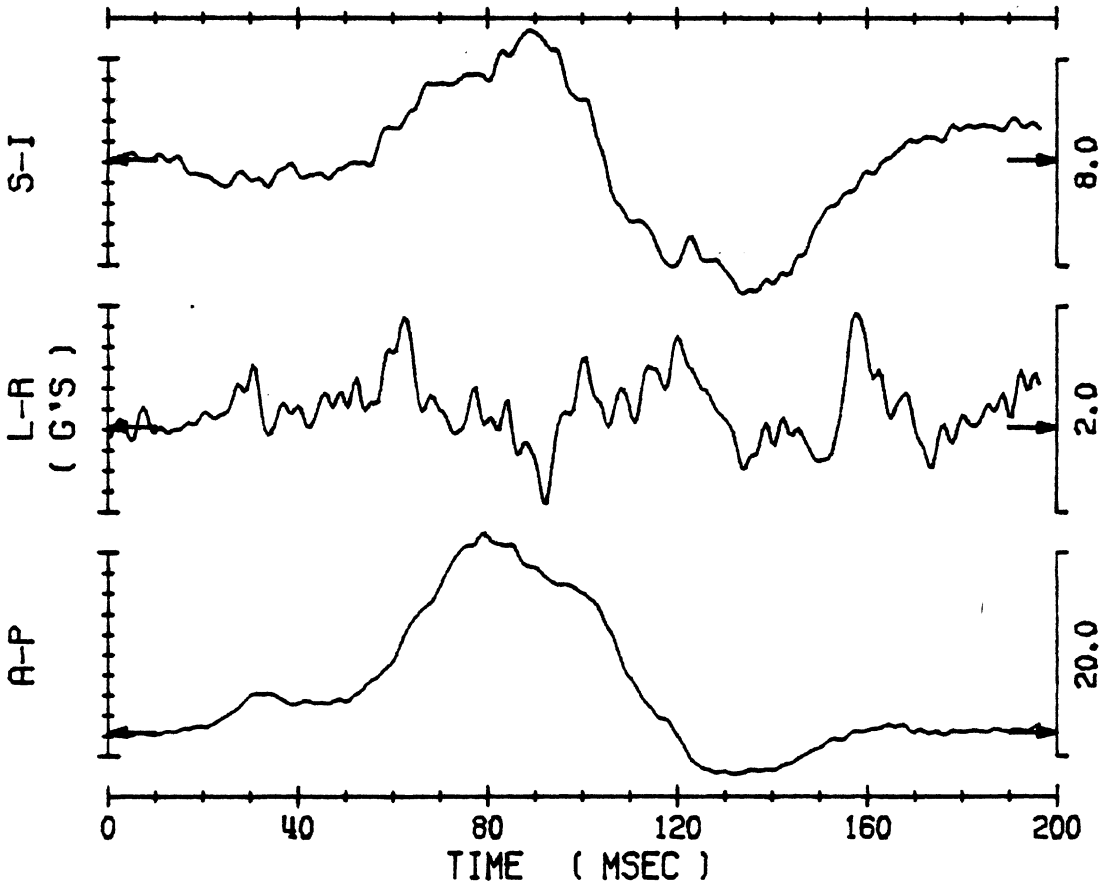
PELVIS

INTERNAL



THORAX: (GSI= 49)

INTERNAL



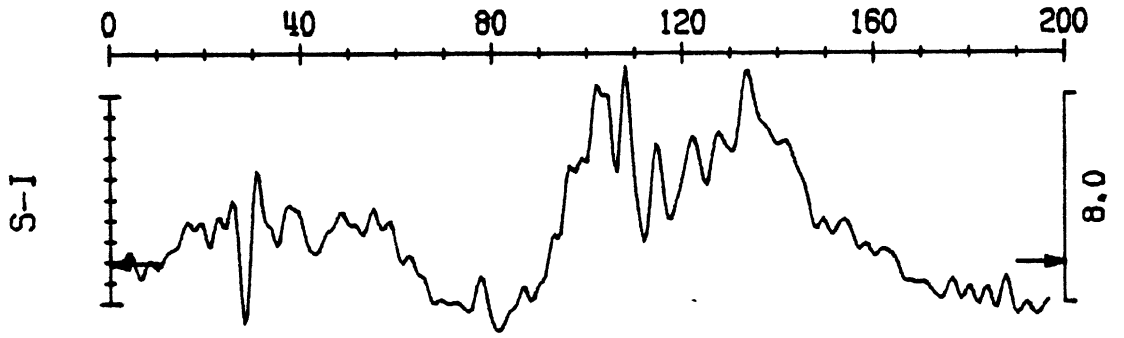
MEASURED ACCELERATIONS

FILE: 23

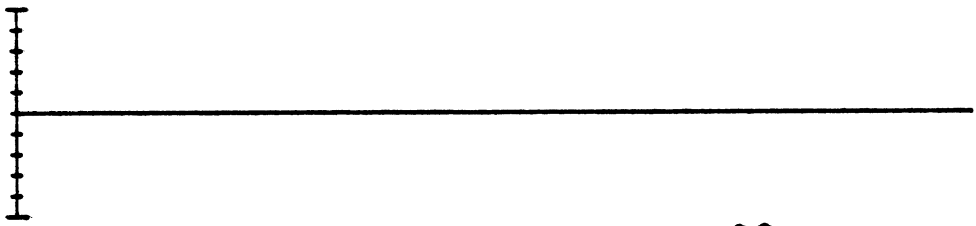
77B101-2: HYB-3L

PELVIS

EXTERNAL



L-R
(G'S)



A-P



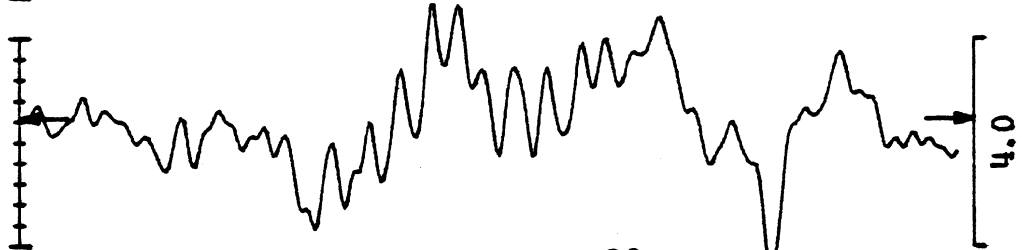
S-I



THORAX: (GSI= 68)

EXTERNAL

L-R
(G'S)



A-P

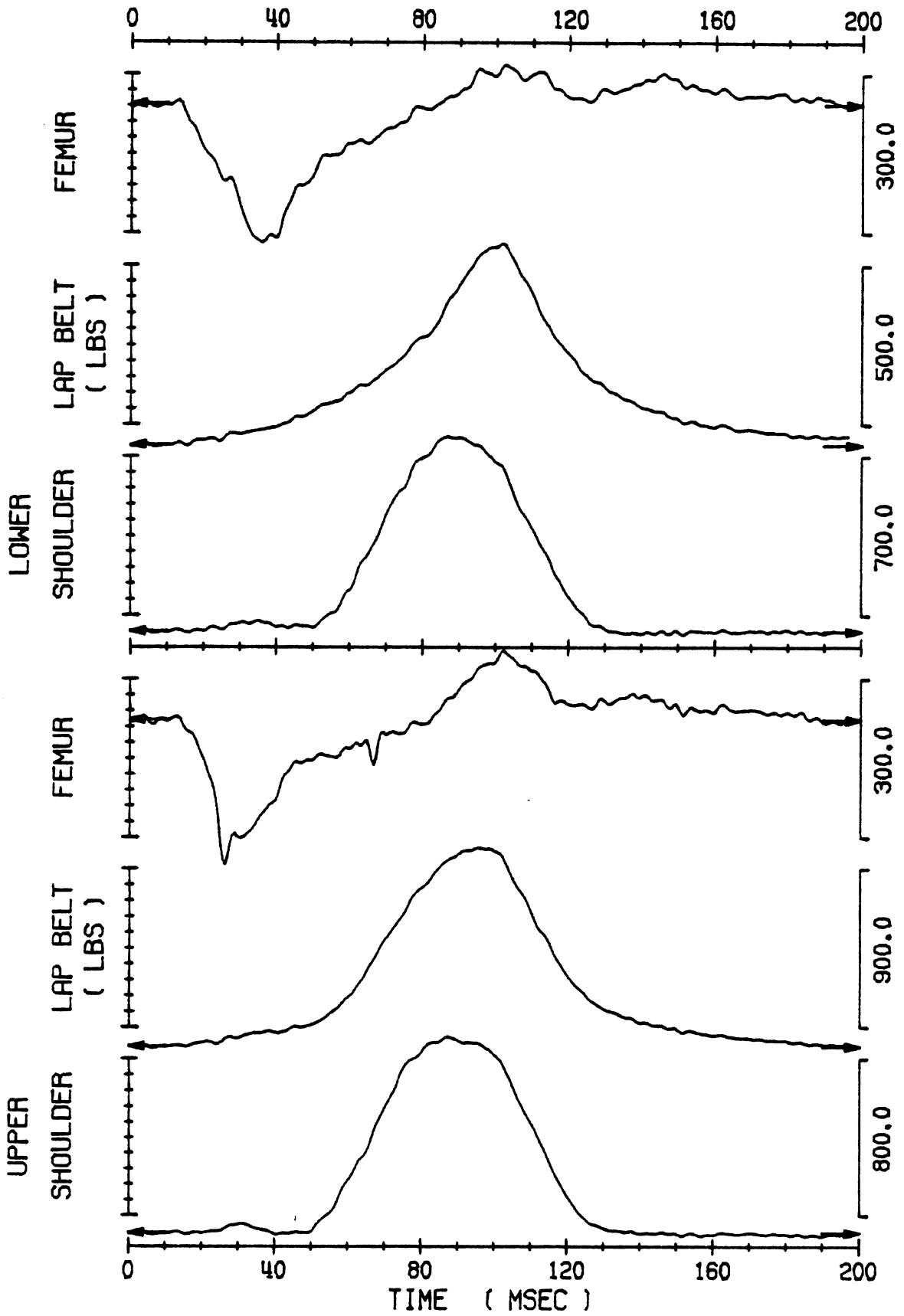


TIME (MSEC)

MEASURED ACCELERATIONS

RIGHT SIDE

LEFT SIDE

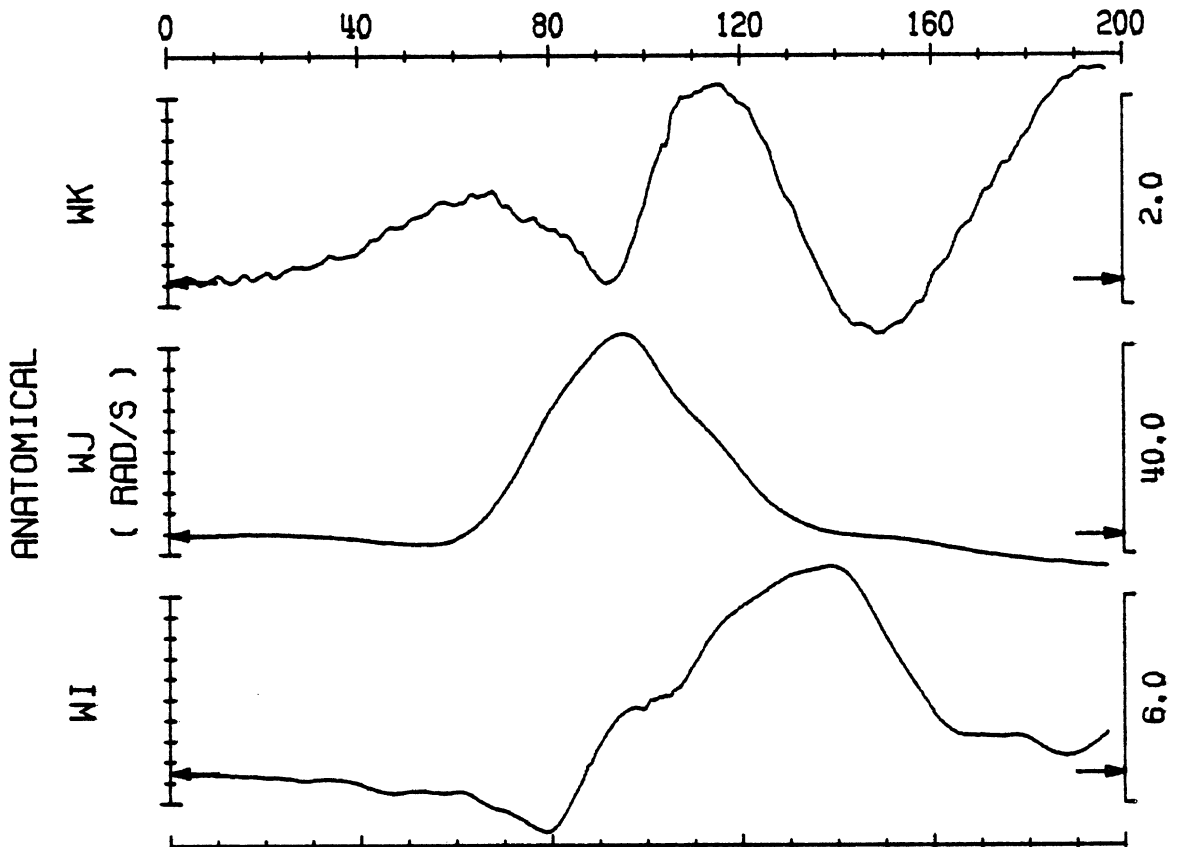


MEASURED FORCES

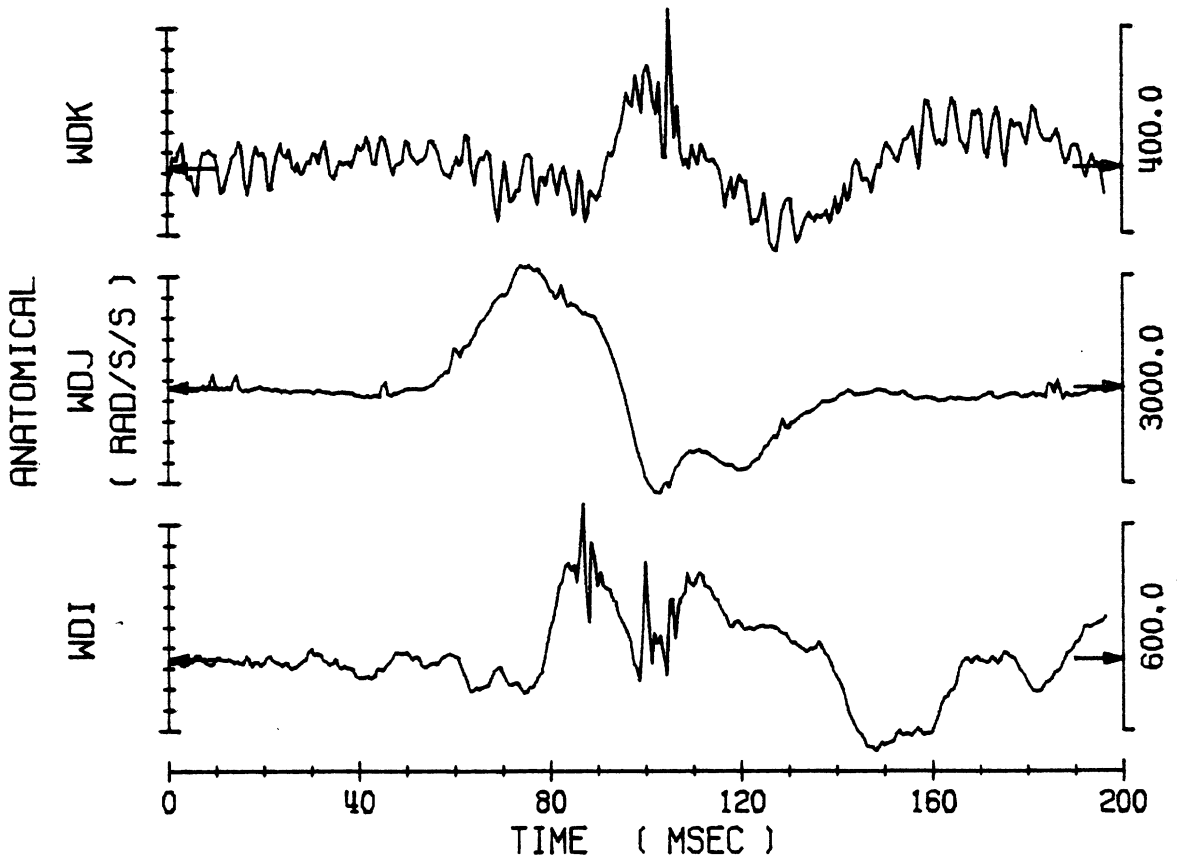
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77B101-1: HYB-3L

ANG VELOCITIES



ANG ACCELERATIONS



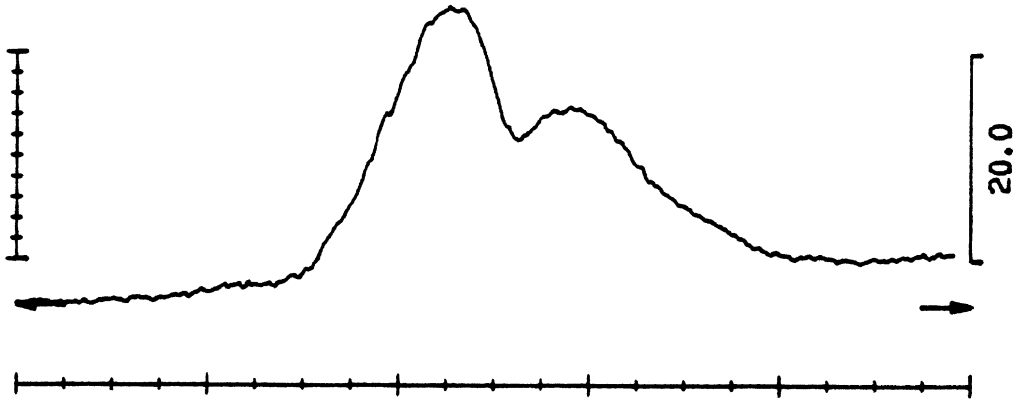
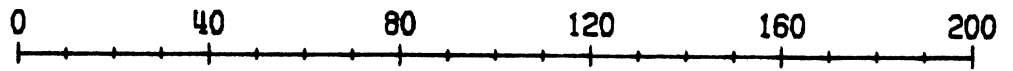
3-D ANGULAR MOTION

FILE: 26

77B101-3: HYB-3L

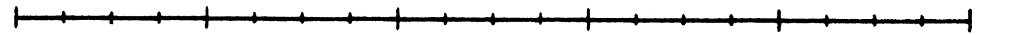
RESULTANT

GSI = 130
HIC = 109



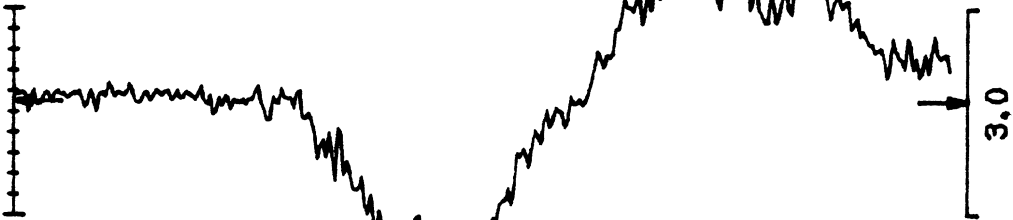
INTERNAL HEAD TRIAX

S-I

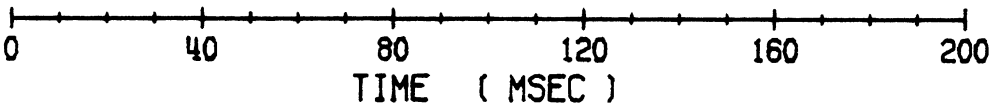
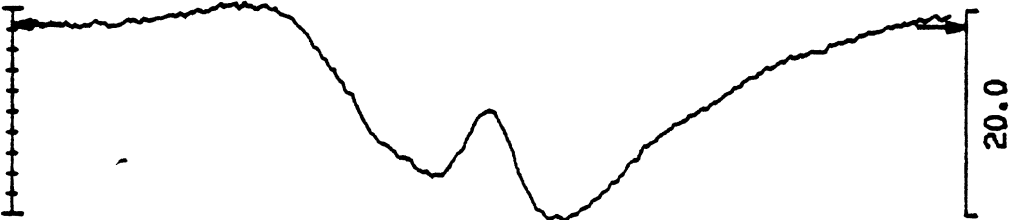


READINGS

L-R
(G'S)



A-P

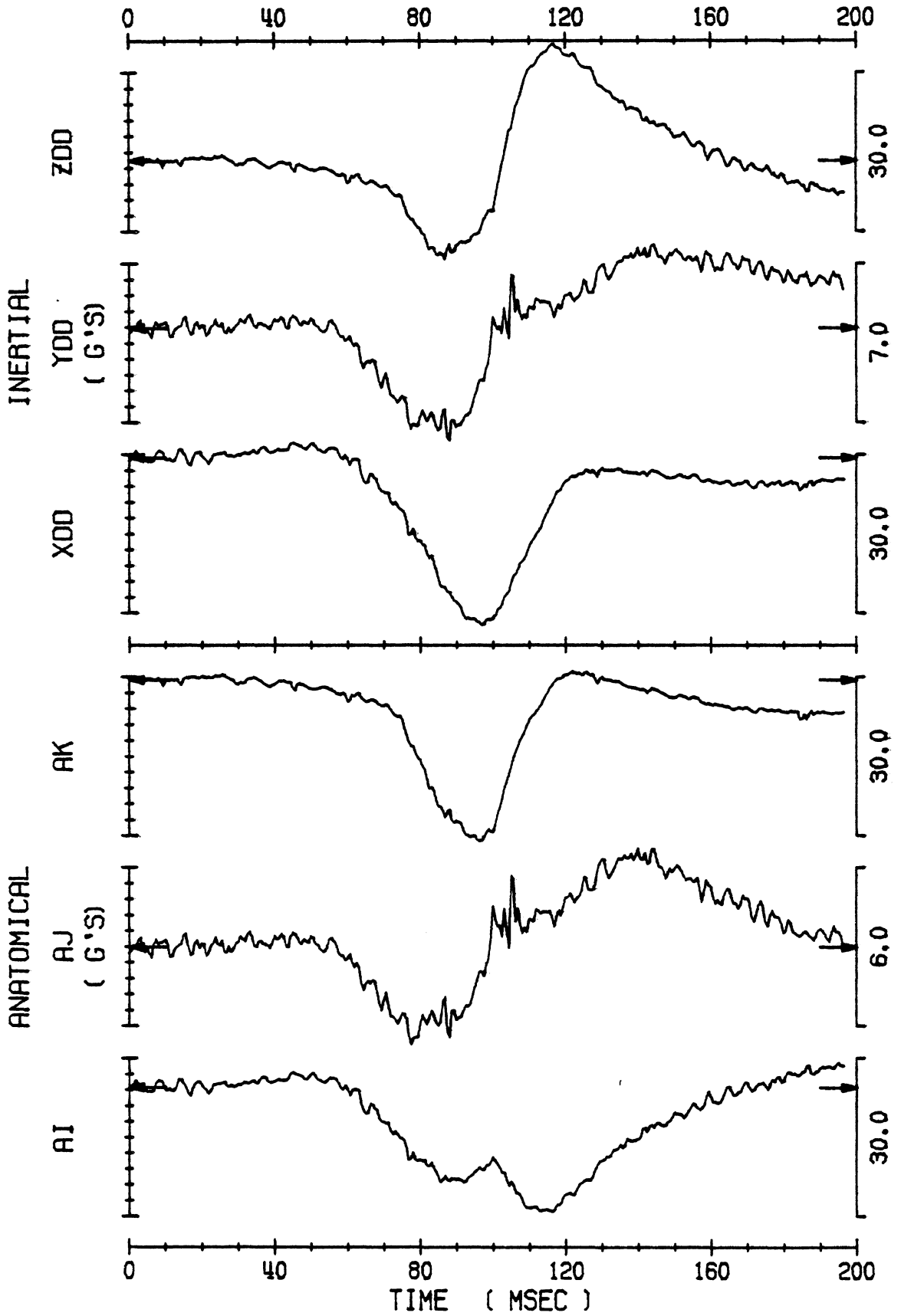


MEASURED ACCELERATIONS

ACC OF: HEAD C.G. GSI= 202, HIC= 170

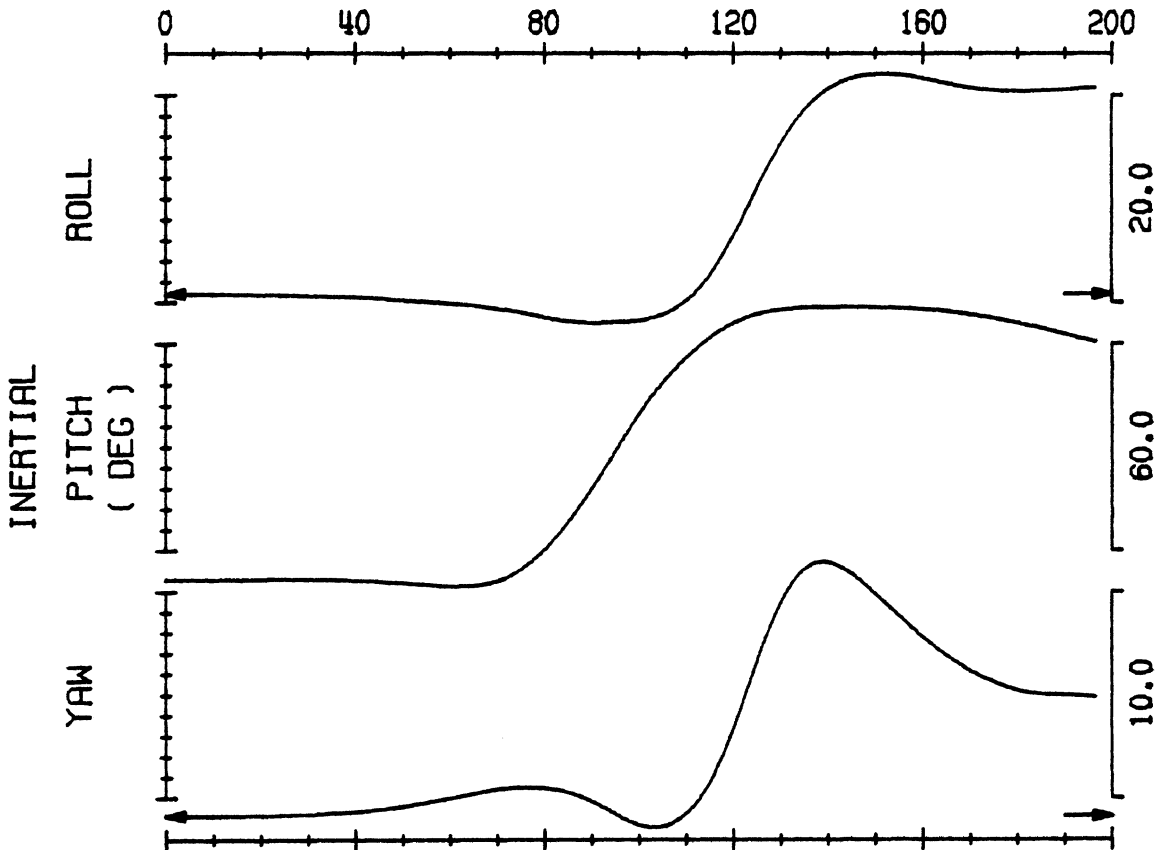
FILE: 20

77B101-1: HYB-3L

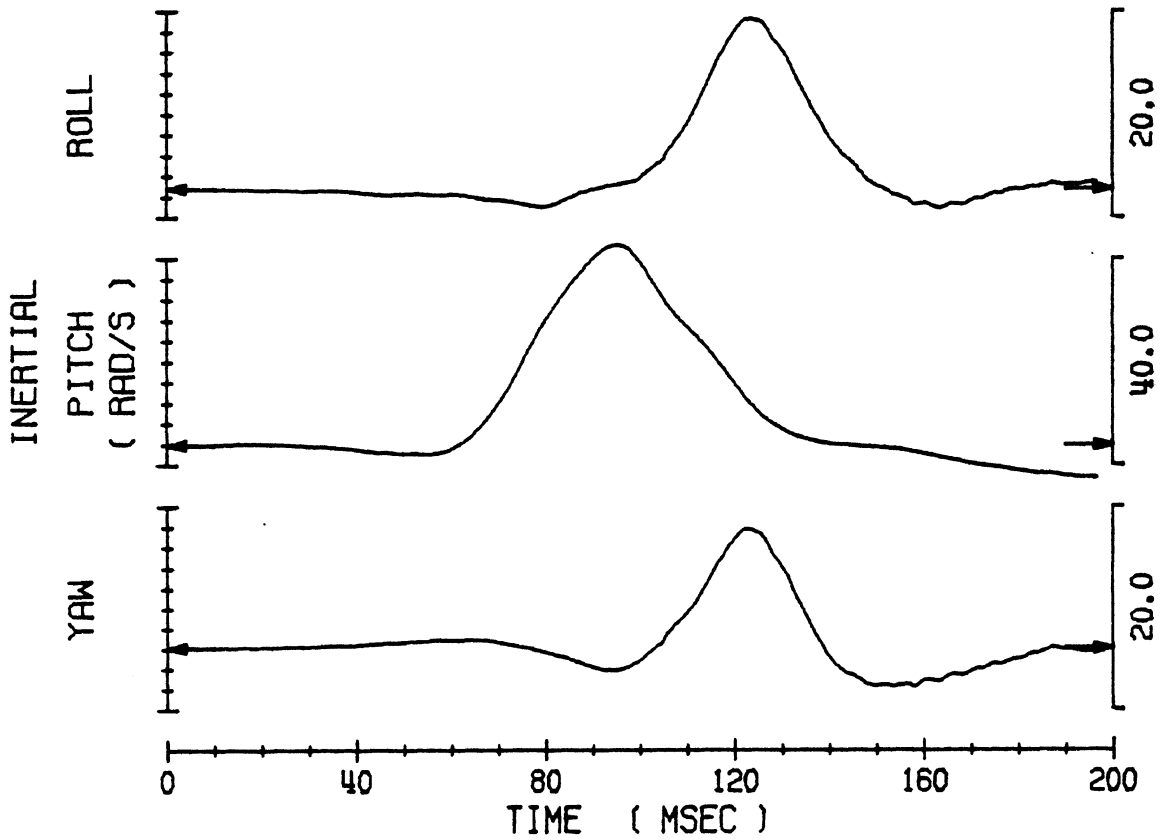


3-D ACCELERATIONS

EULER ANGLES



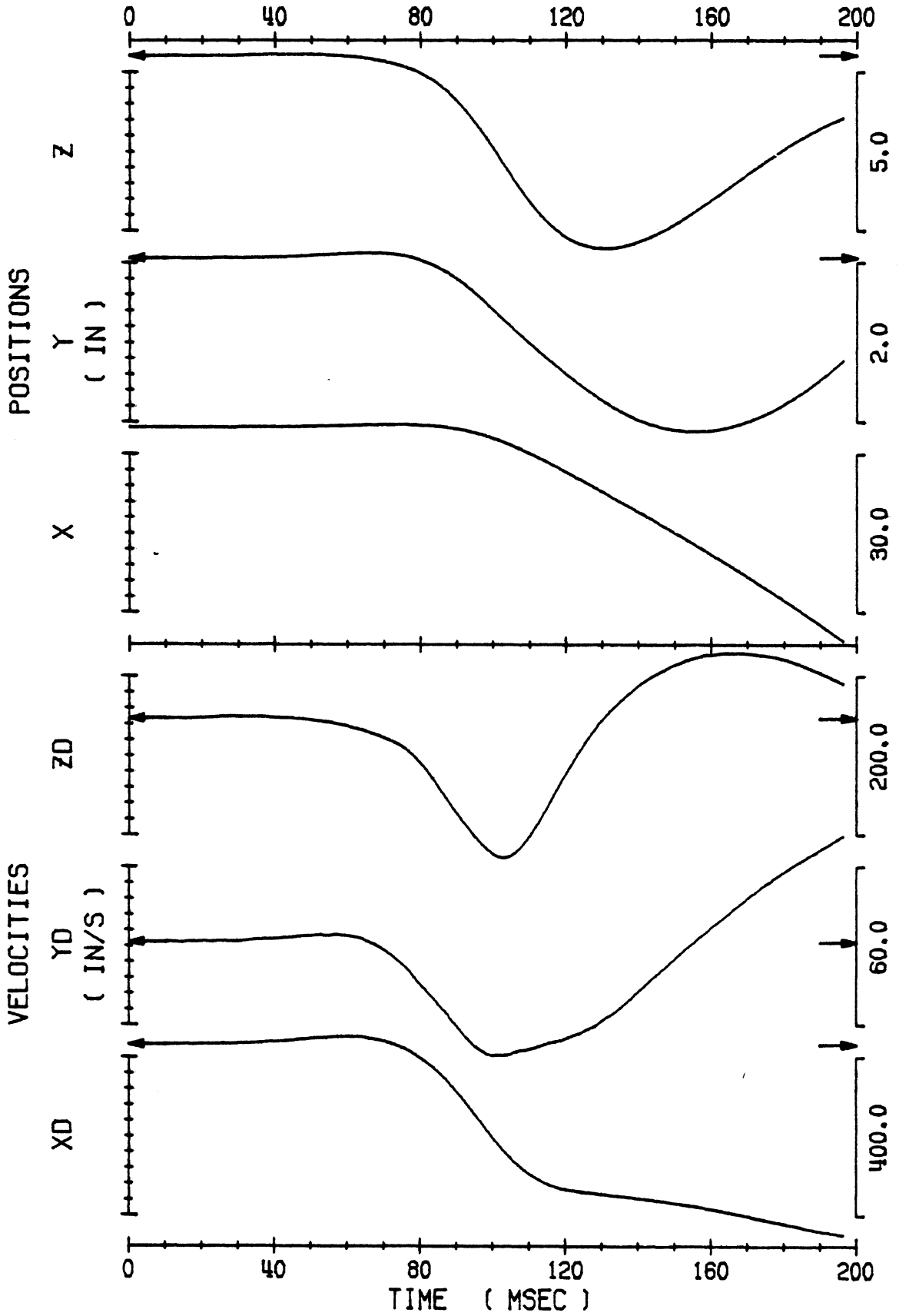
EULER RATES



3-D ROTATIONS

HEAD C.G.

INERTIAL MOTION OF:



3-D TRANSLATIONS

WHOLE BODY RESPONSE

SUMMARY

TEST NO.: 77B102

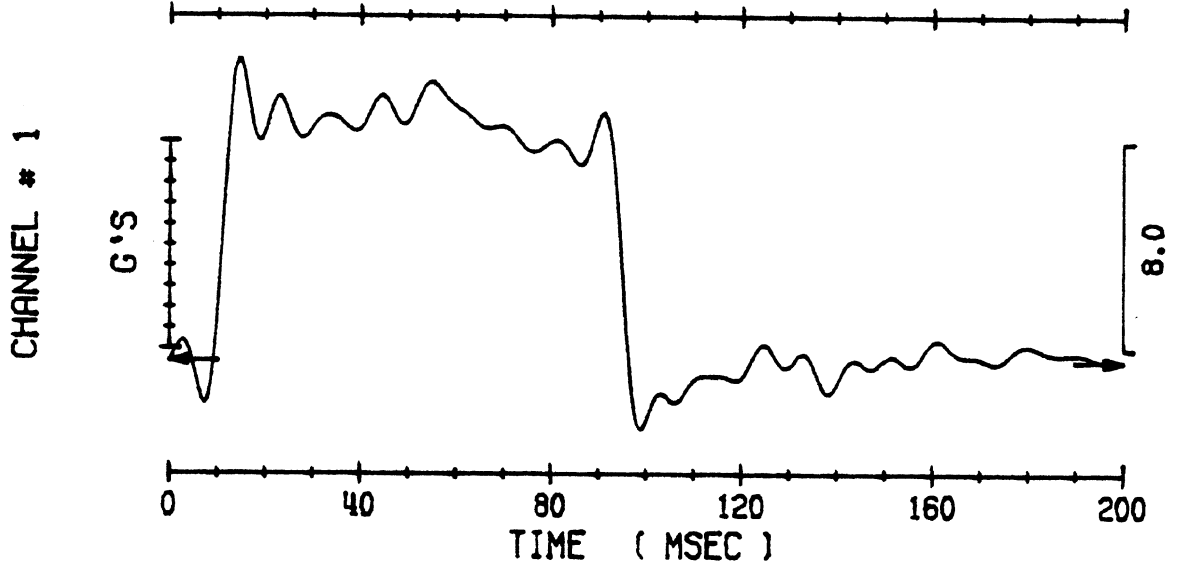
9.5 G-LEVEL
87. MS LONG
16.4 MPH DV
(15.6 ACTUAL)

	SHOULDER BELT		LAP BELT		FEMURS	
	UPPER	LOWER	LEFT	RIGHT	LEFT	RIGHT
PEAK FORCES: (LBS) @ (MS)	1054. 83.9	868. 75.7	1176. 87.0	629. 91.4	-308. 17.6	-230. 22.0
NECK FORCES:	AP= 225. LBS @ 107. MS		SI= 250. LBS @ 83. MS		MOM= 930. IN-LB @ 89. MS	

	RESULTANT PEAK	(A-P)		(L-R)		(S-I)	
		MIN	MAX	MIN	MAX	MIN	MAX
IN THORAX ACC: (G'S) @ (MS) GSI=	19. 76.4 46	-4. 125.7	17. 71.9	-2. 75.2	1. 126.1	-6. 111.3	4. 79.6
DEFLECTION= 0.50 IN @ 90. MS							
IN PELVIS ACC: (G'S) @	15. 93.9	-1. 125.7	15. 91.0	-4. 103.8	2. 70.7	-2. 134.2	8. 106.4
EX THORAX ACC: (G'S) @ GSI=	23. 76.4 67	-21. 70.4	4. 116.5	-3. 147.3	3. 75.3	-7. 72.8	8. 108.3
EX PELVIS ACC: (G'S) @	20. 91.4	-19. 91.3	2. 119.6	0. 0.0	0. 0.0	-1. 75.7	7. 98.6
.....							
HEAD ANG ACC : (RAD/S/S) @	1704. 67.0	-274. 146.2	275. 99.0	-1523. 91.8	1599. 66.3	-130. 75.7	154. 91.8
HEAD ANG VEL : (RAD/S) @	38.2 84.5	-0.5 67.9	6.4 125.2	-0.6 125.7	38.1 84.5	-1.3 83.3	1.8 117.8
EULER ANGLES : (DEGREES) @			8.6 134.7		74.8 123.8		21.6 144.9
.....							
HEAD C.G. ACC: (G'S) @	35. 83.3	-24. 105.7	2. 40.7	-2. 65.7	3. 133.7	-32. 85.7	3. 112.3
HEAD C.G. HIC=	176						
HEAD C.G. VEL: (IN/S) @	496. 187.1	-417. 145.7	7. 60.7	-17. 85.5	30. 145.7	-175. 93.3	90. 153.2
HEAD C.G. DIS: (IN) @			-22.0 145.7		-0.5 118.2		-5.5 119.5

FILE: 36

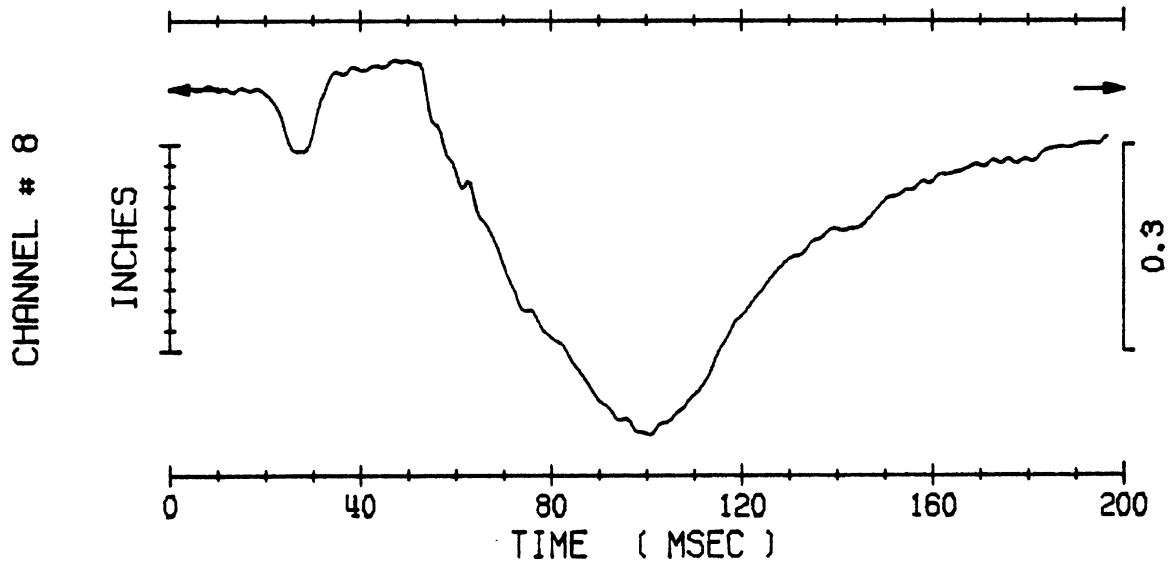
77B102-2: HYB-3L



SLED DECELERATION

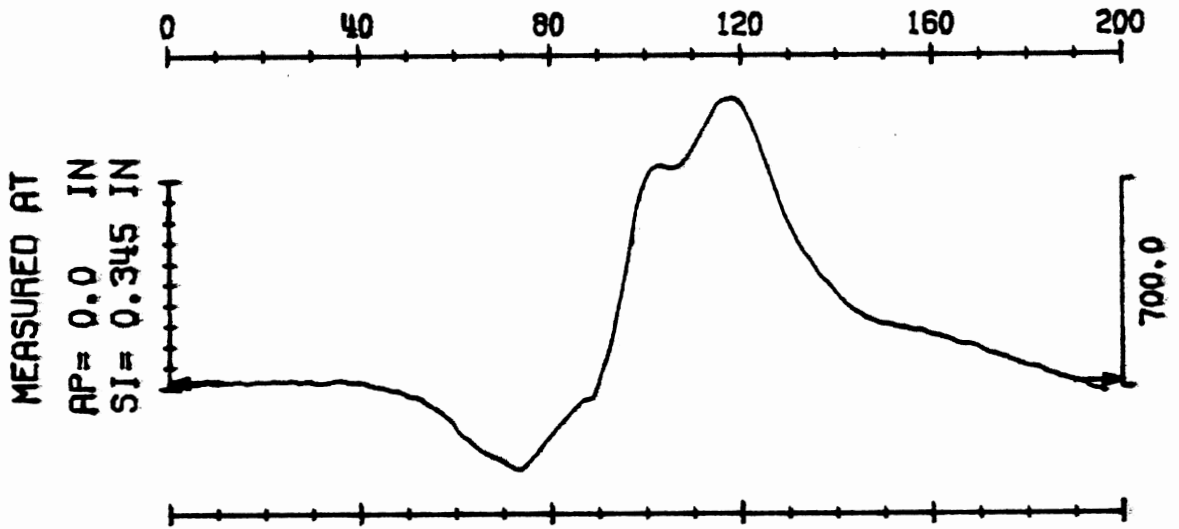
FILE: 41

77B102-3: HYB-3L



A-P CHEST DEFLECTION

MOMENT



NECK REACTIONS



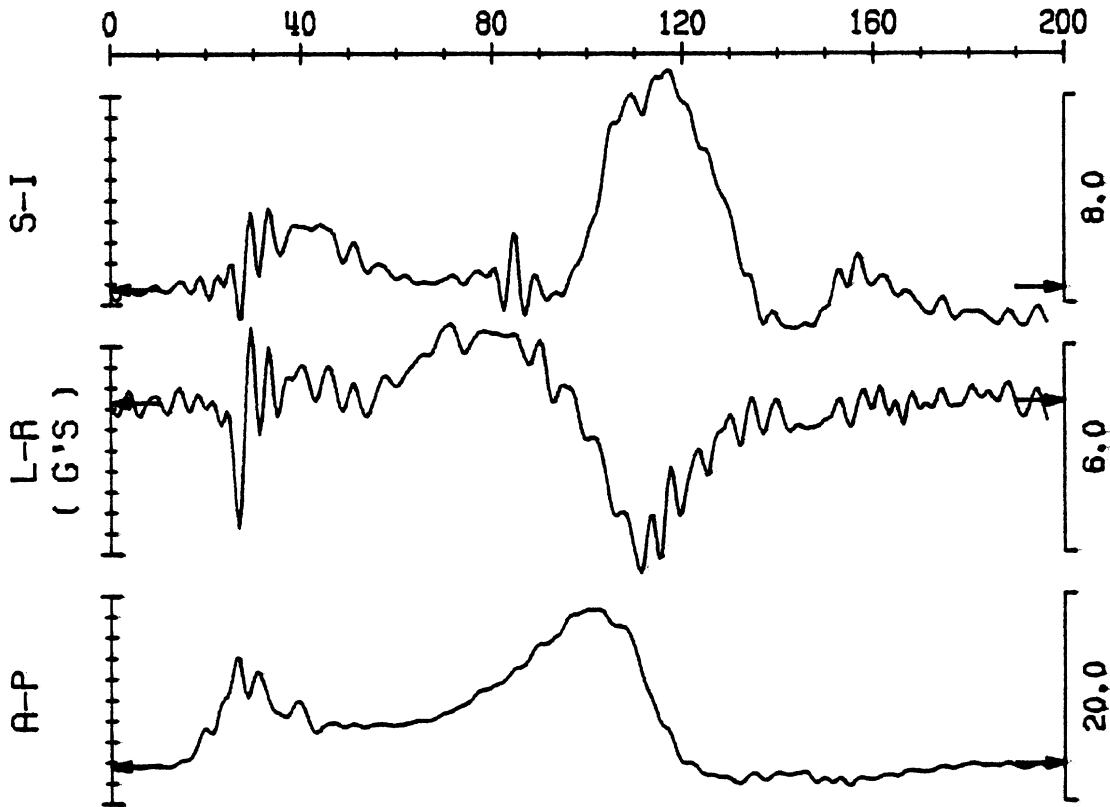
MEASURED FORCES

FILE: 42

77B102-1: HYB-3L

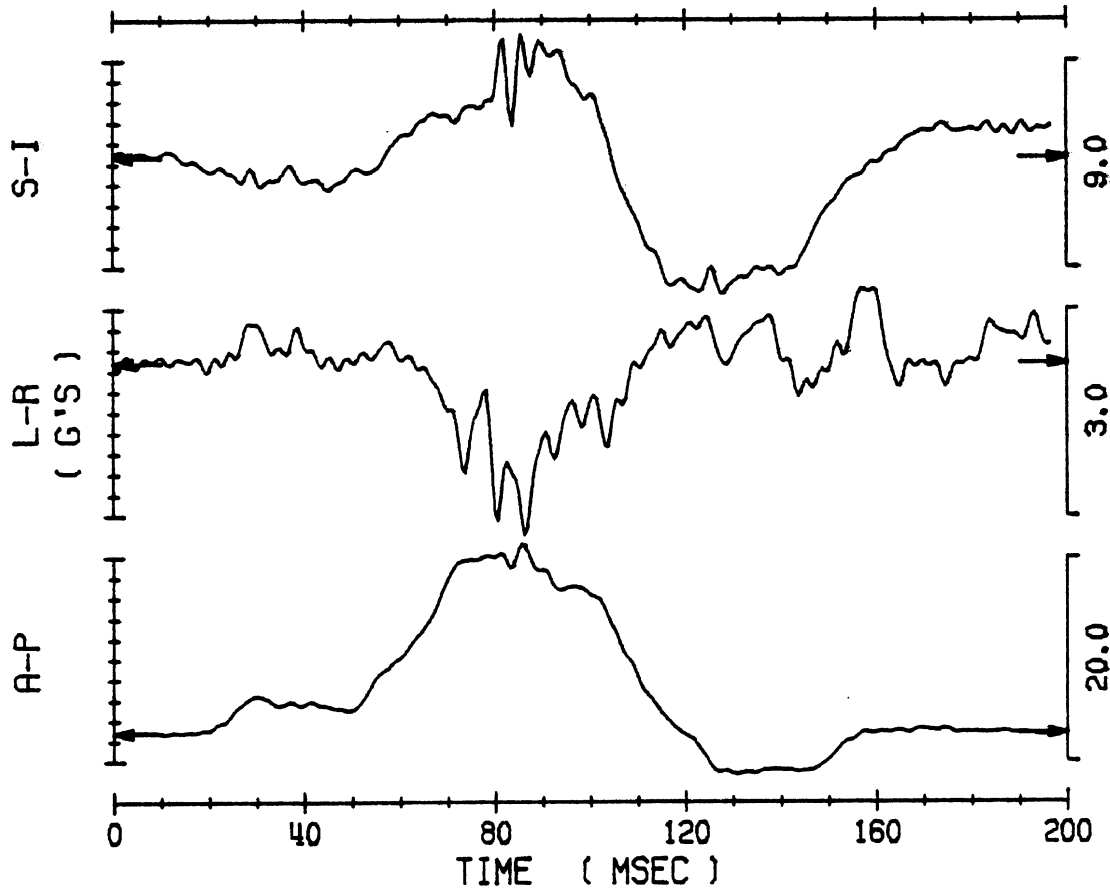
PELVIS

INTERNAL



THORAX: (GSI= 46)

INTERNAL



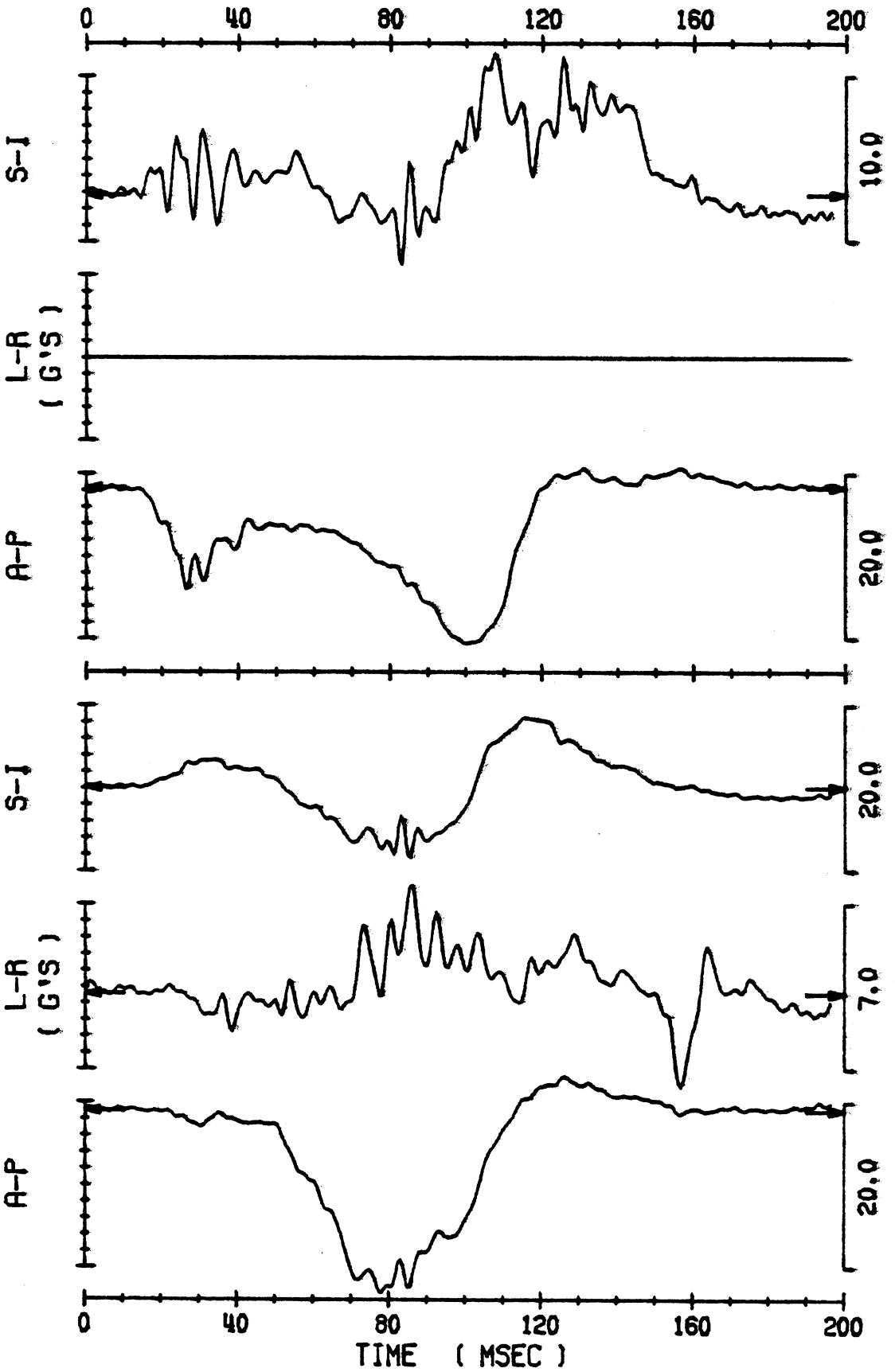
MEASURED ACCELERATIONS

PELVIS

THORAX: (GSI= 67)

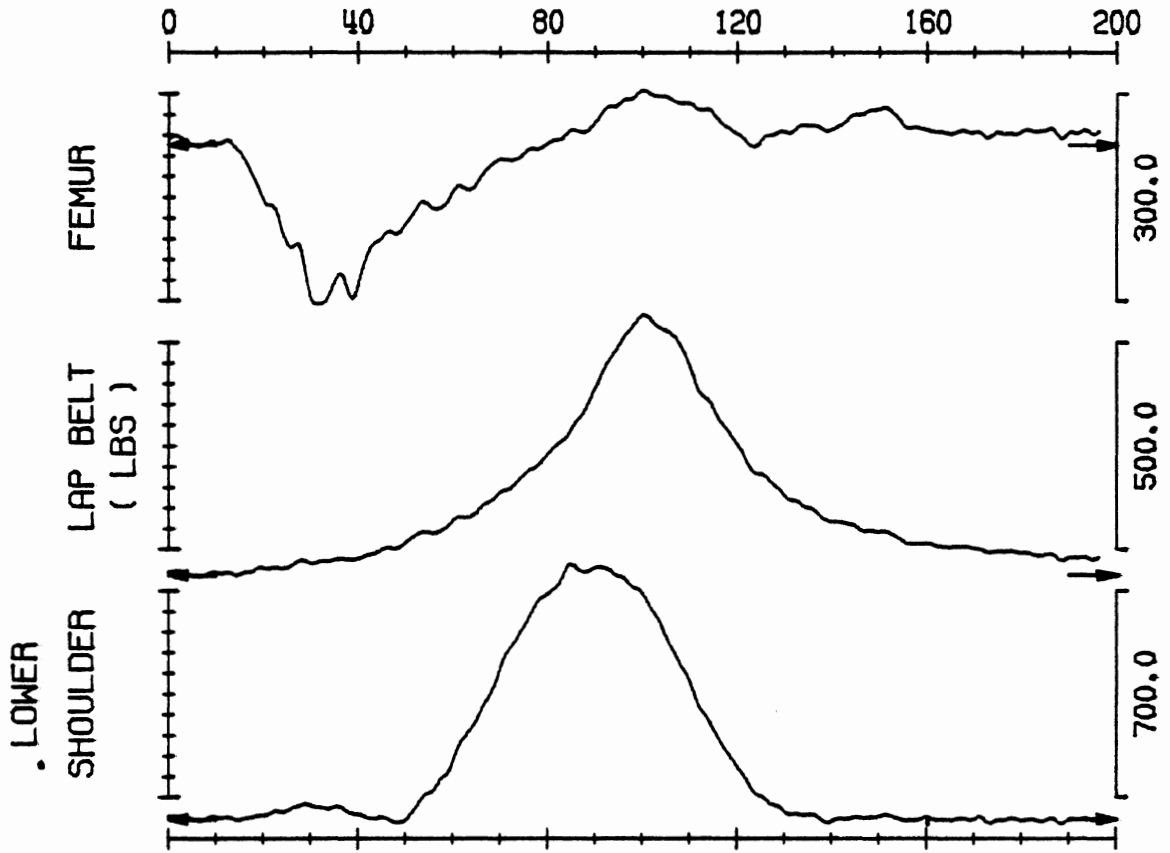
EXTERNAL

EXTERNAL

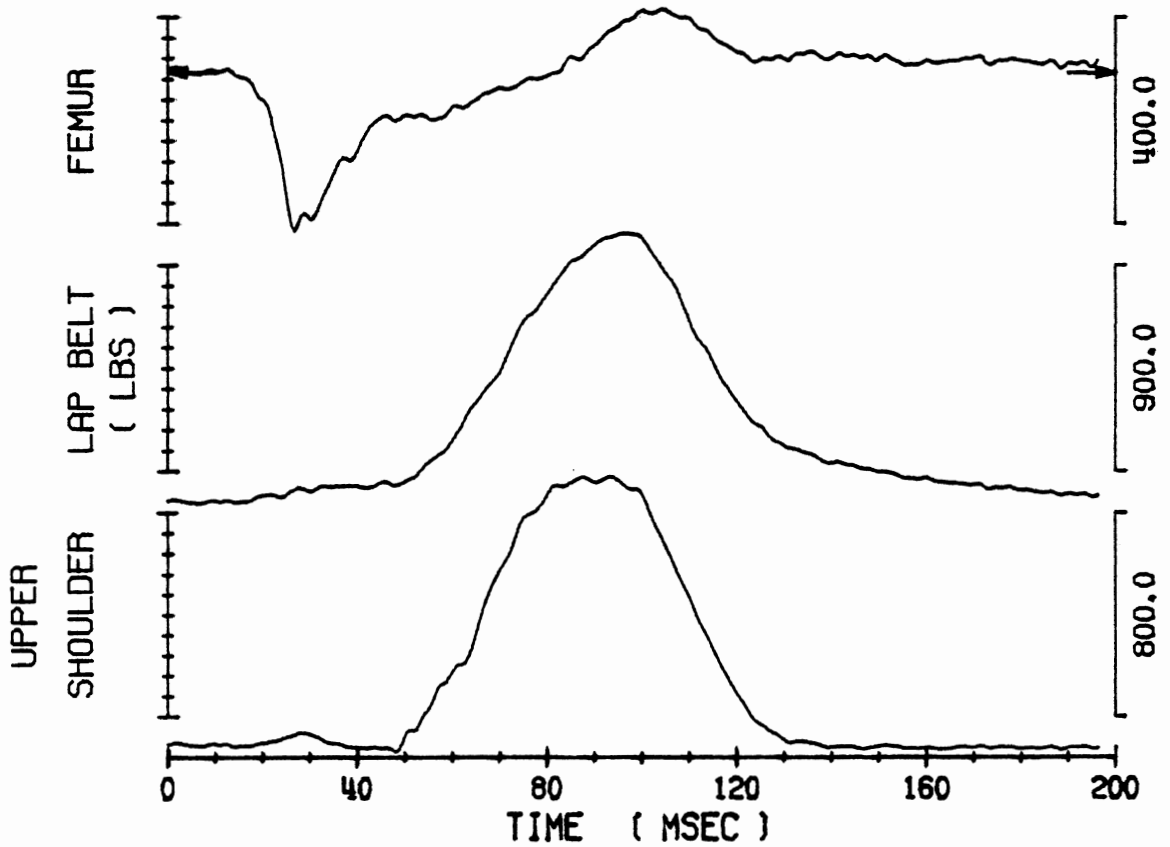


MEASURED ACCELERATIONS

RIGHT SIDE

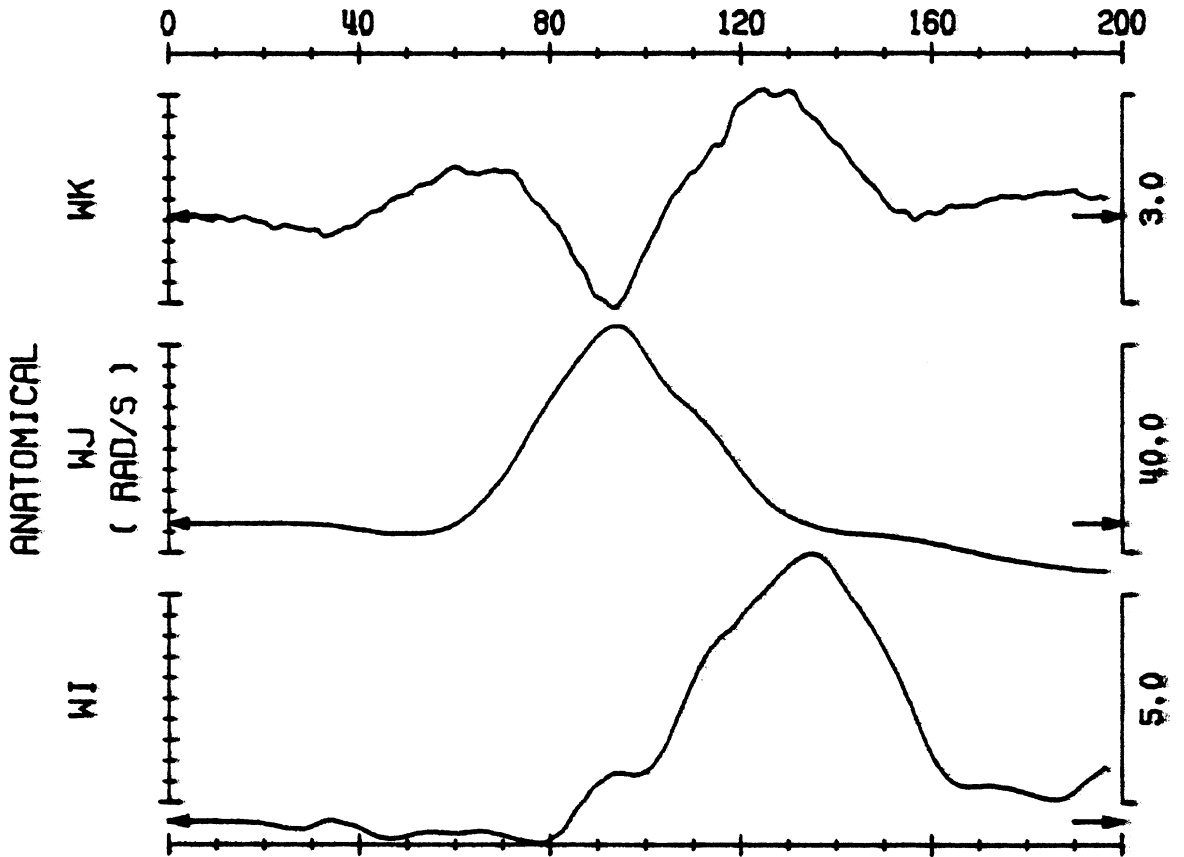


LEFT SIDE

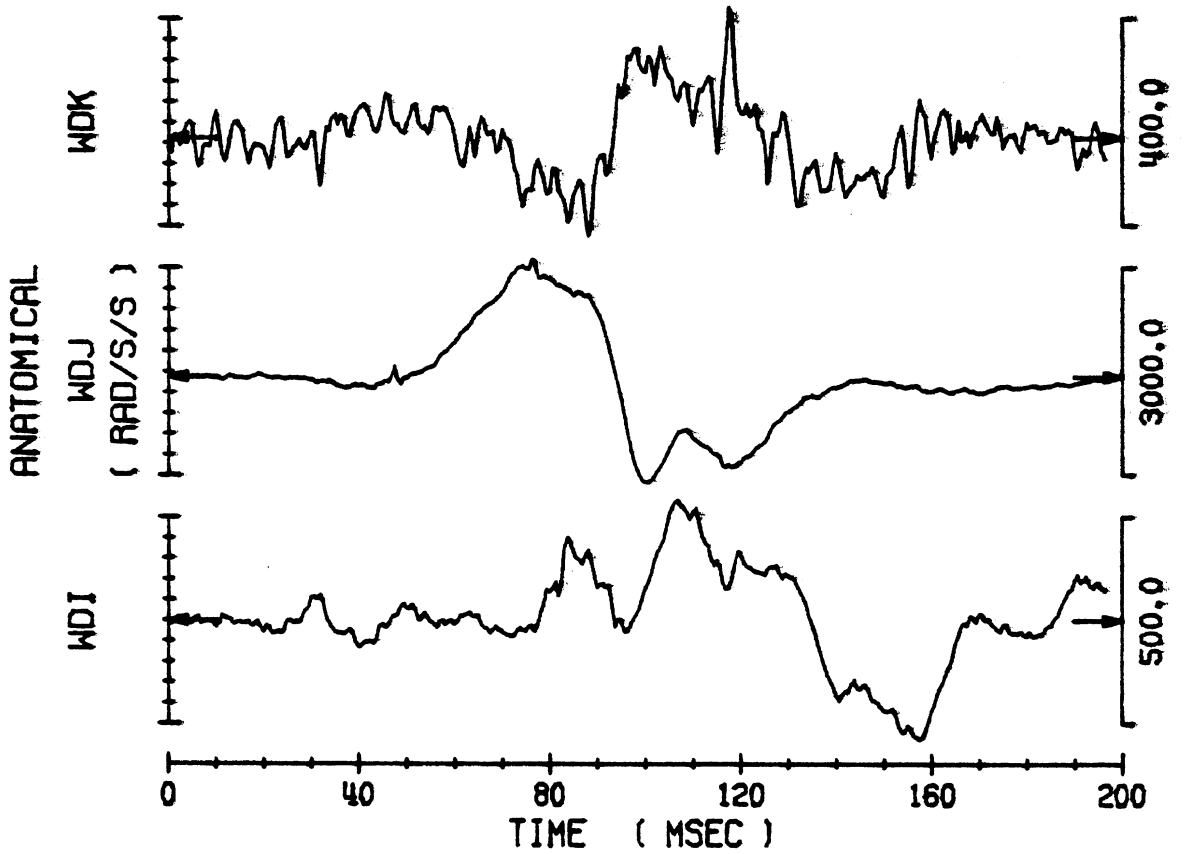


MEASURED FORCES

ANG VELOCITIES



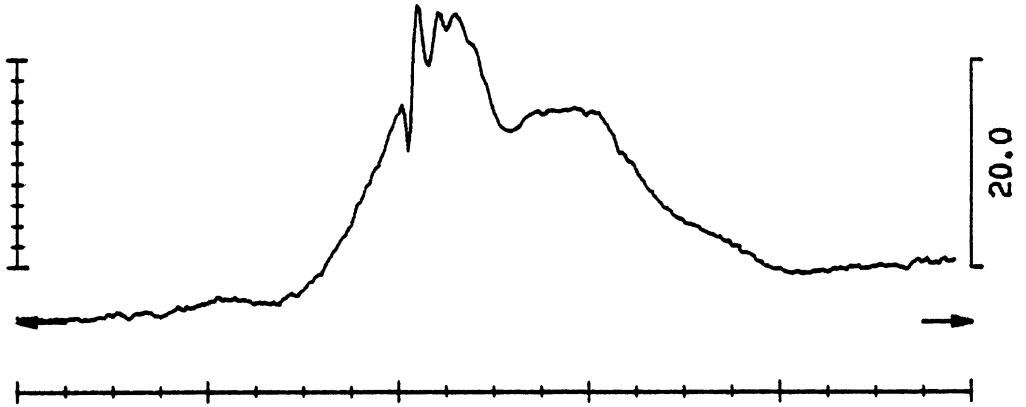
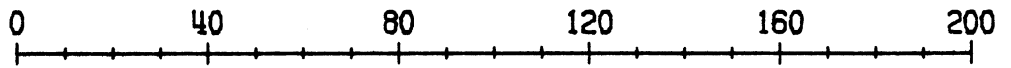
ANG ACCELERATIONS



3-D ANGULAR MOTION

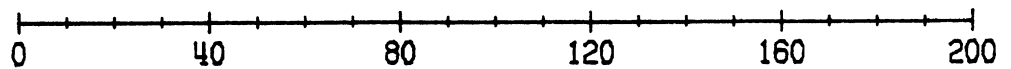
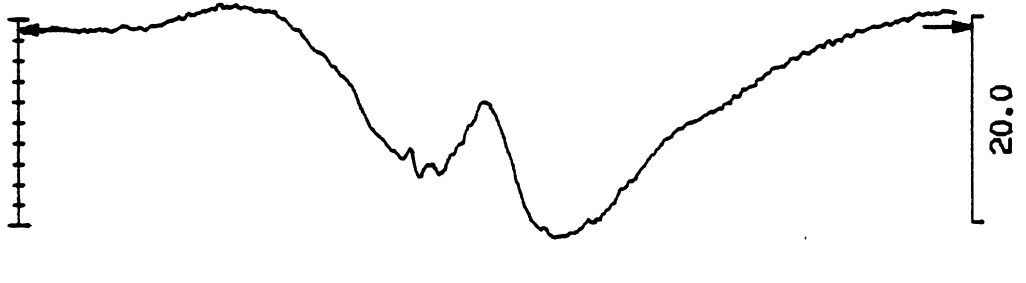
RESULTANT

GSI = 139
HIC = 117



INTERNAL HEAD TRIAX READINGS

L-R
(G'S)



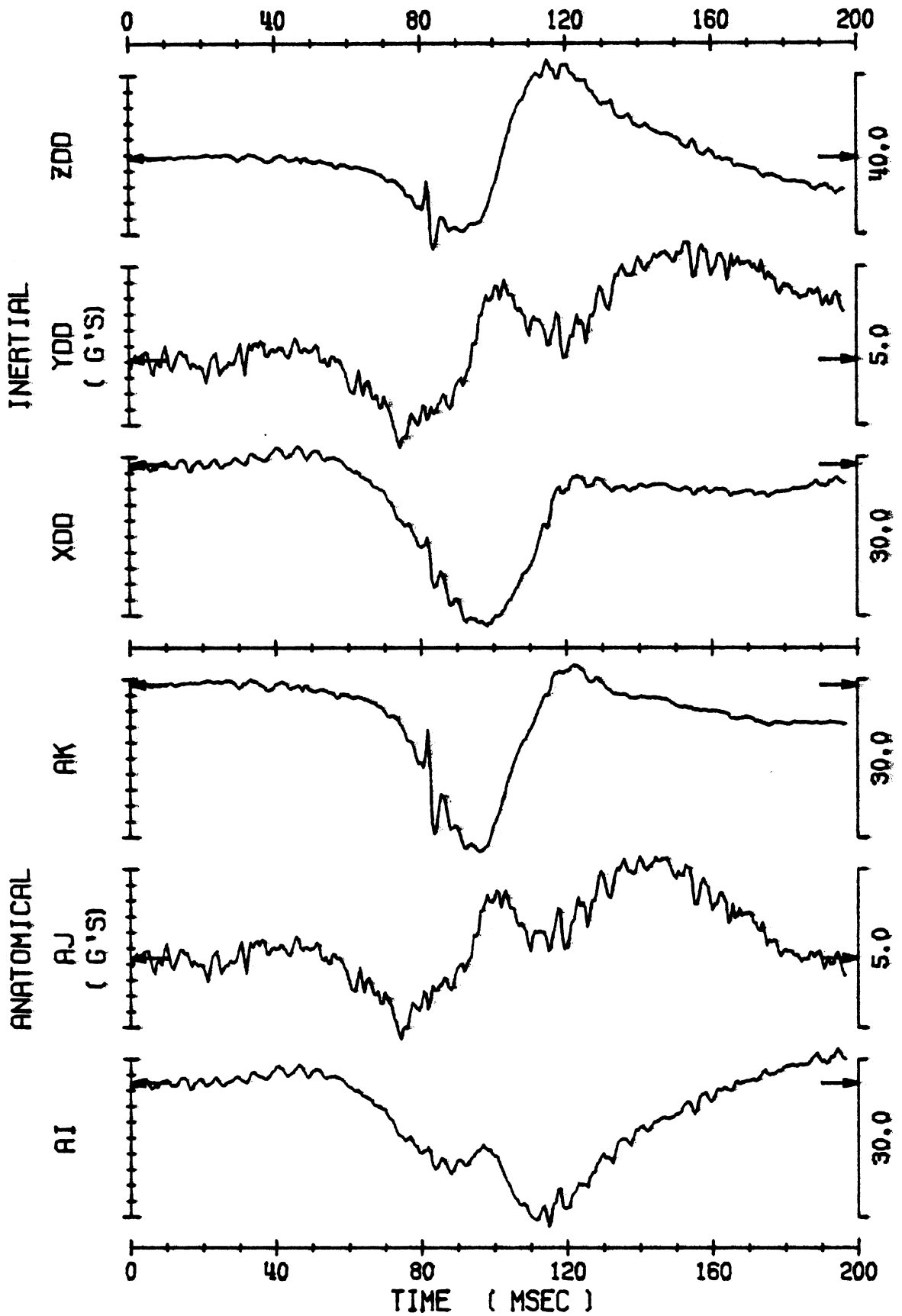
TIME (MSEC)

MEASURED ACCELERATIONS

ACC OF; HEAD C.G. GSI= 210, HIC= 176

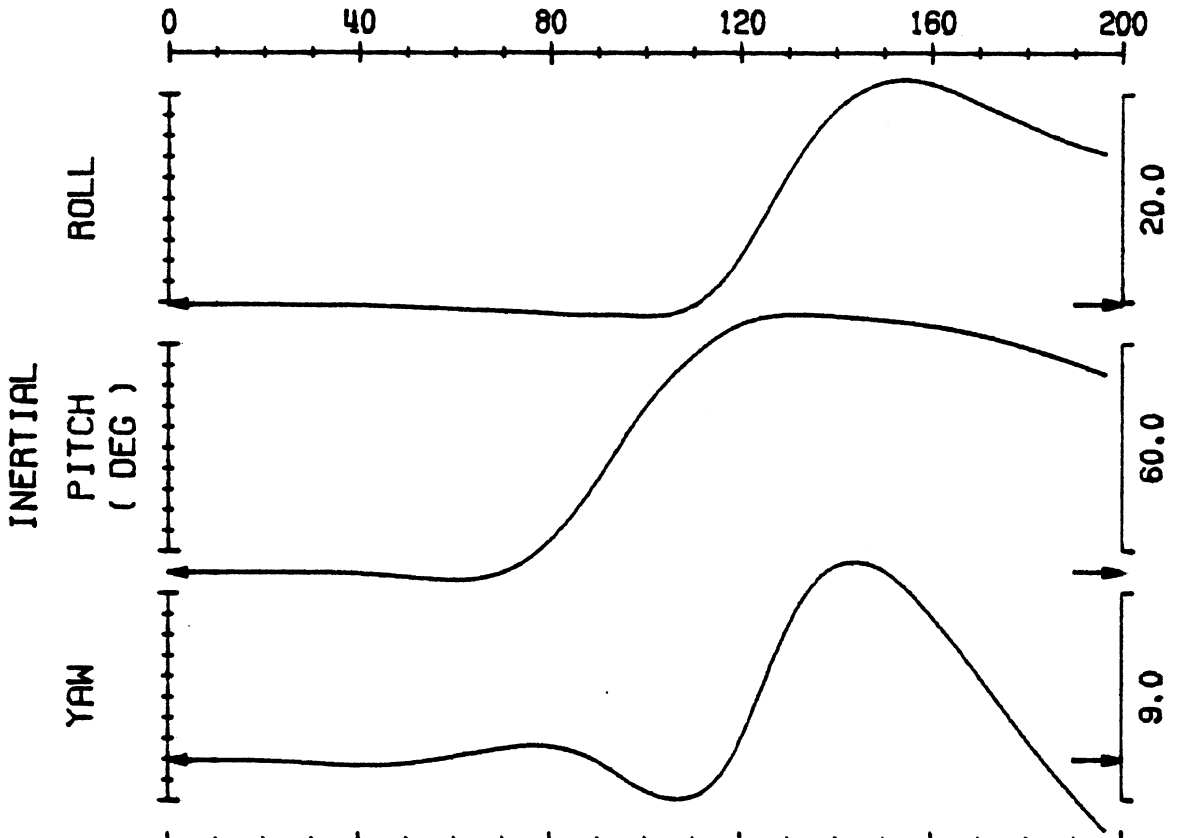
FILE: 34

77B102-1: HYB-3L

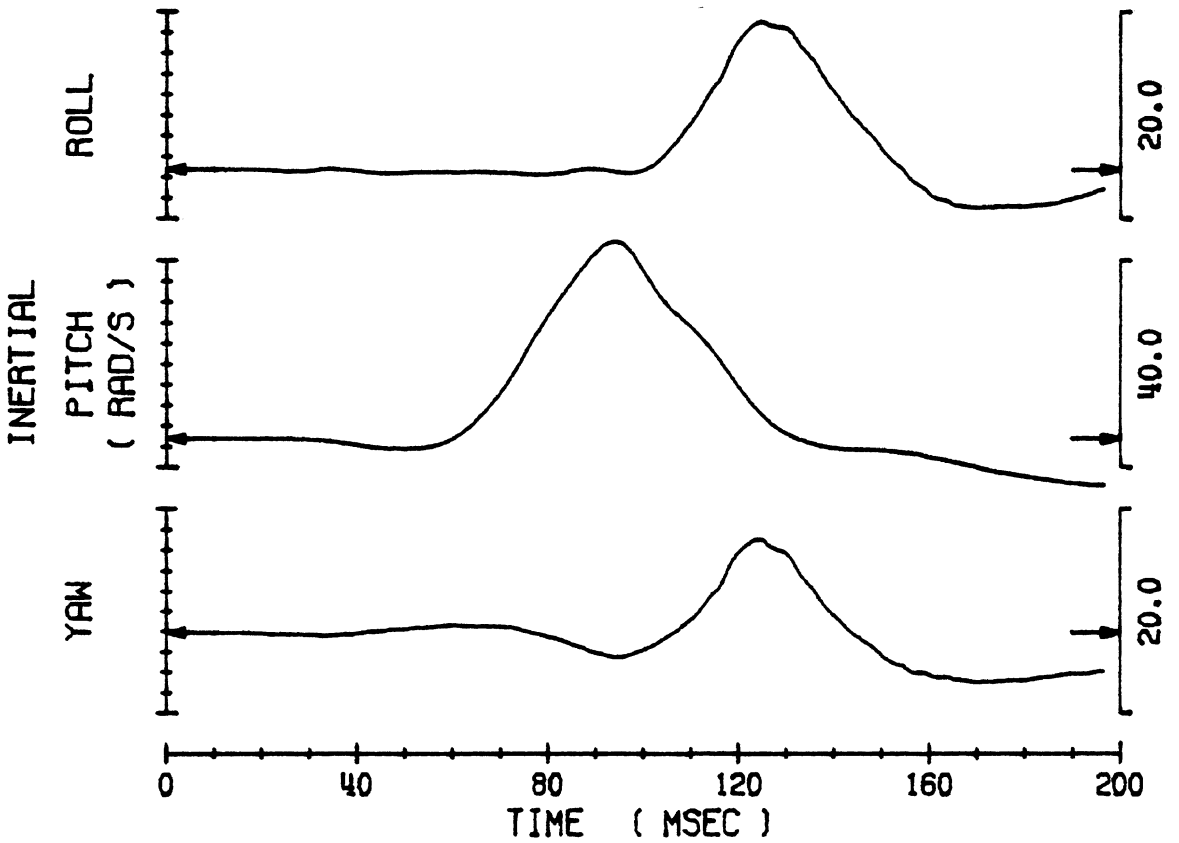


3-D ACCELERATIONS

EULER ANGLES



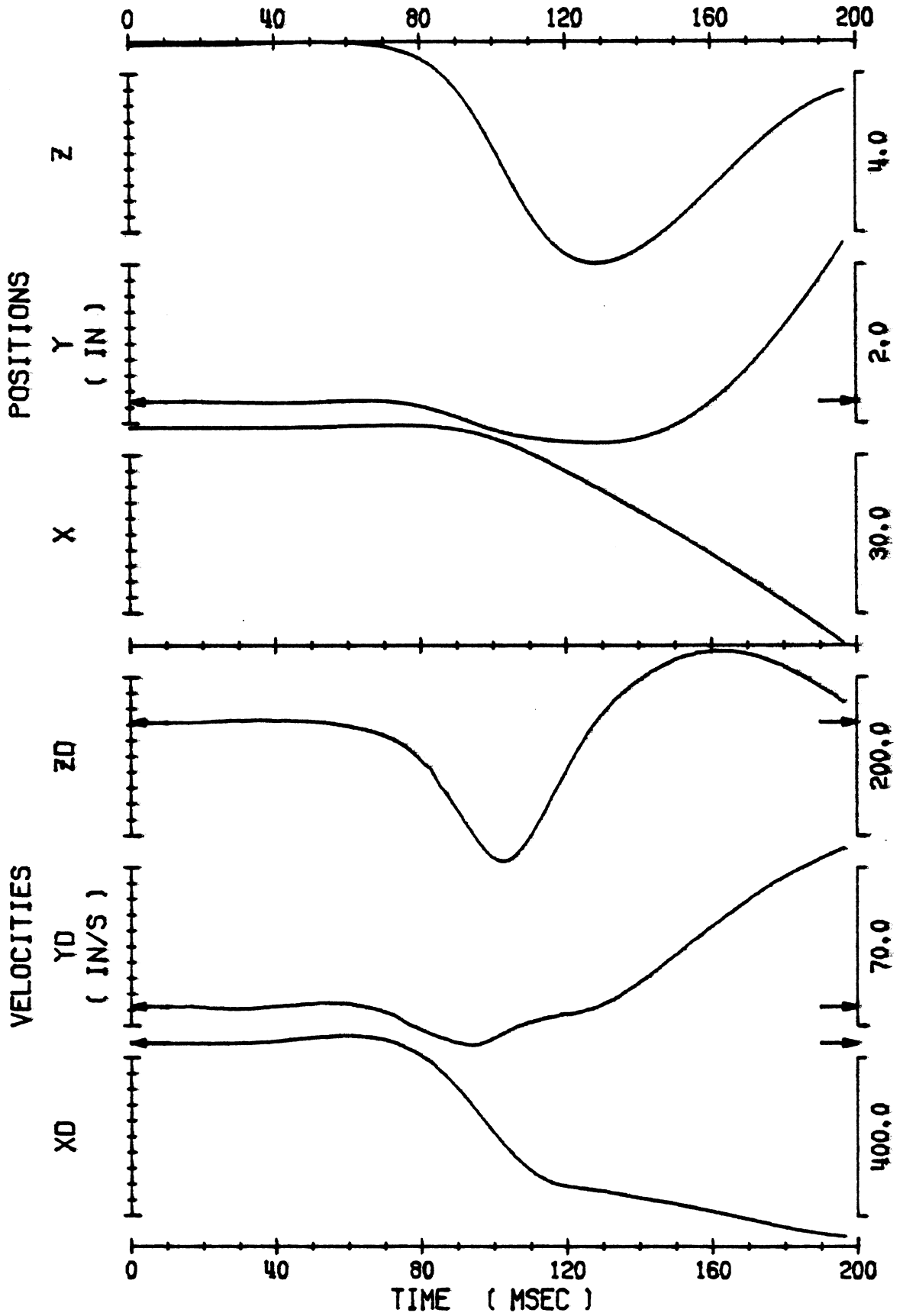
EULER RATES



3-D ROTATIONS

HEAD C.G.

INERTIAL MOTION OF:



3-D TRANSLATIONS

WHOLE BODY RESPONSE

SUMMARY

TEST NO.: 77B103

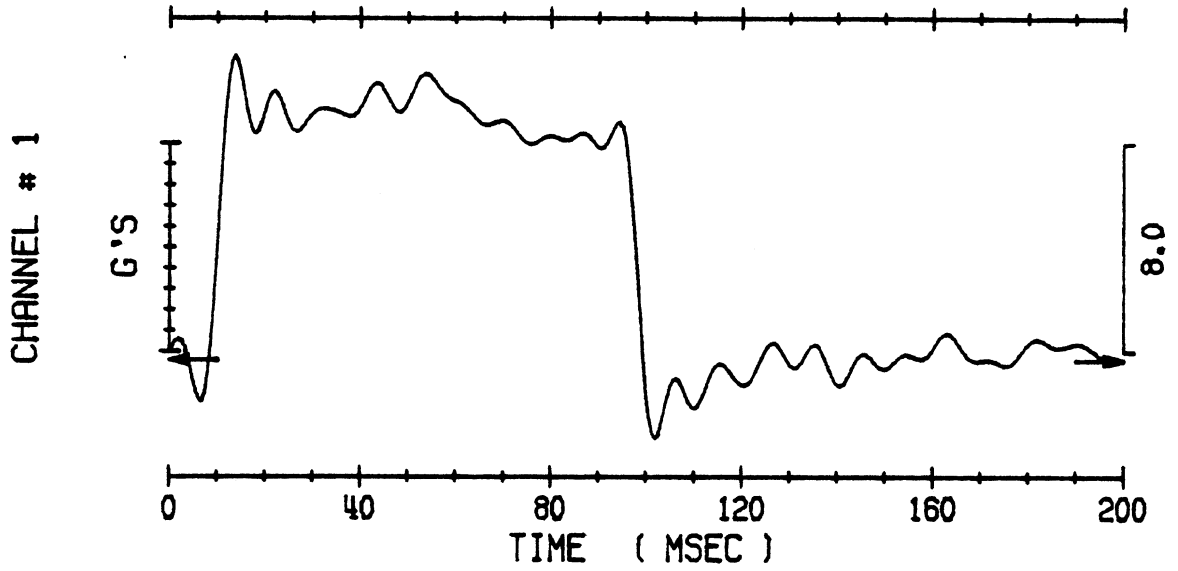
9.7 G-LEVEL
 91. MS LONG
 17.7 MPH DV
 (16.4 ACTUAL)

	SHOULDER BELT		LAP BELT		FEMURS	
	UPPER	LOWER	LEFT	RIGHT	LEFT	RIGHT
PEAK FORCES: (LBS) @ (MS)	1062. 79.2	886. 79.8	1167. 89.8	630. 95.5	-339. 17.3	-249. 29.8
NECK FORCES:	AP= 160. LBS @ 105. MS		SI= 270. LBS @ 82. MS		MOM= 970. IN-LB @ 90. MS	

	RESULTANT PEAK	(A-P)		(L-R)		(S-I)	
		MIN	MAX	MIN	MAX	MIN	MAX
IN THORAX ACC: (G'S) @ (MS) GSI=	20. 74.2 49	-3. 130.5	19. 72.5	-1. 71.6	1. 143.6	-6. 112.4	5. 78.0
DEFLECTION= 0.50 IN @ 90. MS							
IN PELVIS ACC: (G'S) @	17. 96.7	-1. 123.9	15. 93.6	-4. 104.1	1. 70.9	-0. 82.5	8. 106.0
EX THORAX ACC: (G'S) @ GSI=	25. 69.8 73	-22. 67.6	3. 118.3	-2. 142.4	2. 75.2	-7. 76.6	8. 107.5
EX PELVIS ACC: (G'S) @	20. 96.1	-19. 94.4	2. 122.5	0. 0.0	0. 0.0	-3. 73.3	7. 99.3
.....							
HEAD ANG ACC : (RAD/S/S) @	1881. 67.3	-277. 142.2	366. 99.4	-1530. 93.0	1810. 67.6	-129. 76.6	184. 93.1
HEAD ANG VEL : (RAD/S) @	40.4 86.1	-0.6 69.7	6.1 122.0	-1.0 146.6	40.3 85.7	-2.4 84.0	1.9 121.8
EULER ANGLES : (DEGREES) @			7.1 141.7		81.2 127.9		22.6 146.1
.....							
HEAD C.G. ACC: (G'S) @	37. 84.8	-26. 106.2	2. 41.4	-2. 66.7	2. 94.5	-33. 86.4	2. 114.7
HEAD C.G. HIC=	193						
HEAD C.G. VEL: (IN/S) @	528. 188.0	-429. 146.6	11. 56.6	-17. 82.5	45. 146.6	-184. 94.3	101. 146.6
HEAD C.G. DIS: (IN) @			-22.8 146.6		-0.4 100.0		-6.0 120.1

FILE: 52

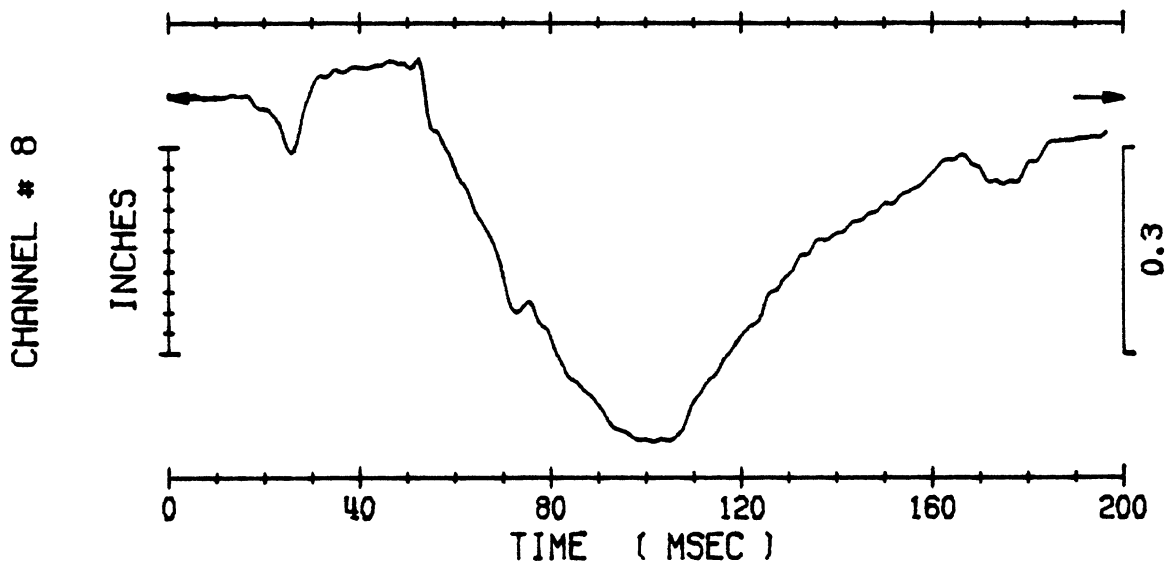
77B103-2: HYB-3L



SLED DECELERATION

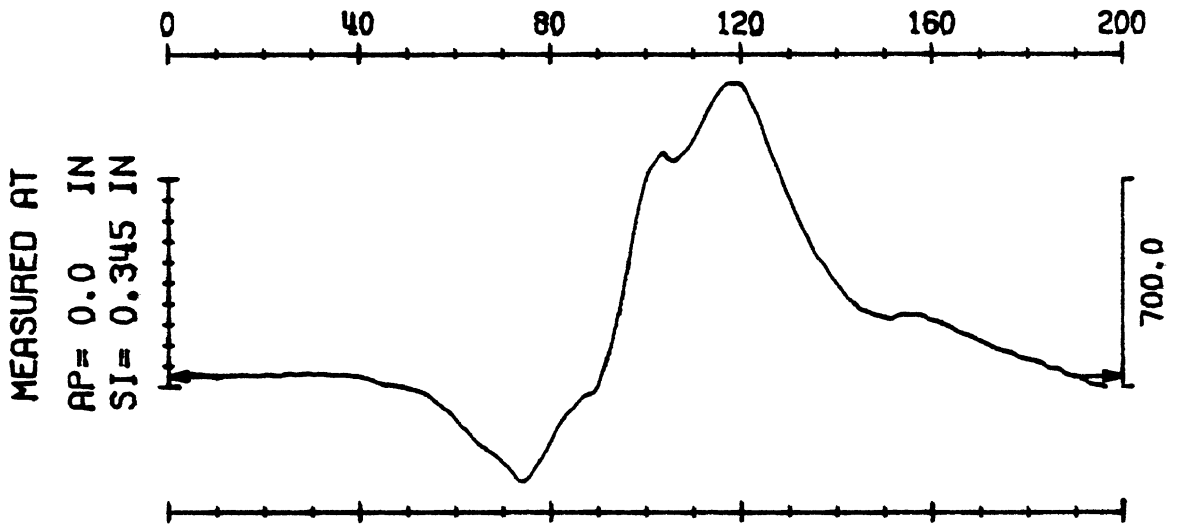
FILE: 57

77B103-3: HYB-3L

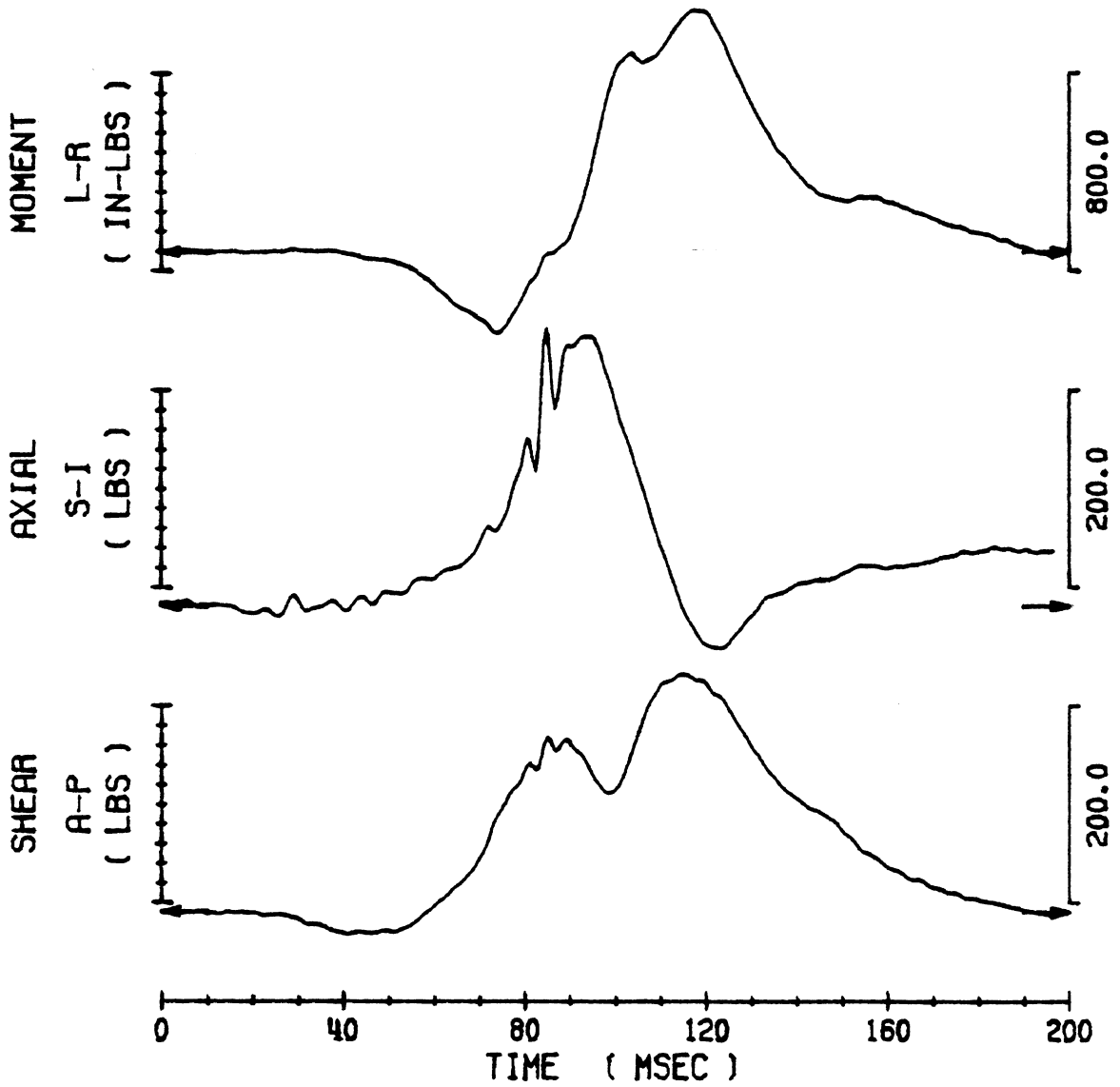


A-P CHEST DEFLECTION

MOMENT



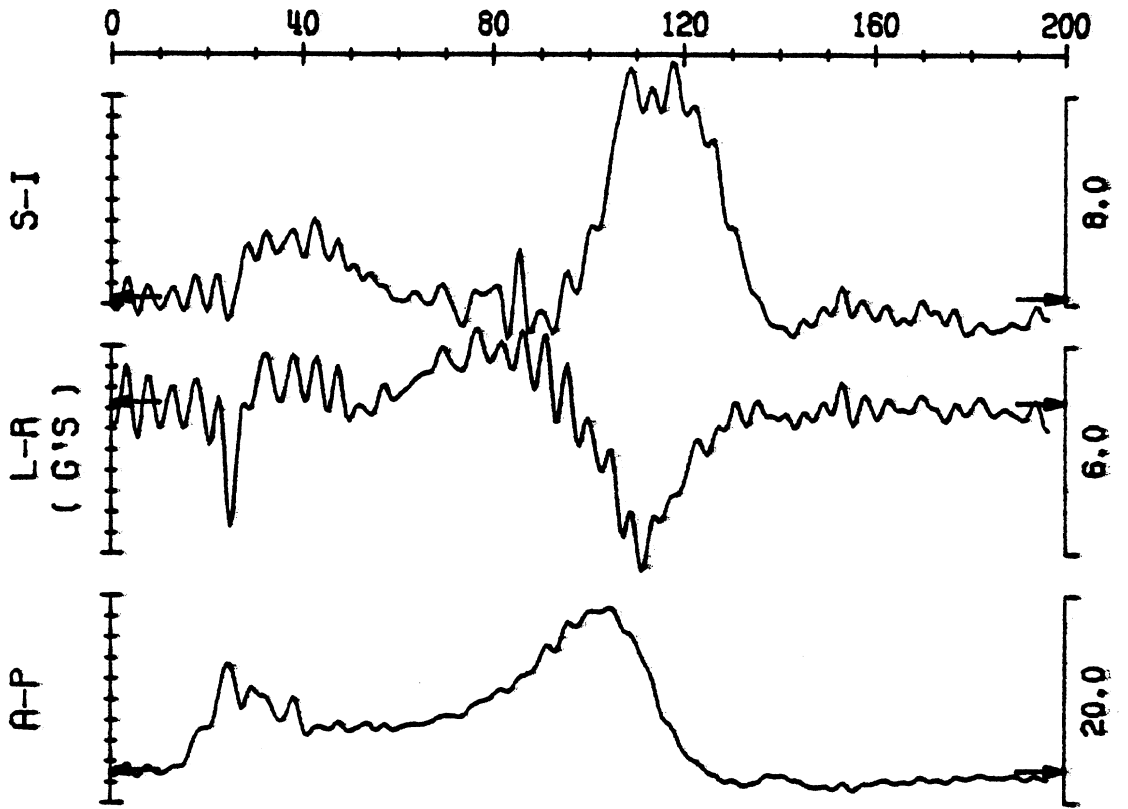
NECK REACTIONS



MEASURED FORCES

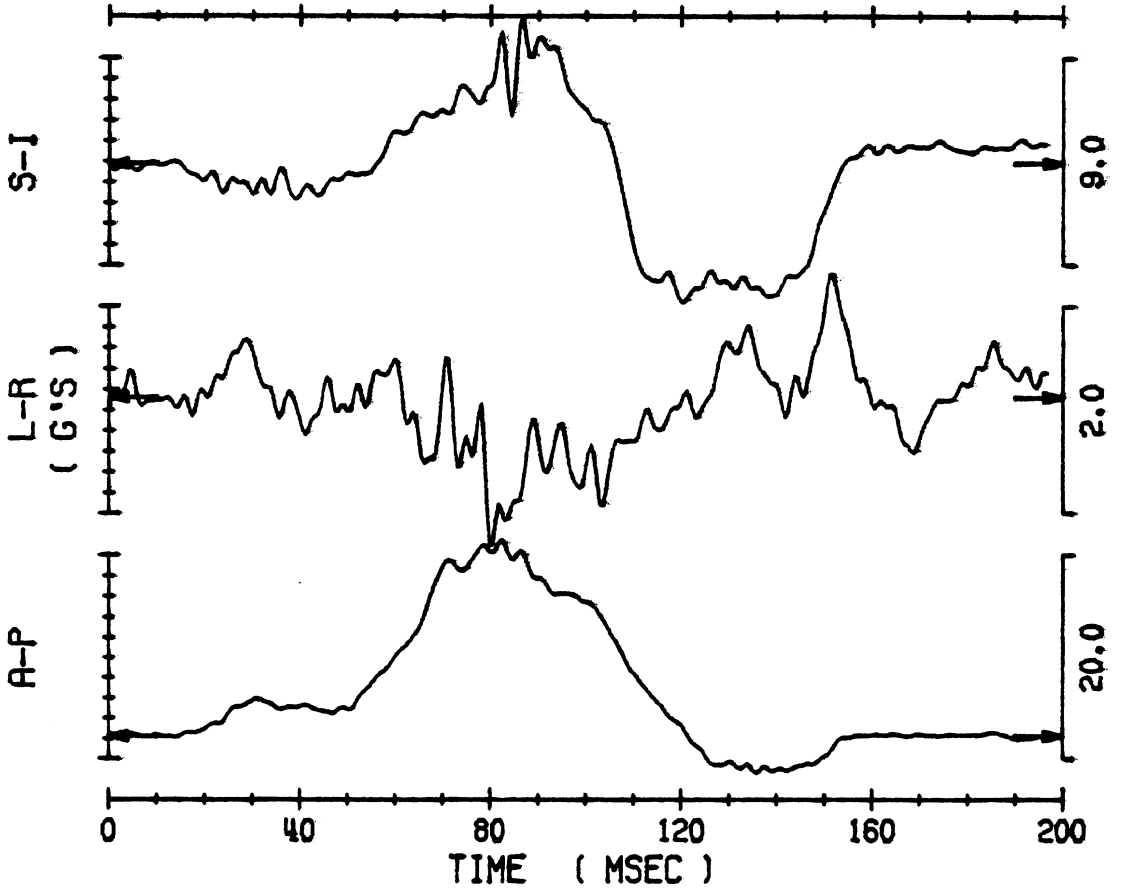
PELVIS

INTERNAL



THORAX; (GSI= 49)

INTERNAL



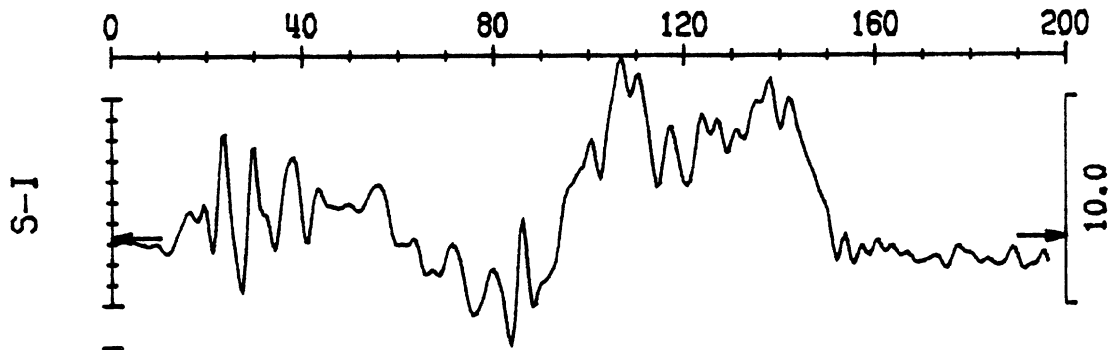
MEASURED ACCELERATIONS

FILE: 53

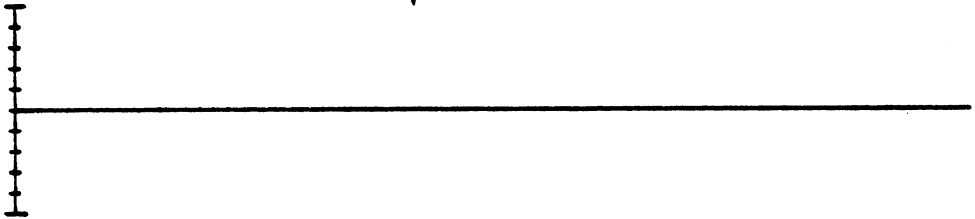
77B103-2: HYB-3L

PELVIS

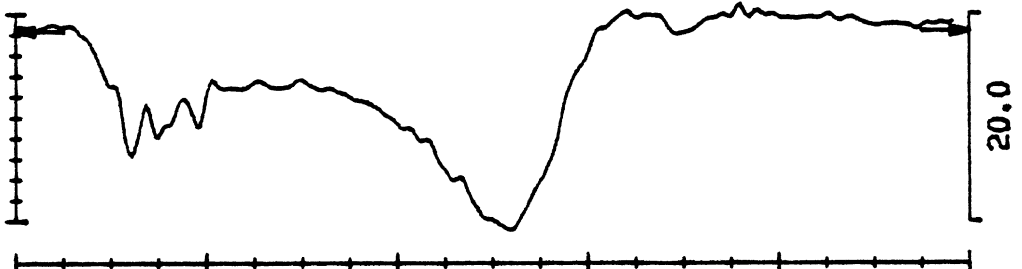
EXTERNAL



L-R
(G'S)

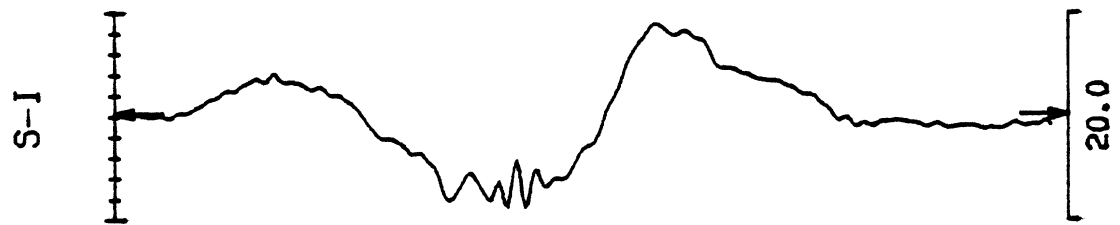


A-P

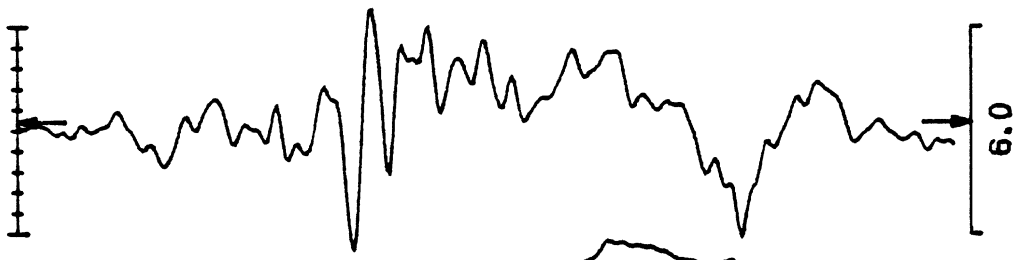


THORAX: (GSI= 74)

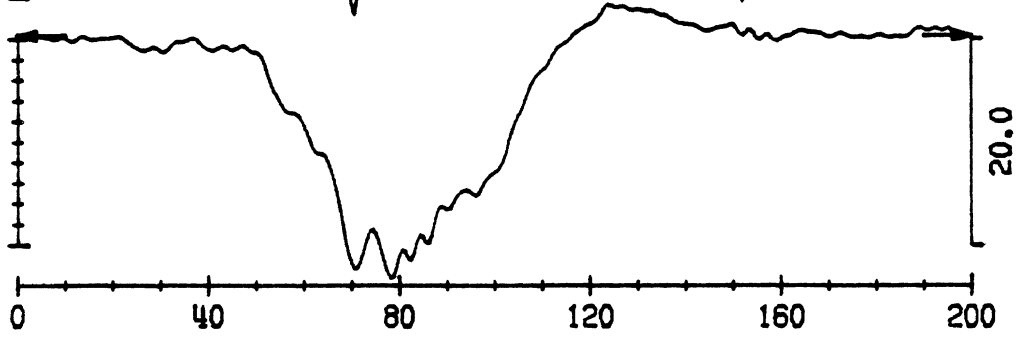
EXTERNAL



L-R
(G'S)



A-P

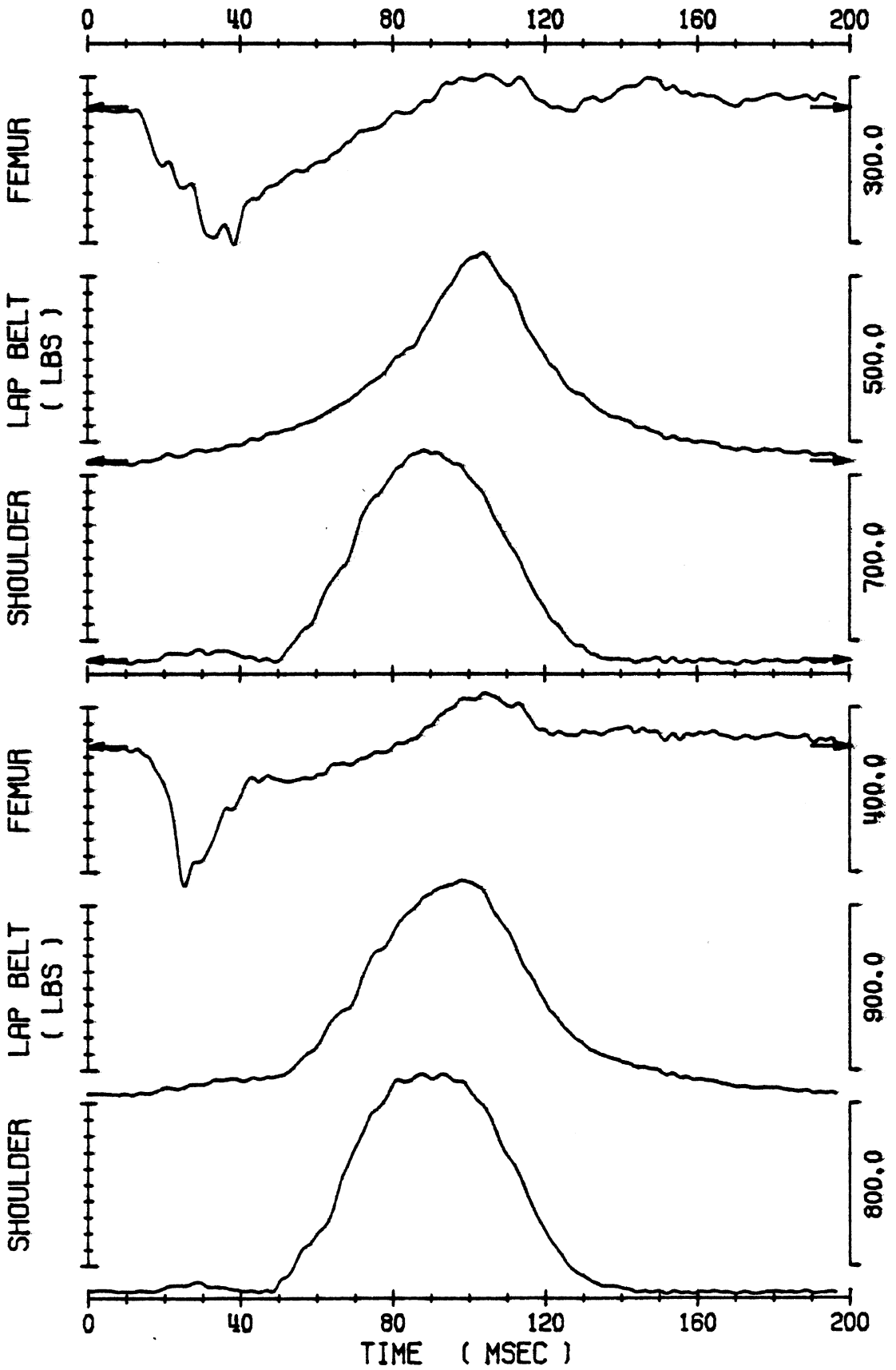


TIME (MSEC)

MEASURED ACCELERATIONS

RIGHT SIDE

LOWER



LEFT SIDE

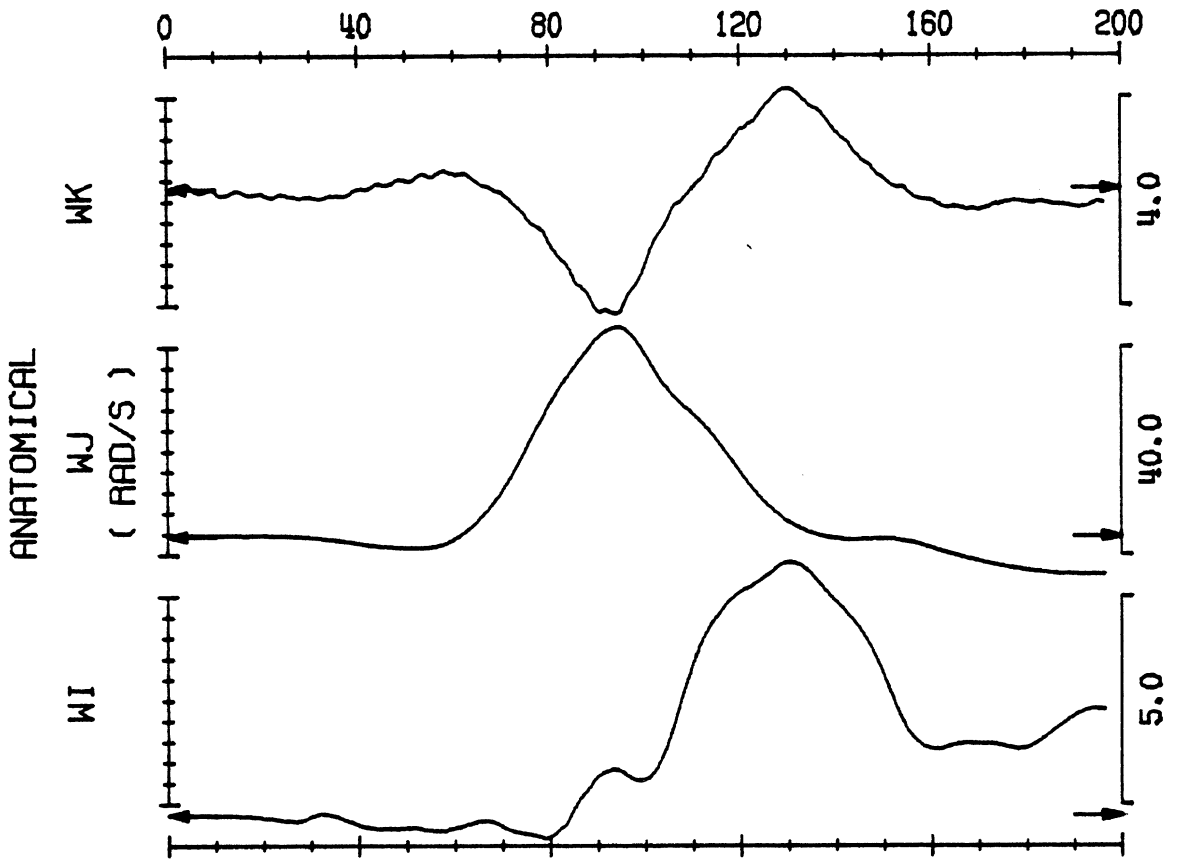
UPPER

MEASURED FORCES

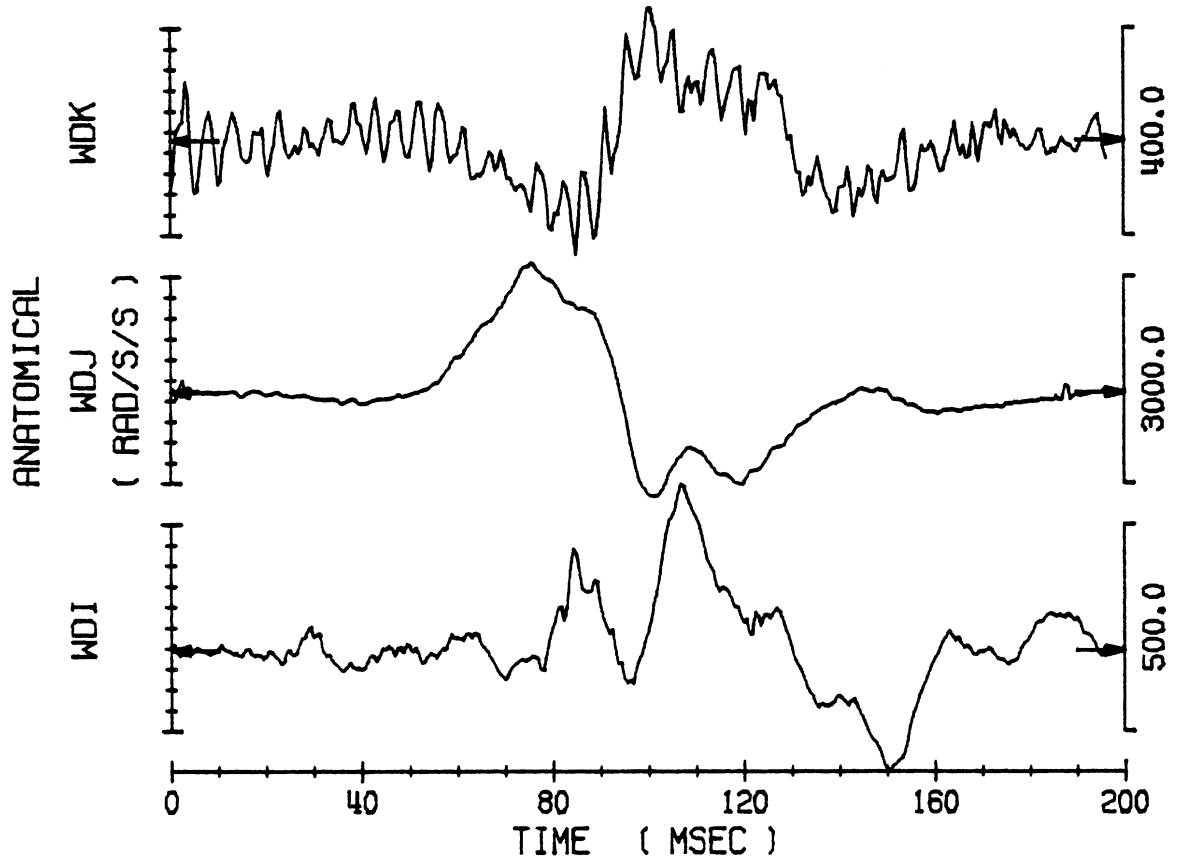
FILE: 46

77B103-1: HYB-3L

ANG VELOCITIES



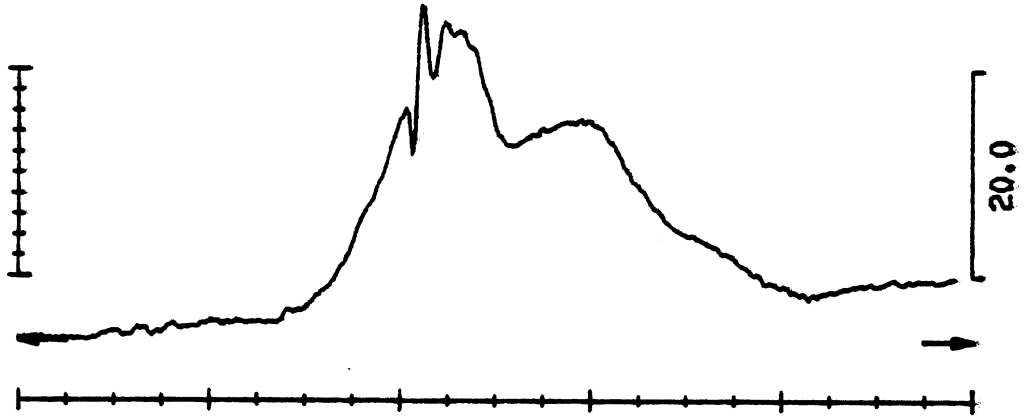
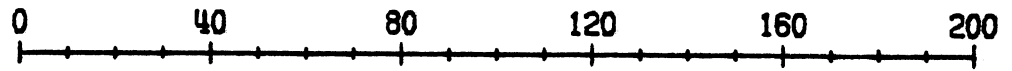
ANG ACCELERATIONS



3-D ANGULAR MOTION

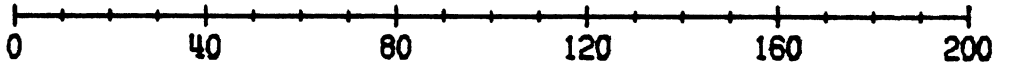
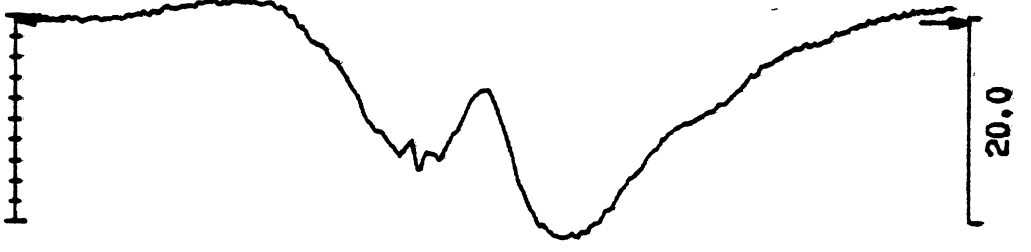
RESULTANT

GSI = 150
HIC = 126



INTERNAL HEAD TRIAX

READINGS
L-R
(G'S)



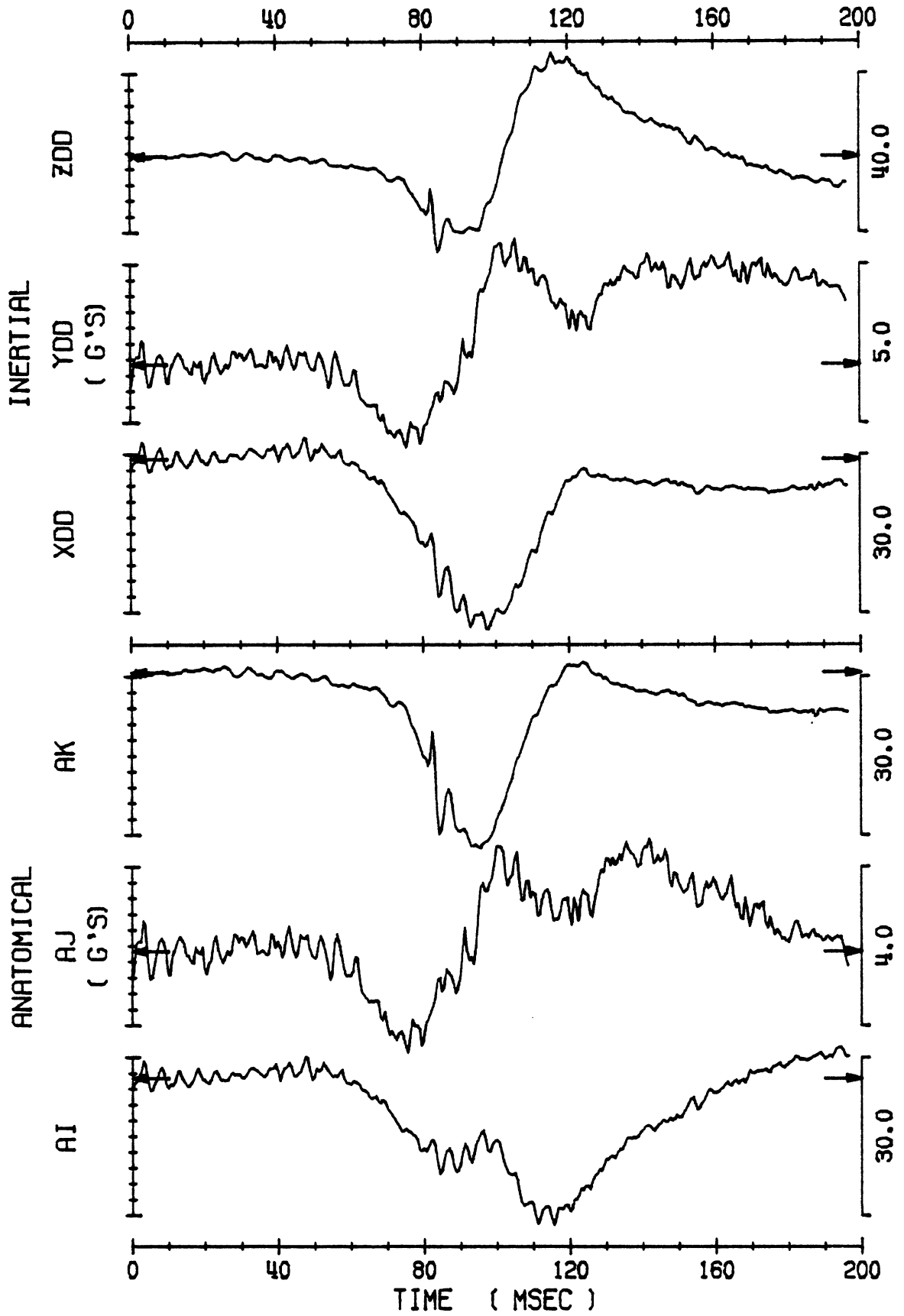
TIME (MSEC)

MEASURED ACCELERATIONS

ACC OF: HEAD C.G. GSI= 231, HIC= 193

FILE: 50

77B103-1: HYB-3L

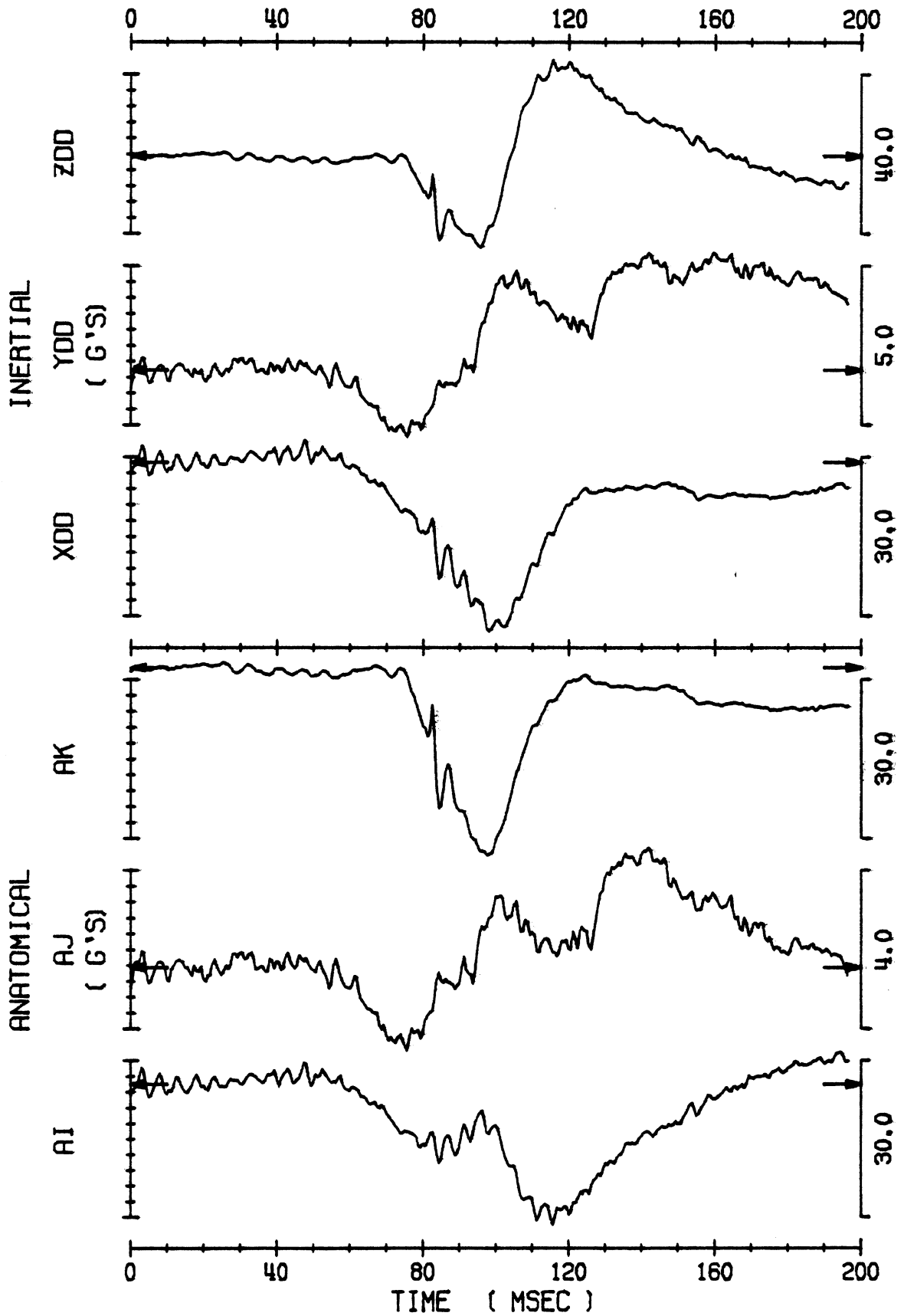


3-D ACCELERATIONS

ACC OF: A-P ACC CENTER GSI= 212, HIC= 174

FILE: 48

77B103-1: HYB-3L

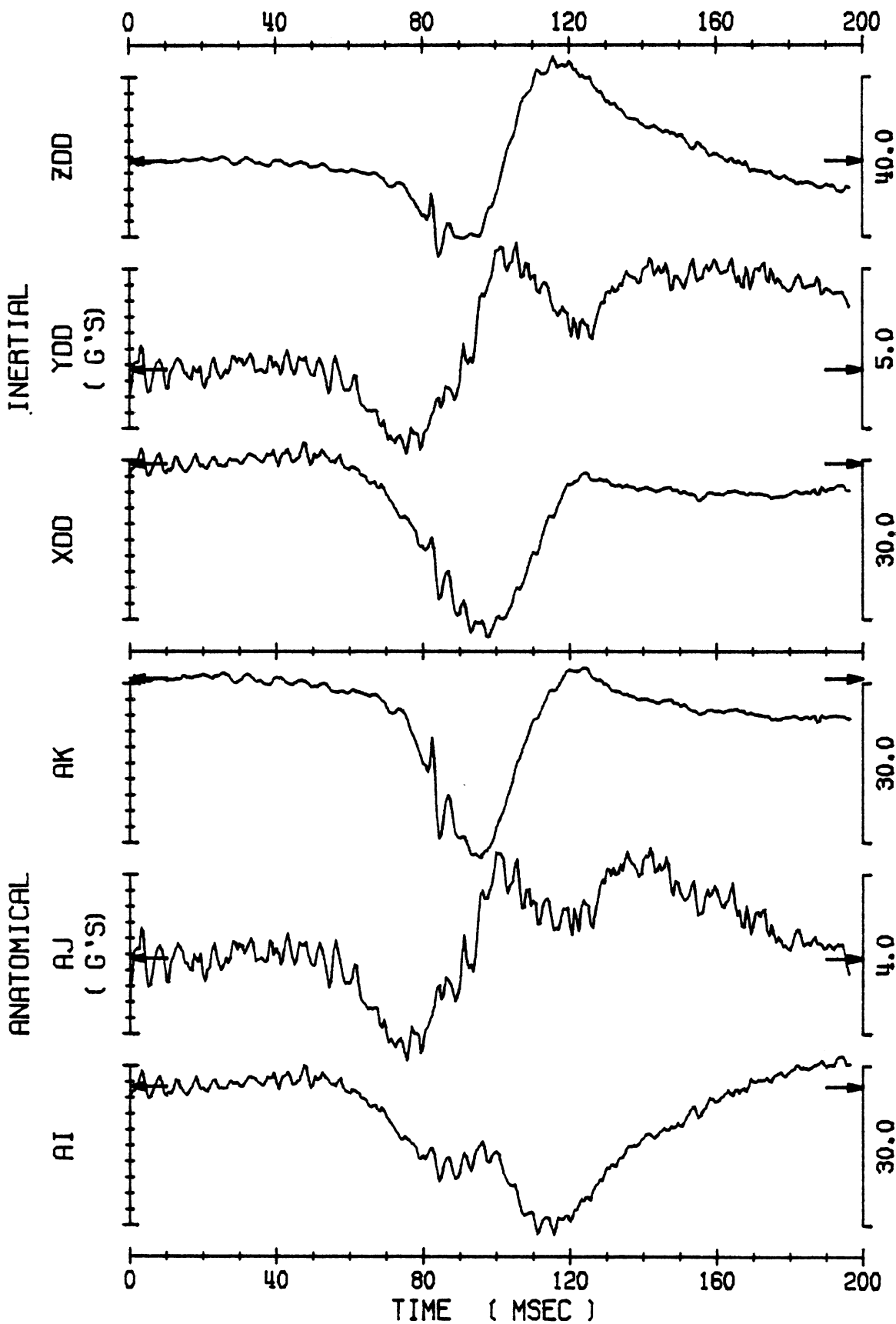


3-D ACCELERATIONS

ACC OF: L-R ACC CENTER GSI= 230, HIC= 192

FILE: 49

77B103-1: HYB-3L

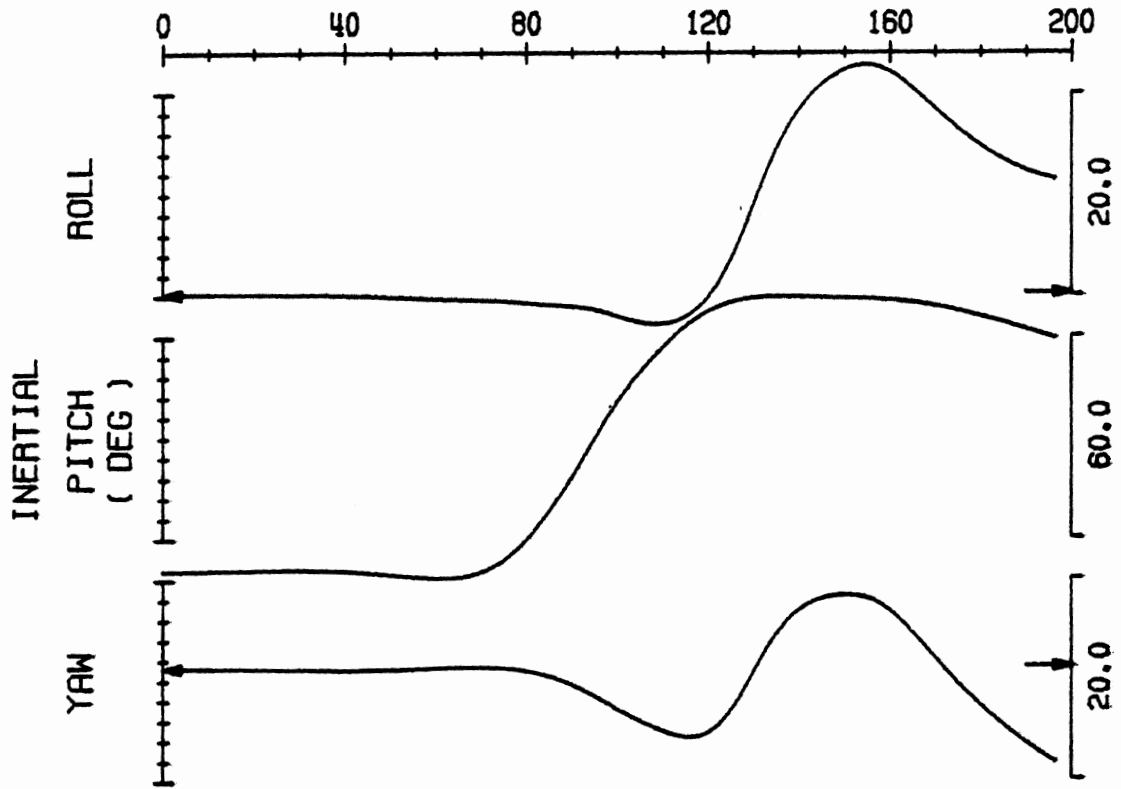


3-D ACCELERATIONS

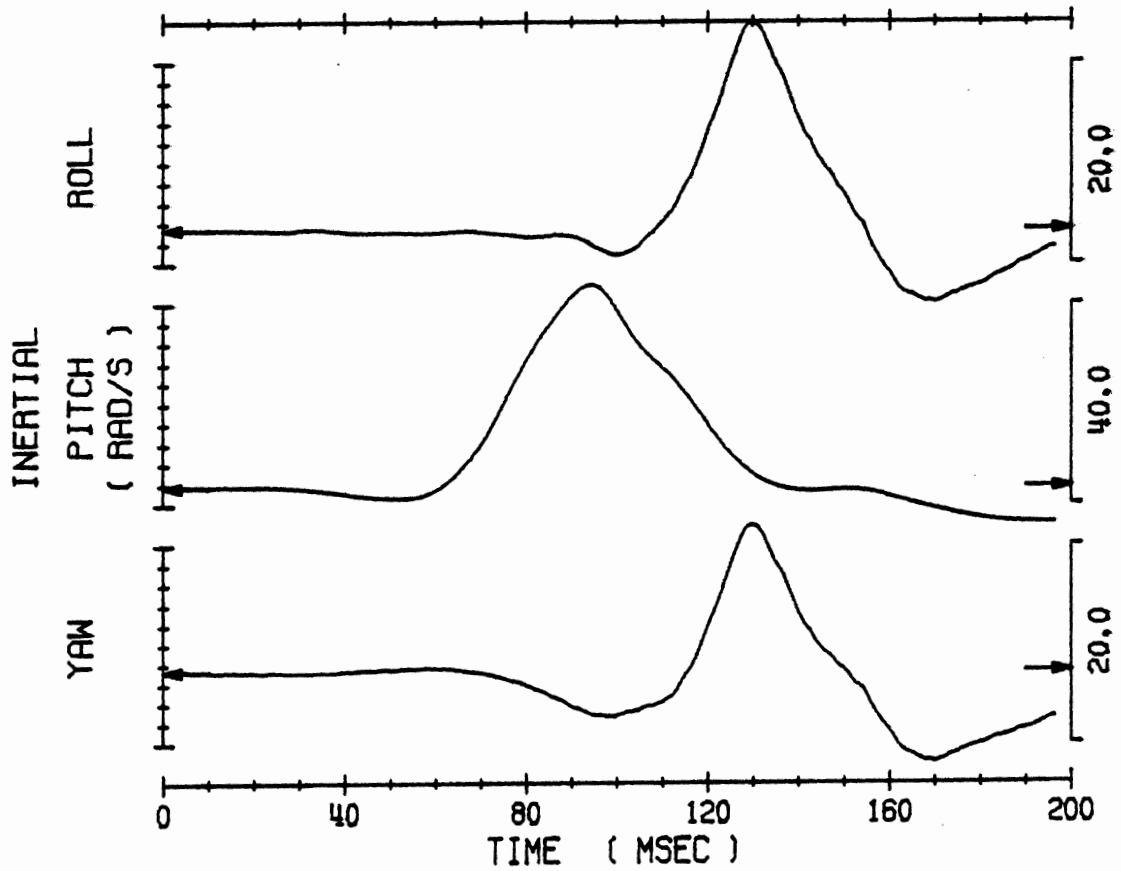
FILE: 47

77B103-1: HYB-3L

EULER ANGLES



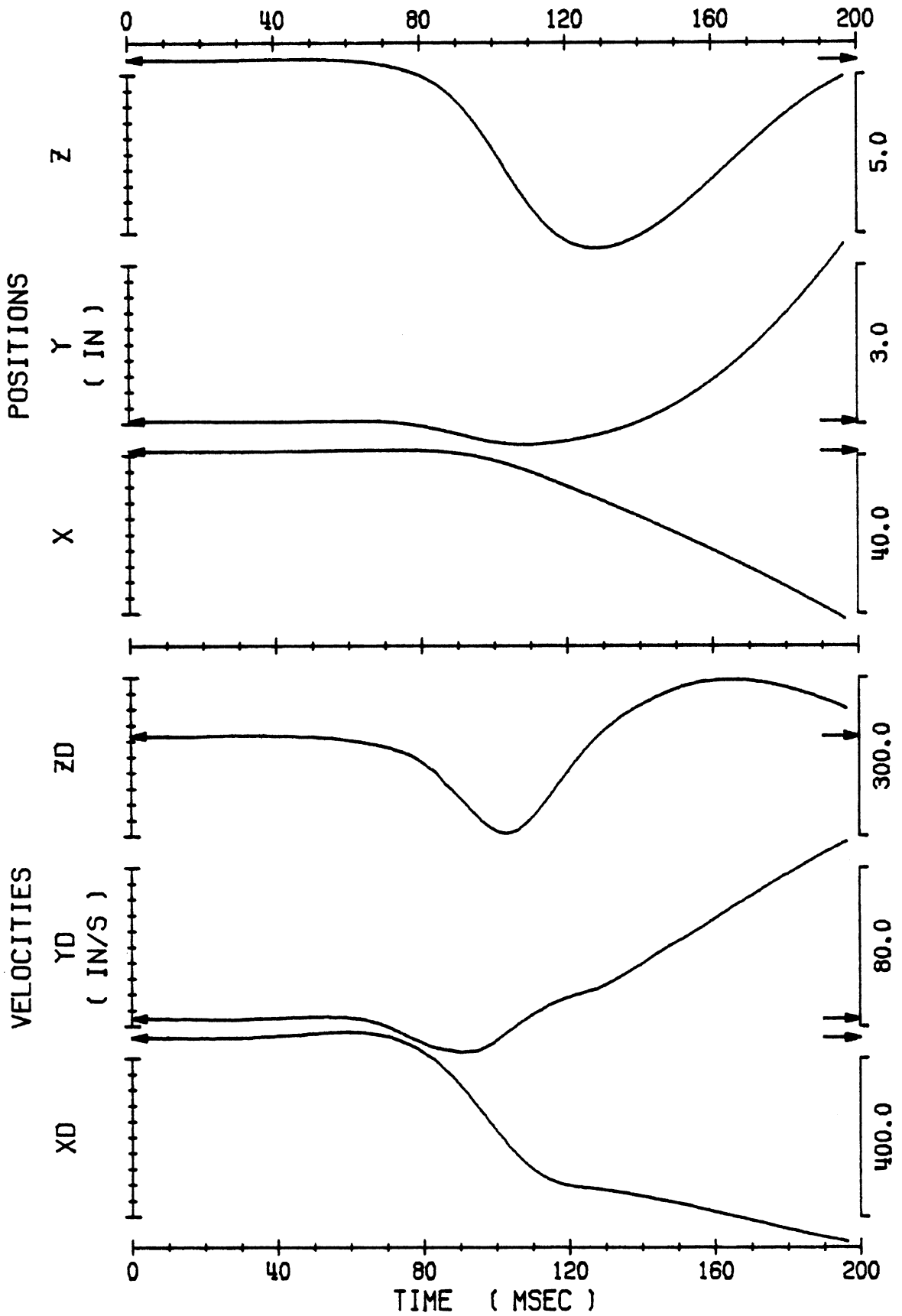
EULER RATES



3-D ROTATIONS

HEAD C.G.

INERTIAL MOTION OF:



3-D TRANSLATIONS

WHOLE BODY RESPONSE

SUMMARY

TEST NO.: 77B104

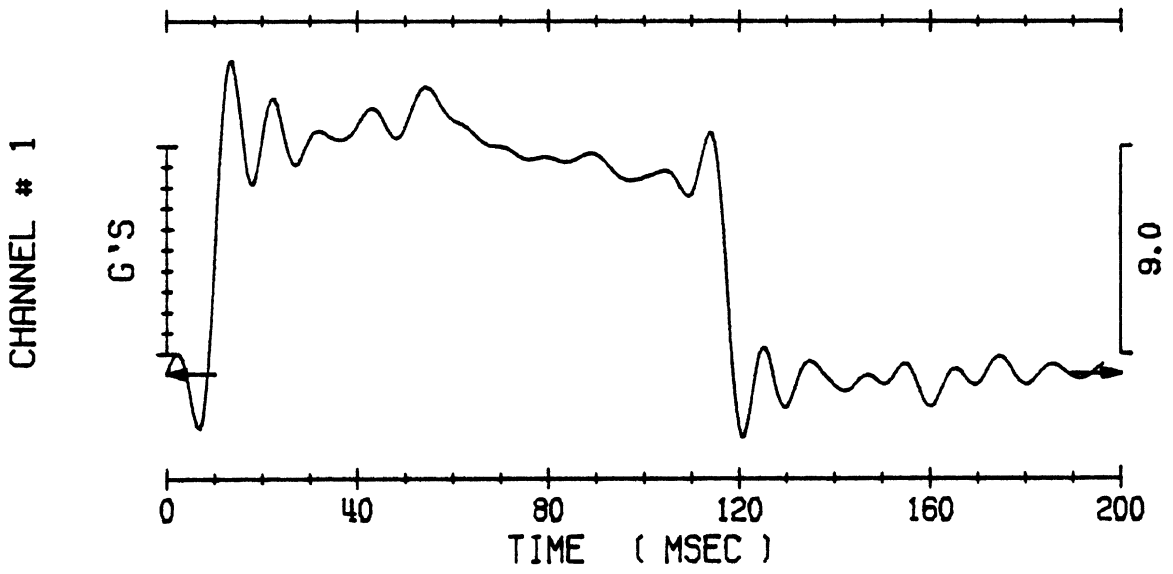
10.3 G-LEVEL
 110. MS LONG
 22.9 MPH DV
 (22.5 ACTUAL)

	SHOULDER BELT		LAP BELT		FEMURS	
	UPPER	LOWER	LEFT	RIGHT	LEFT	RIGHT
PEAK FORCES: (LBS) @ (MS)	1165. 72.7	962. 77.0	1342. 85.2	832. 92.7	-347. 17.7	-304. 21.4
NECK FORCES:	AP= 275. LBS @ 100. MS		SI= 295. LBS @ 78. MS		MOM= 1025. IN-LB @ 94. MS	

	RESULTANT PEAK	(A-P)		(L-R)		(S-I)	
		MIN	MAX	MIN	MAX	MIN	MAX
IN THORAX ACC: (G'S) @ (MS) GSI=	21. 67.1 67	0. 146.4	20. 66.4	-2. 75.5	1. 135.1	-12. 106.9	6. 75.3
DEFLECTION= 0.60 IN @ 83. MS							
IN PELVIS ACC: (G'S) @	23. 95.2	0. 122.4	20. 93.8	-3. 100.9	1. 62.9	-2. 136.4	14. 98.9
EX THORAX ACC: (G'S) @ GSI=	27. 63.9 98	-24. 65.4	0. 146.4	-1. 125.0	4. 74.6	-7. 73.9	16. 104.8
EX PELVIS ACC: (G'S) @	29. 95.8	-25. 93.7	-0. 146.4	0. 0.0	0. 0.0	-2. 141.9	13. 101.4
.....							
HEAD ANG ACC : (RAD/S/S) @	2191. 62.1	-268. 131.6	450. 92.6	-1851. 87.5	2114. 62.2	-70. 66.4	261. 86.1
HEAD ANG VEL : (RAD/S) @	42.8 80.8	0.0 34.4	8.3 121.9	-6.1 166.4	42.8 80.3	-1.1 77.2	3.3 148.8
EULER ANGLES : (DEGREES) @			56.7 144.5		78.5 119.2		75.2 147.0
.....							
HEAD C.G. ACC: (G'S) @	40. 81.5	-30. 100.4	2. 36.8	-2. 61.9	3. 87.4	-37. 81.2	1. 106.9
HEAD C.G. HIC=	266						
HEAD C.G. VEL: (IN/S) @	666. 187.8	-574. 146.4	9. 45.3	-10. 72.0	32. 146.4	-209. 88.8	117. 151.0
HEAD C.G. DIS: (IN) @			-14.8 116.4		0.5 146.4		-4.5 146.4

FILE: 66

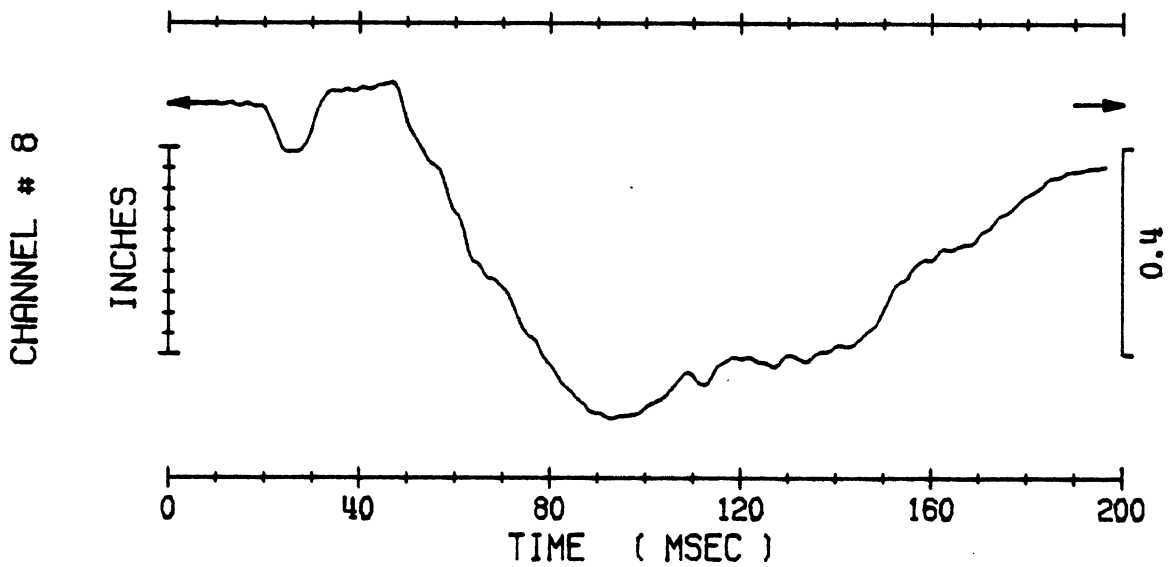
77B104-2: HYB-3M



SLED DECELERATION

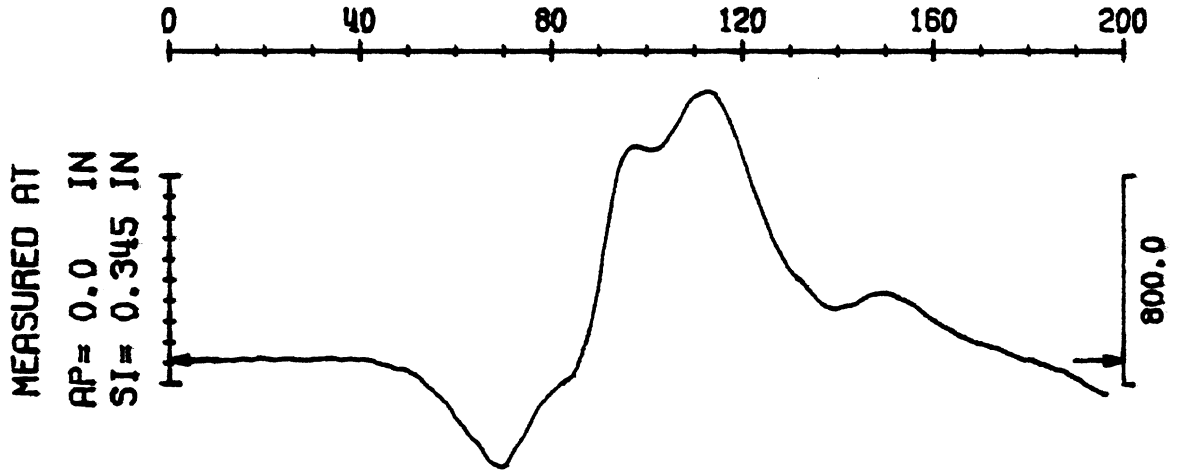
FILE: 71

77B104-3: HYB-3M

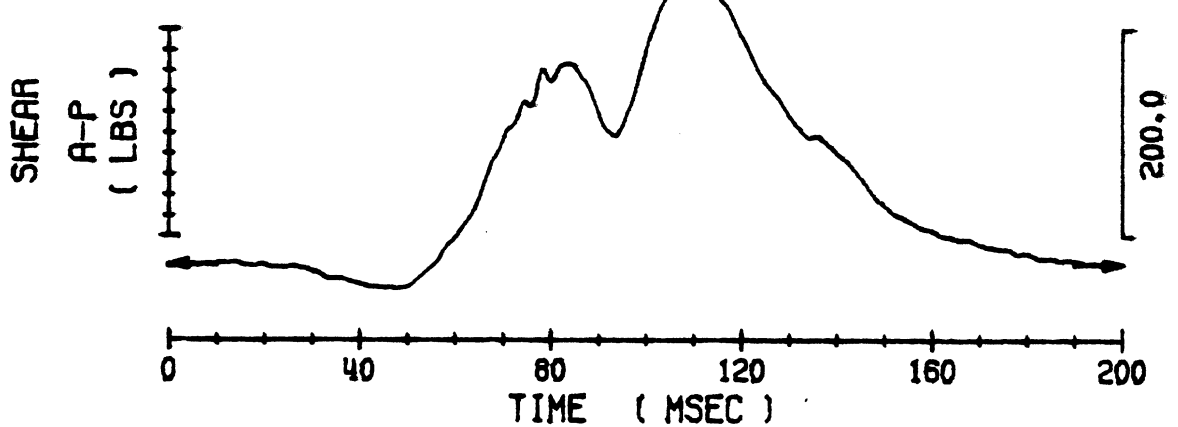
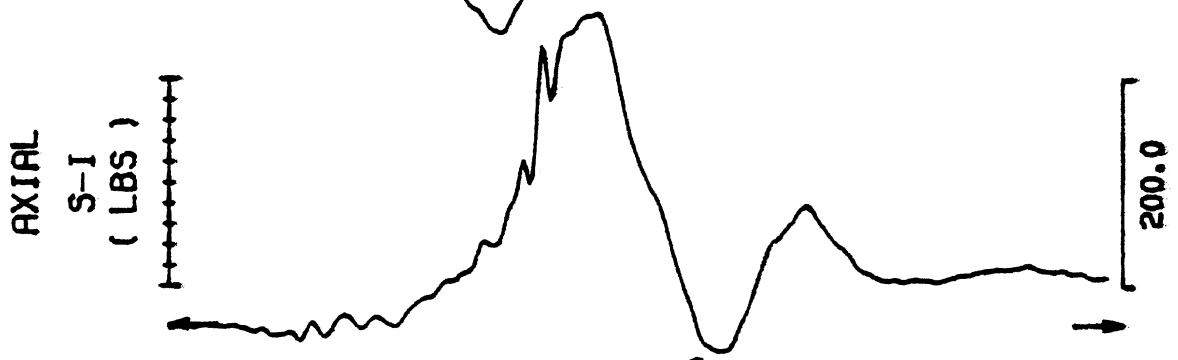
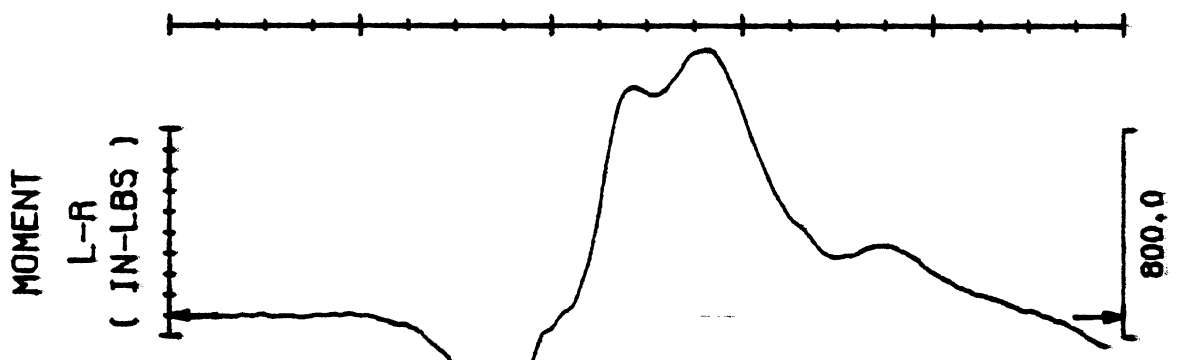


A-P CHEST DEFLECTION

MOMENT



NECK REACTIONS



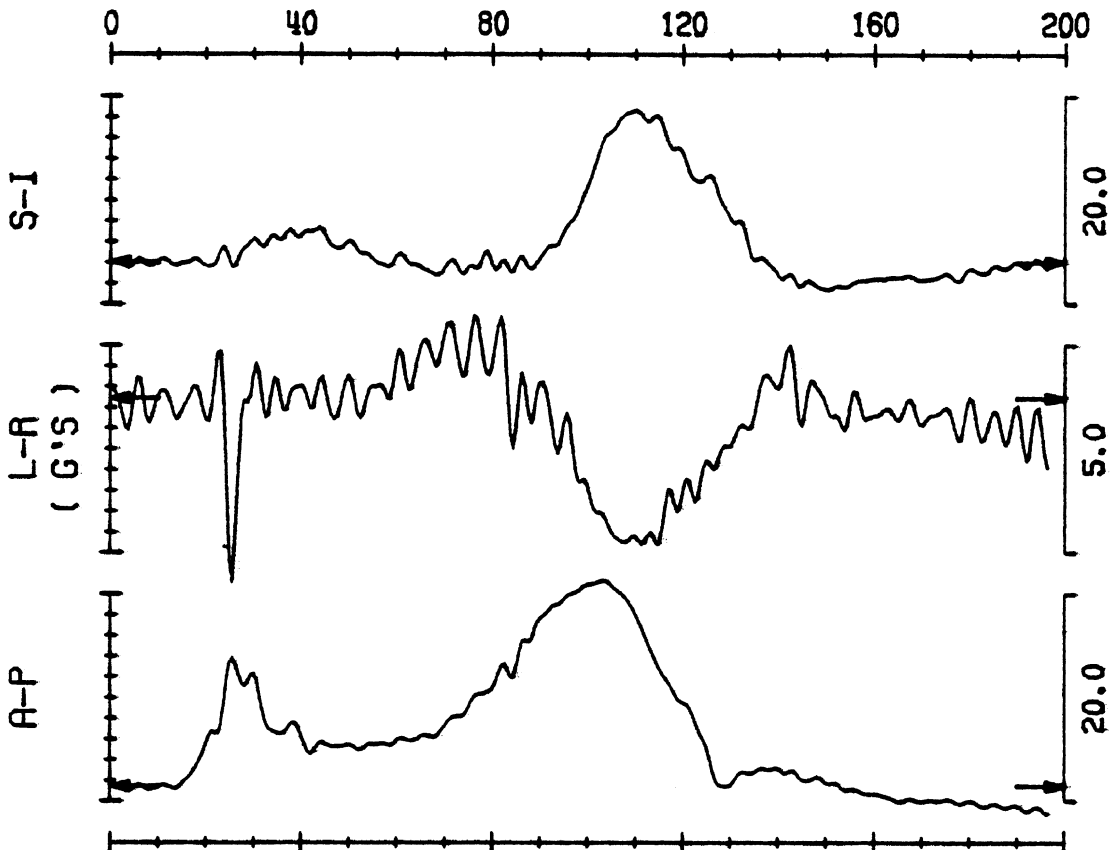
MEASURED FORCES

FILE: 72

77B104-1: HYB-3M

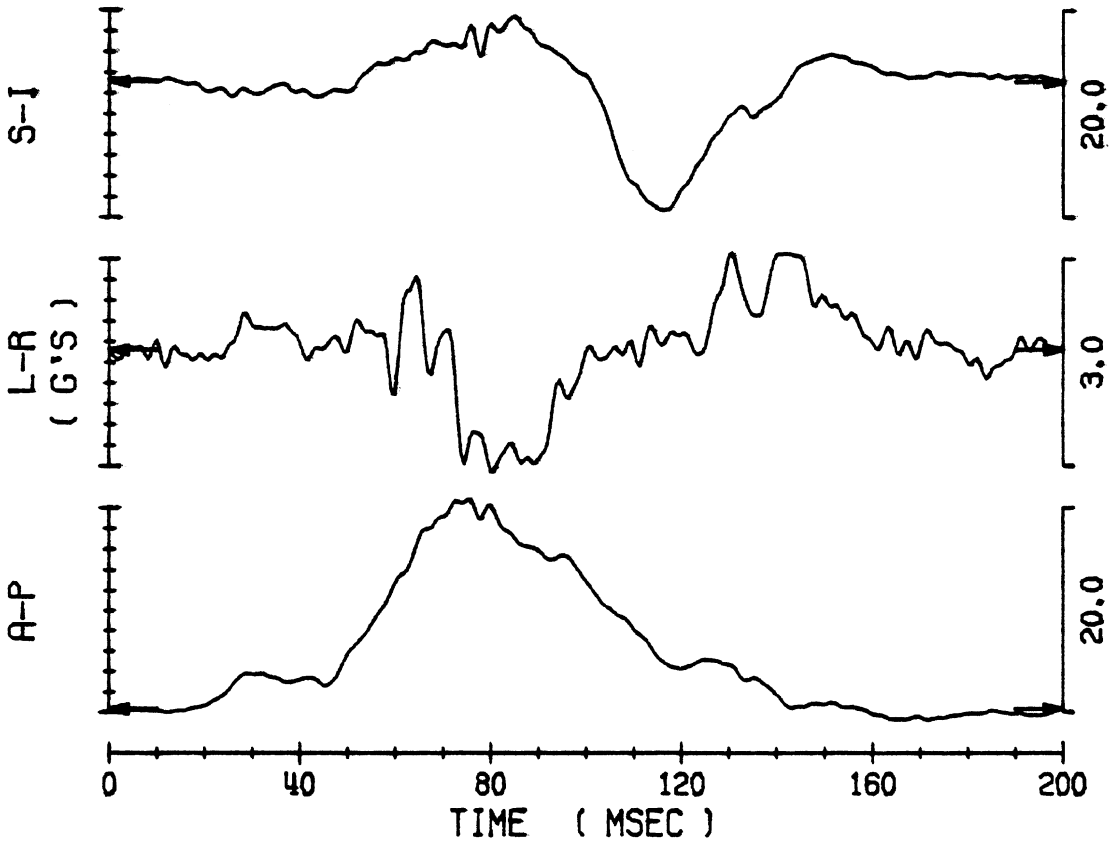
PELVIS

INTERNAL



THORAX: (GSI= 67)

INTERNAL



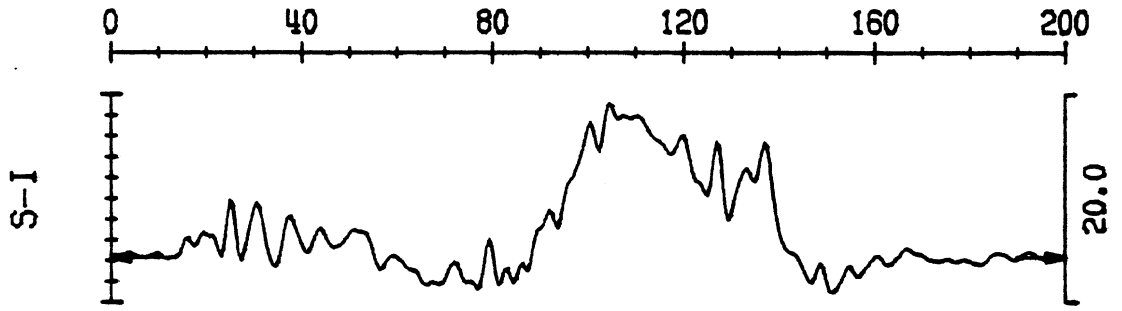
MEASURED ACCELERATIONS

FILE: 67

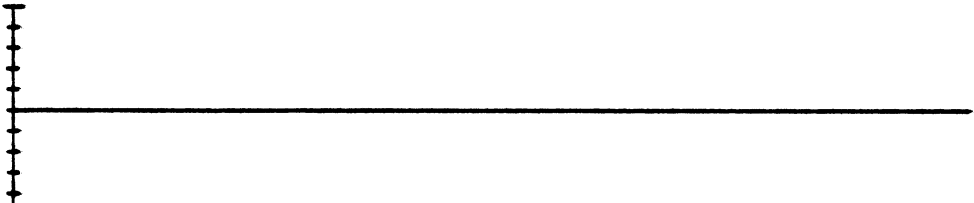
77B104-2: HYB-3M

PELVIS

EXTERNAL



L-R
(G'S)



A-P



THORAX: (GSI= 98)

EXTERNAL



L-R
(G'S)



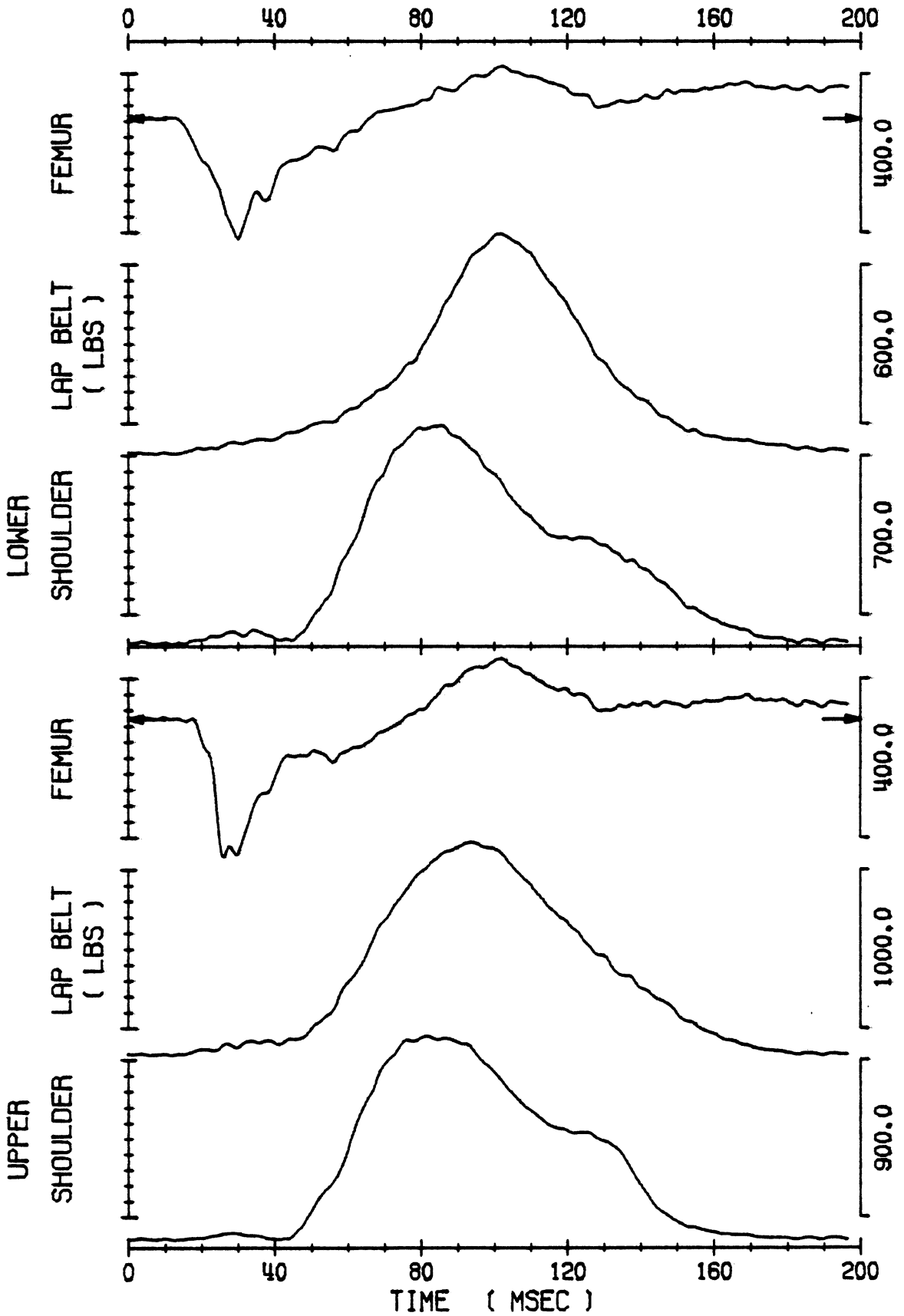
A-P



0 40 80 120 160 200
TIME (MSEC)

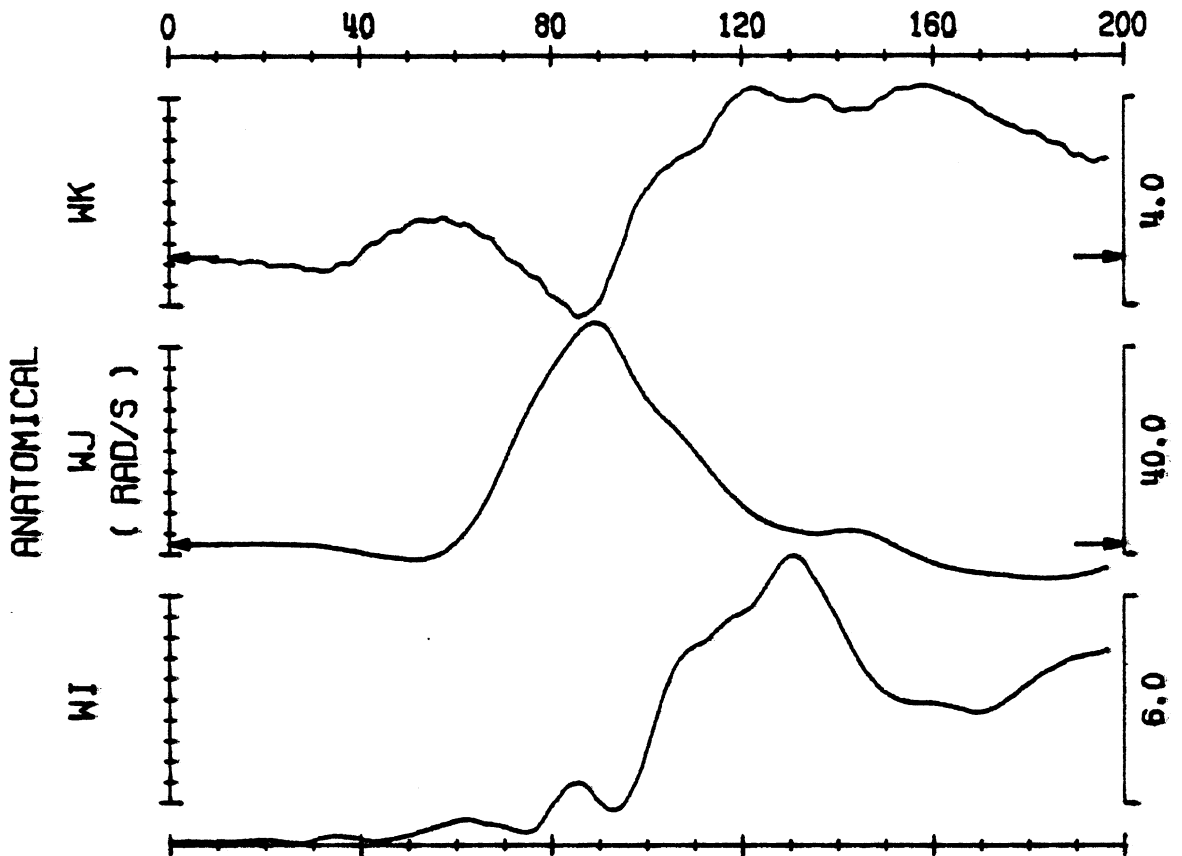
MEASURED ACCELERATIONS

RIGHT SIDE

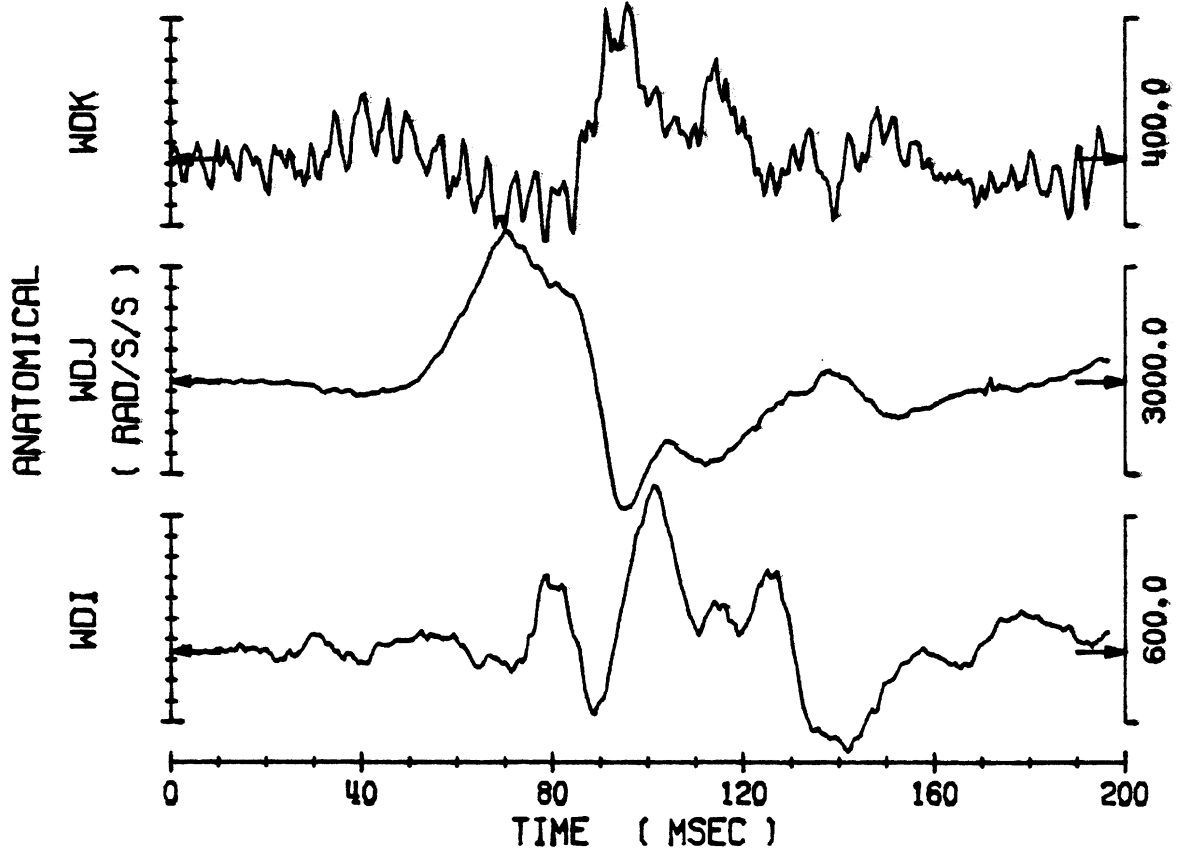


MEASURED FORCES

ANG VELOCITIES



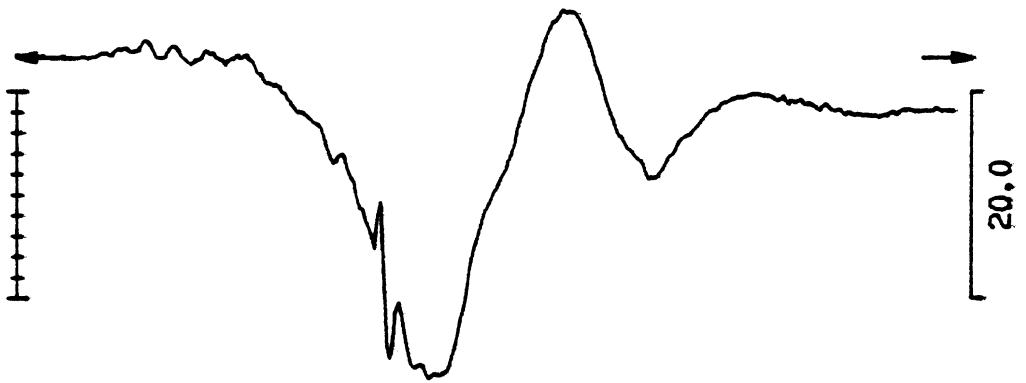
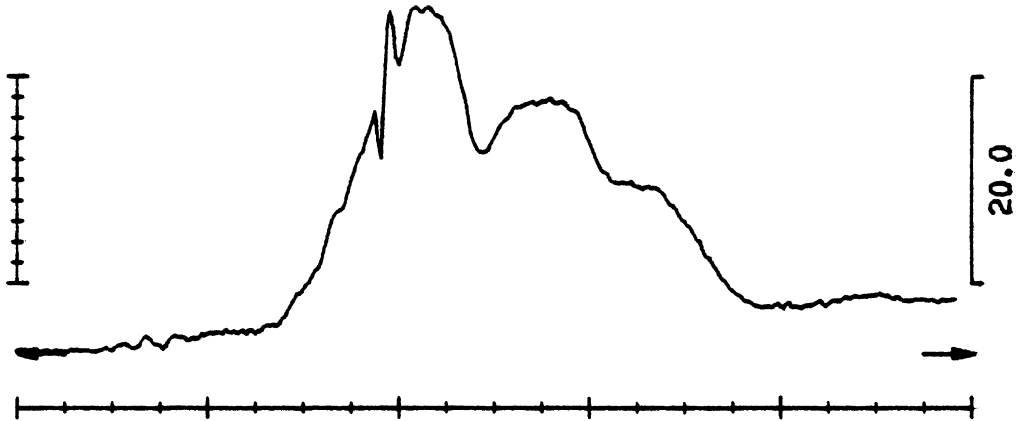
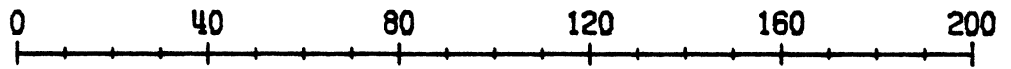
ANG ACCELERATIONS



3-D ANGULAR MOTION

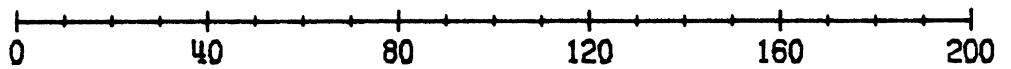
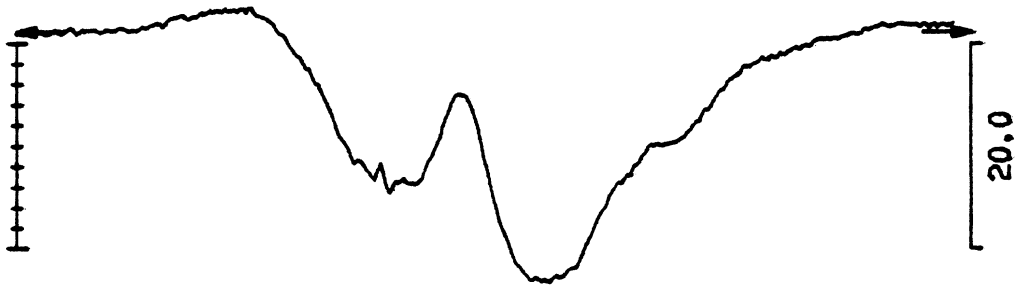
RESULTANT

GSI = 203
HIC = 172



INTERNAL HEAD TRIAX

READINGS
L-R
(G'S)



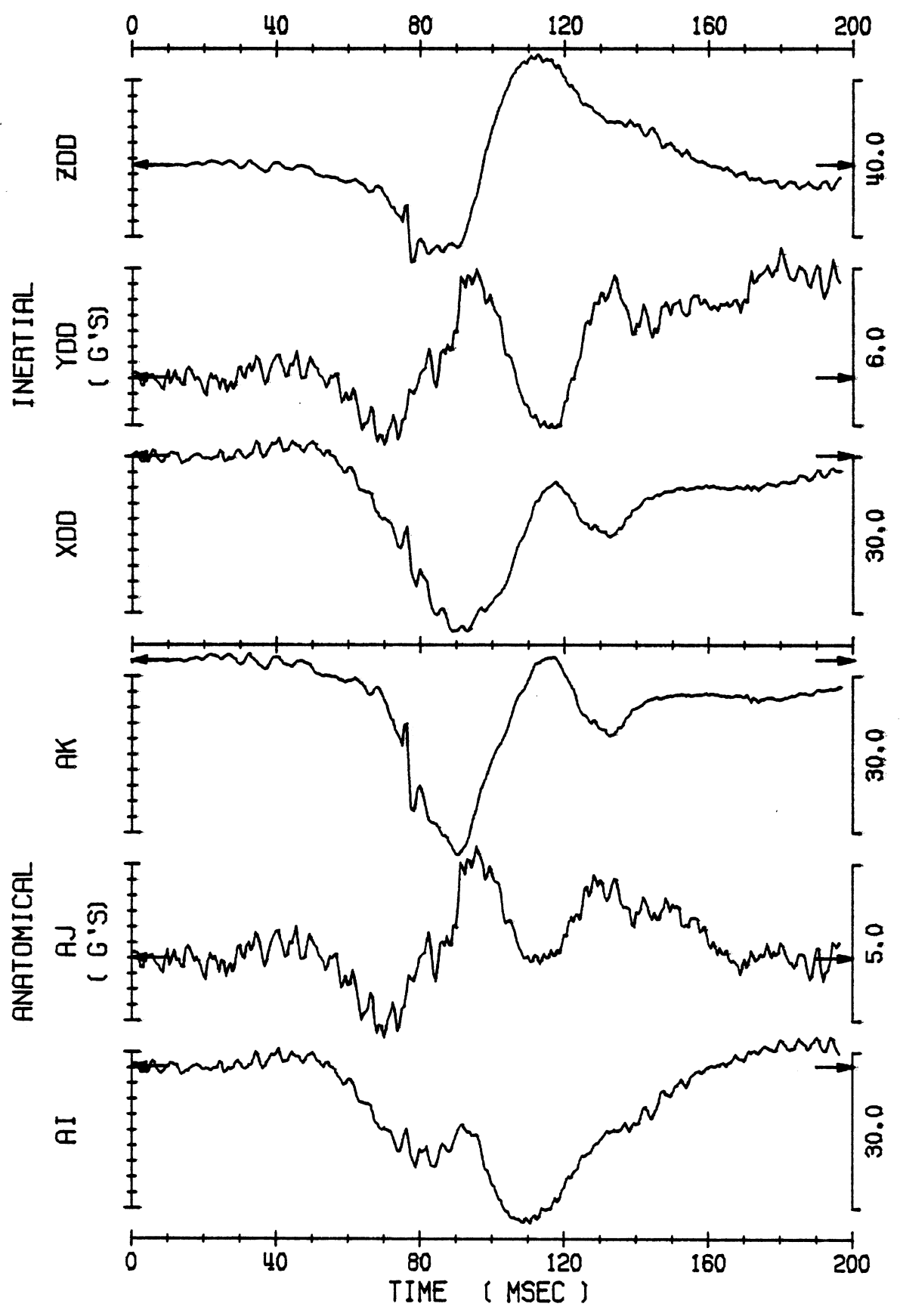
TIME (MSEC)

MEASURED ACCELERATIONS

ACC OF: HEAD C.G. GSI= 314, HIC= 266

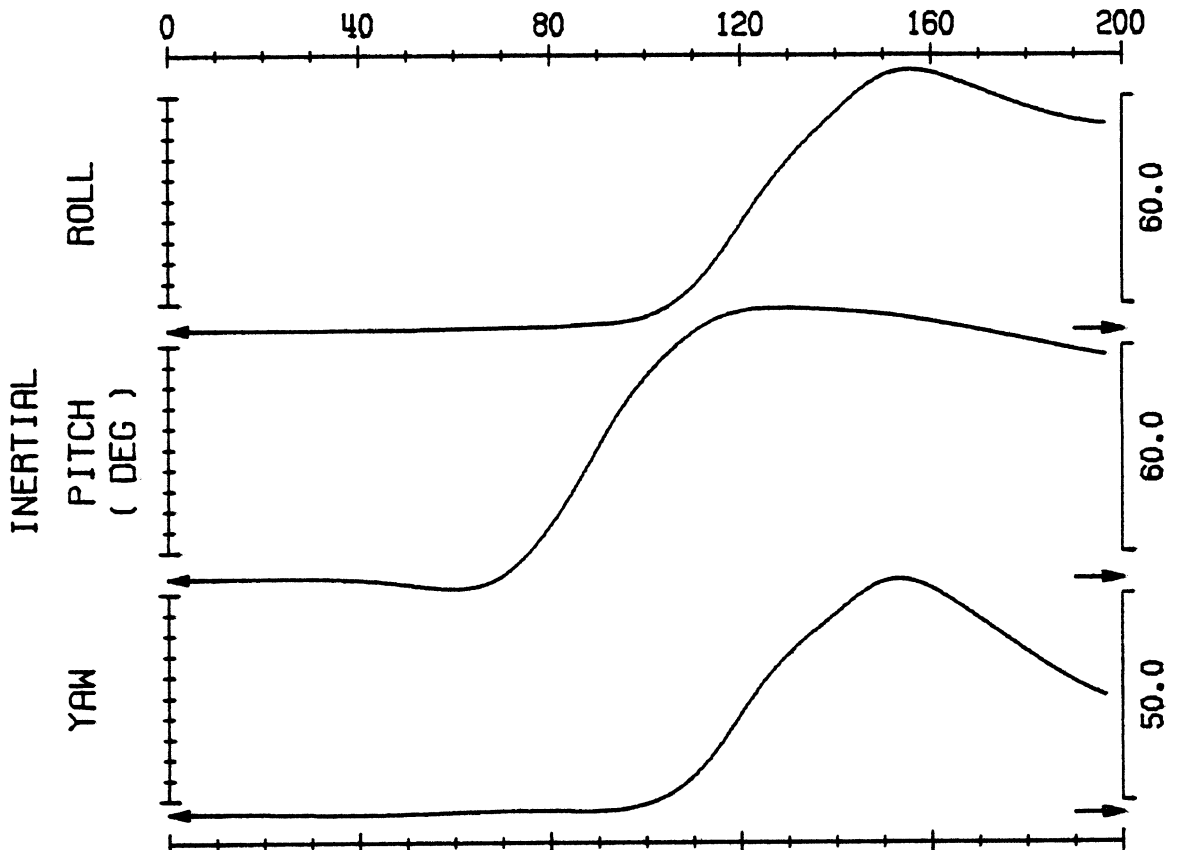
FILE: 64

77B104-1: HYB-3M

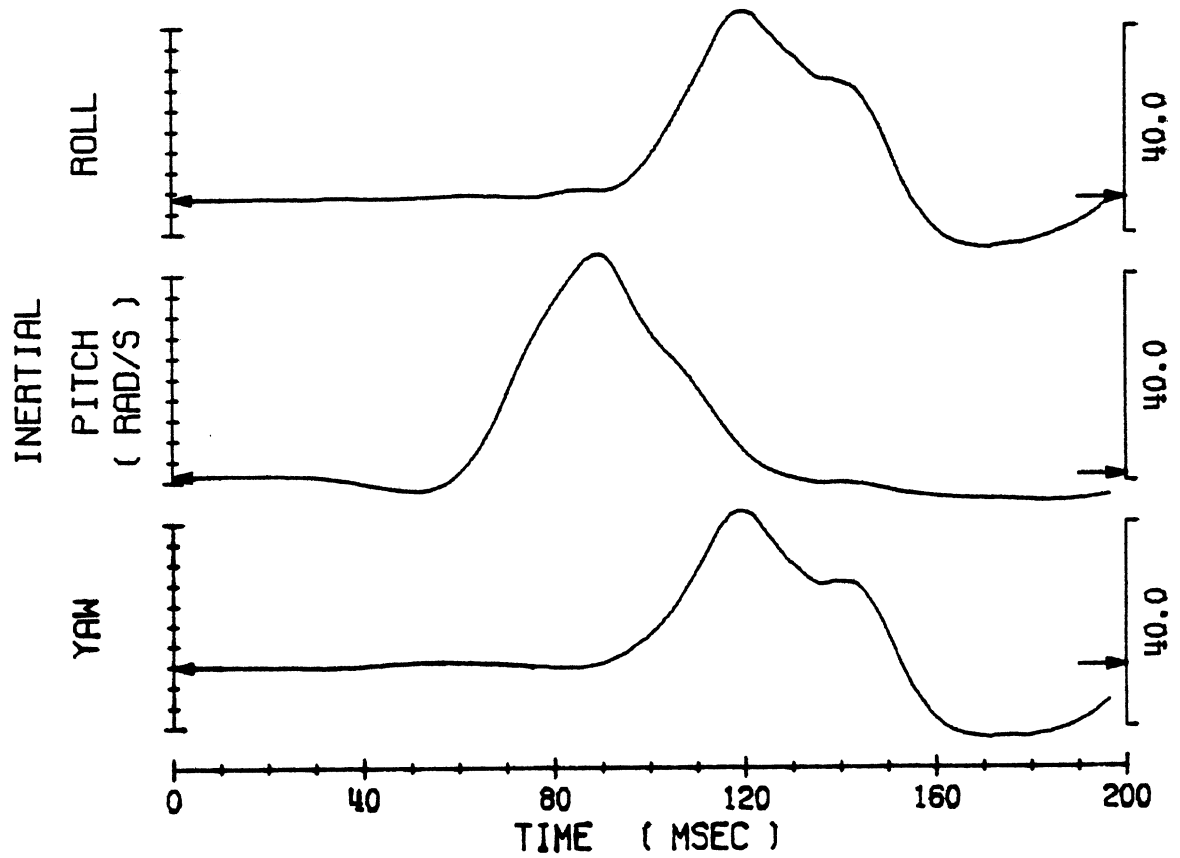


3-D ACCELERATIONS

EULER ANGLES



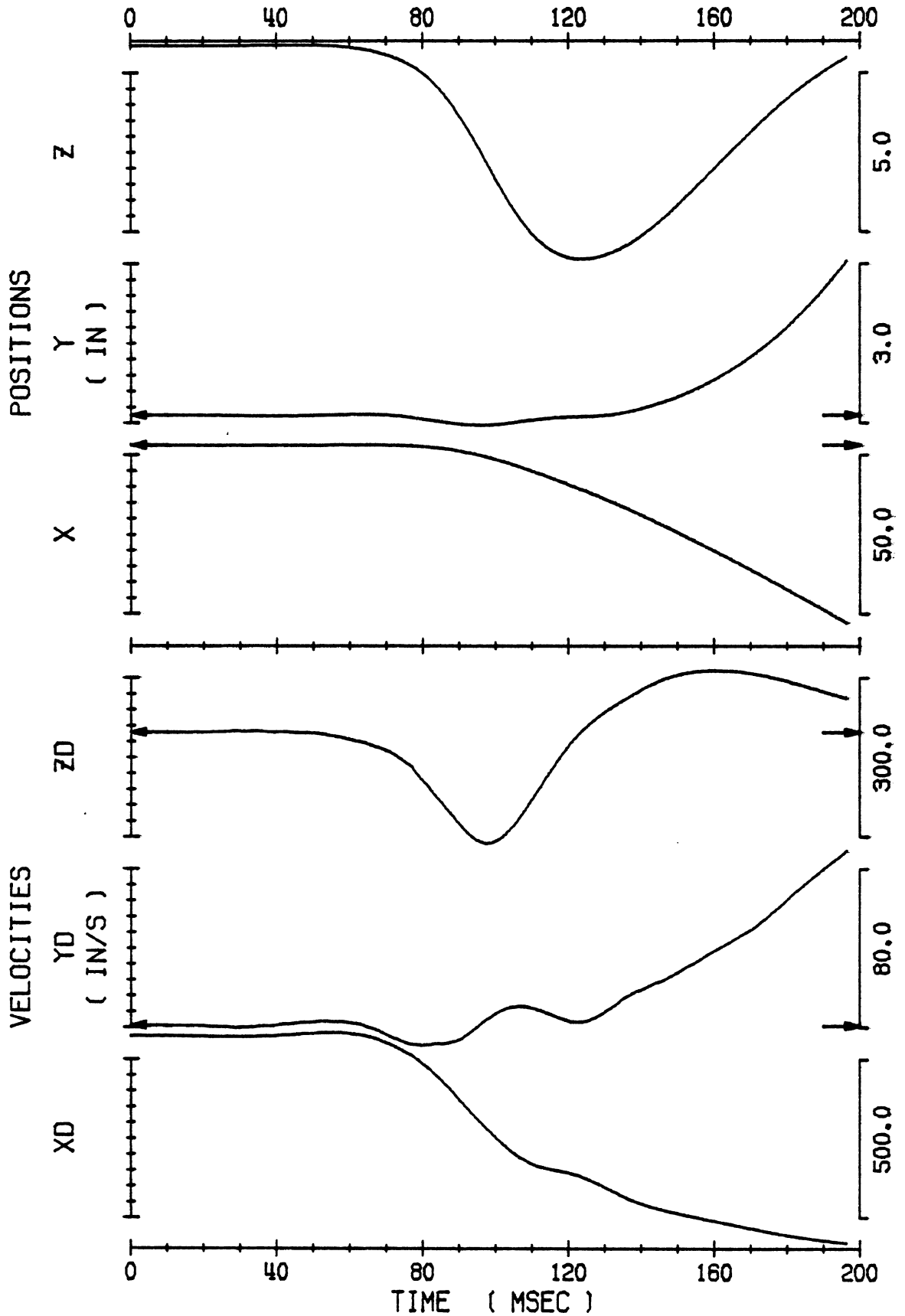
EULER RATES



3-D ROTATIONS

HEAD C.G.

INERTIAL MOTION OF:



3-D TRANSLATIONS

WHOLE BODY RESPONSE

SUMMARY

TEST NO.: 77B105

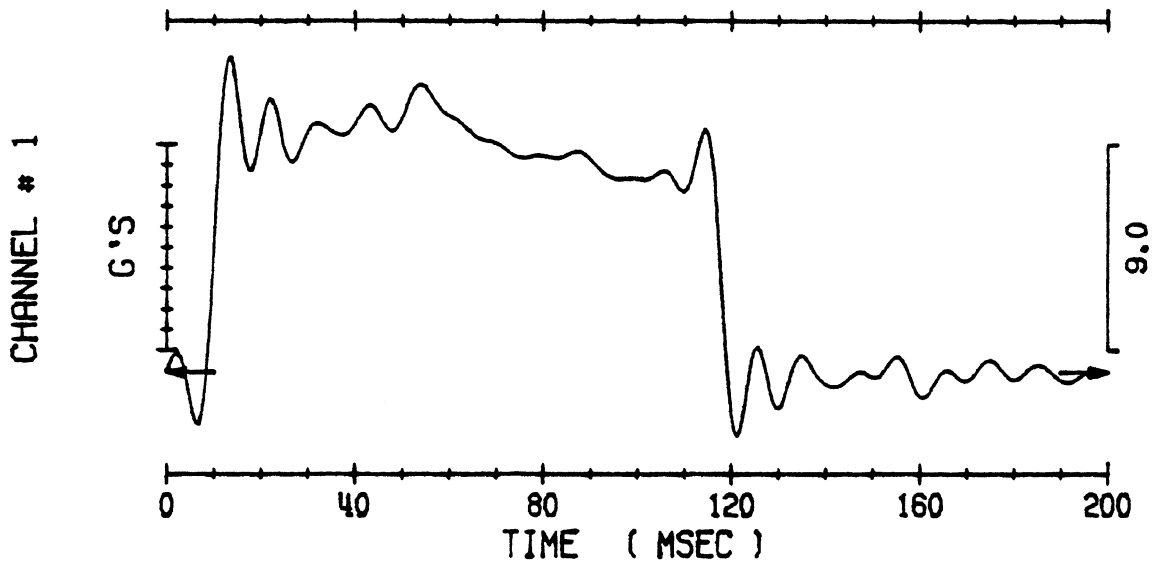
10.5 G-LEVEL
 111. MS LONG
 23.5 MPH DV
 (22.6 ACTUAL)

	SHOULDER BELT		LAP BELT		FEMURS	
	UPPER	LOWER	LEFT	RIGHT	LEFT	RIGHT
PEAK FORCES: (LBS) @ (MS)	1216. 73.5	986. 77.2	1412. 87.2	942. 92.9	-366. 17.8	-337. 20.9
NECK FORCES:	AP= 270. LBS @ 100. MS		SI= 310. LBS @ 79. MS		MOM= 960. IN-LB @ 85. MS	

	RESULTANT PEAK	(A-P)		(L-R)		(S-I)	
		MIN	MAX	MIN	MAX	MIN	MAX
IN THORAX ACC: (G'S) @ (MS) GSI=	22. 71.6 70	1. 141.6	20. 66.5	-2. 70.6	1. 138.8	-12. 107.6	5. 79.1
DEFLECTION= 0.65 IN @ 83. MS							
IN PELVIS ACC: (G'S) @	25. 96.6	-0. 146.5	21. 93.3	-4. 97.0	1. 64.9	-2. 146.5	16. 101.4
EX THORAX ACC: (G'S) @ GSI=	27. 67.2 101	-23. 71.5	-1. 108.5	-2. 97.5	3. 121.5	-7. 74.0	17. 105.1
EX PELVIS ACC: (G'S) @	30. 94.7	-26. 93.7	-1. 122.1	0. 0.0	0. 0.0	-2. 65.1	14. 99.0
.....							
HEAD ANG ACC : (RAD/S/S) @	2020. 62.2	-386. 137.4	355. 93.9	-1874. 88.5	1927. 62.8	-145. 68.1	284. 98.4
HEAD ANG VEL : (RAD/S) @	42.8 81.6	1.3 146.6	7.4 115.7	3.9 124.1	42.7 81.5	-2.5 80.2	3.7 118.7
EULER ANGLES : (DEGREES) @			72.4 150.6		78.9 151.5		91.1 151.6
.....							
HEAD C.G. ACC: (G'S) @	40. 80.4	-28. 102.6	2. 32.8	-3. 62.6	3. 88.7	-36. 82.3	1. 108.9
HEAD C.G. HIC=	253						
HEAD C.G. VEL: (IN/S) @	658. 187.9	-552. 146.5	2. 56.5	-20. 77.6	49. 146.5	-197. 89.9	135. 158.9
HEAD C.G. DIS: (IN) @			-29.1 146.5		0.6 146.5		-6.1 115.1

FILE: 80

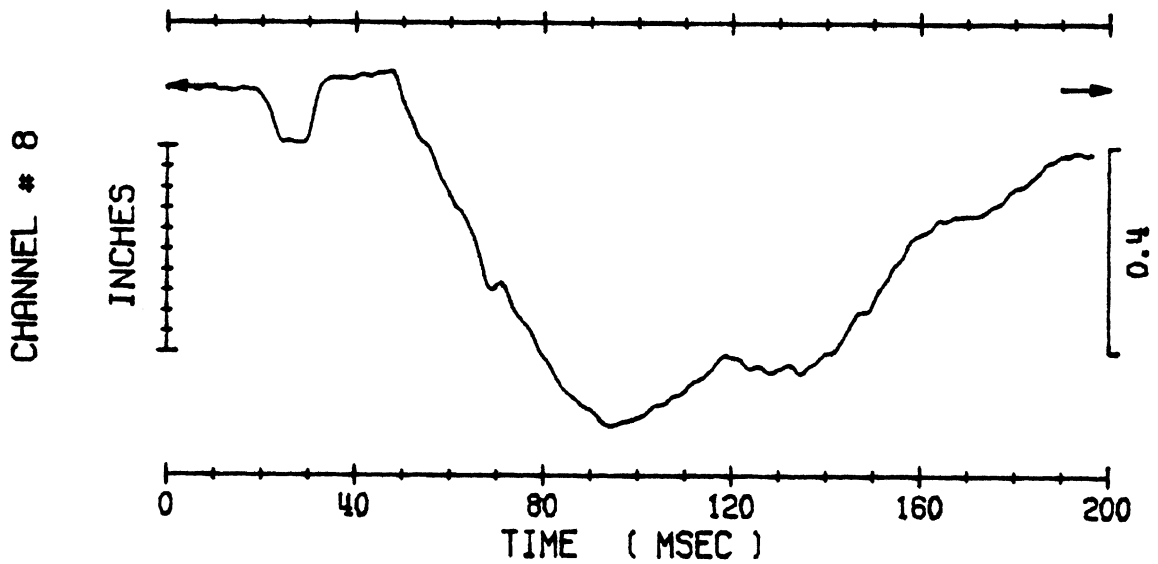
77B105-2: HYB-3M



SLED DECELERATION

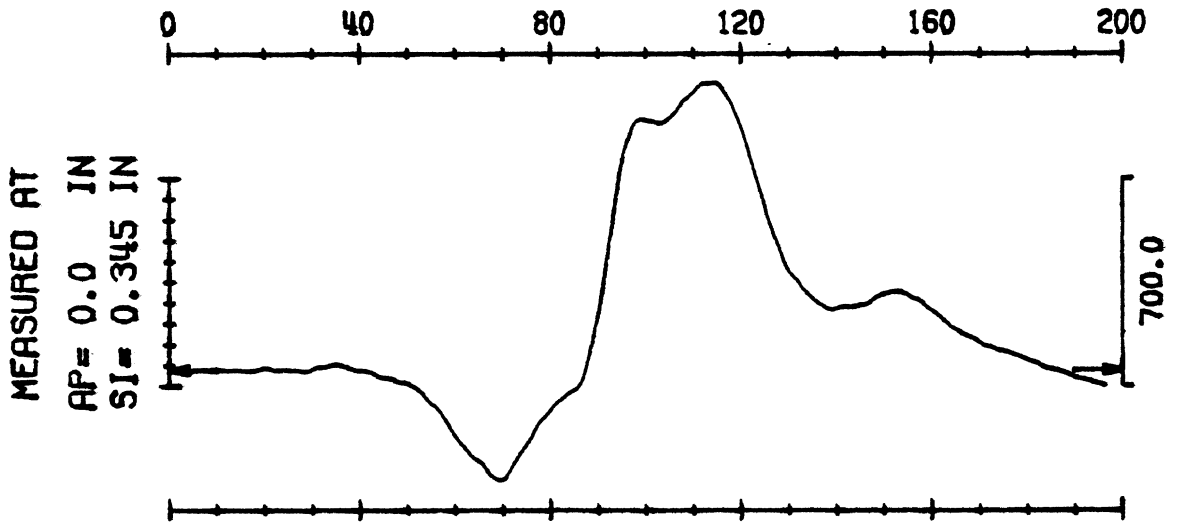
FILE: 85

77B105-3: HYB-3M

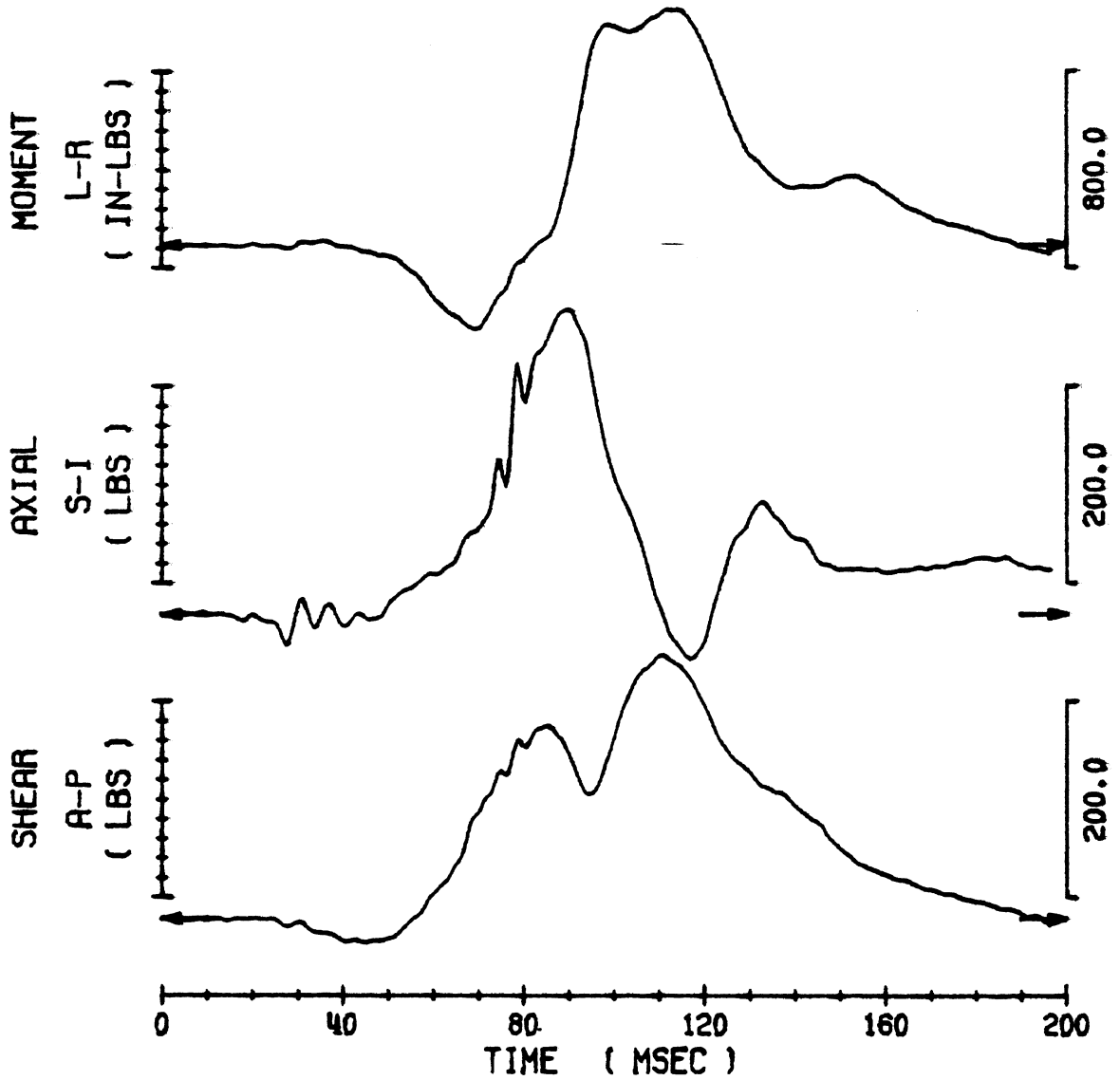


A-P CHEST DEFLECTION

MOMENT



NECK REACTIONS



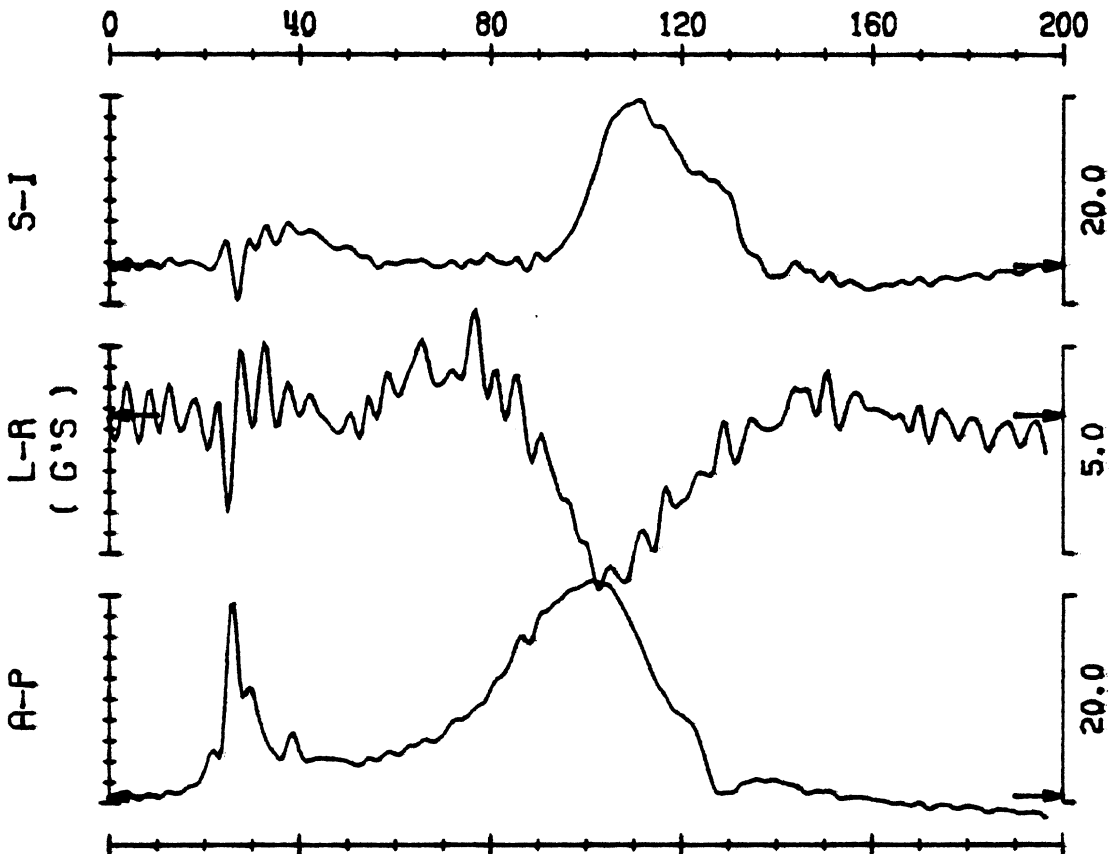
MEASURED FORCES

FILE: 86

77B105-1: HYB-3M

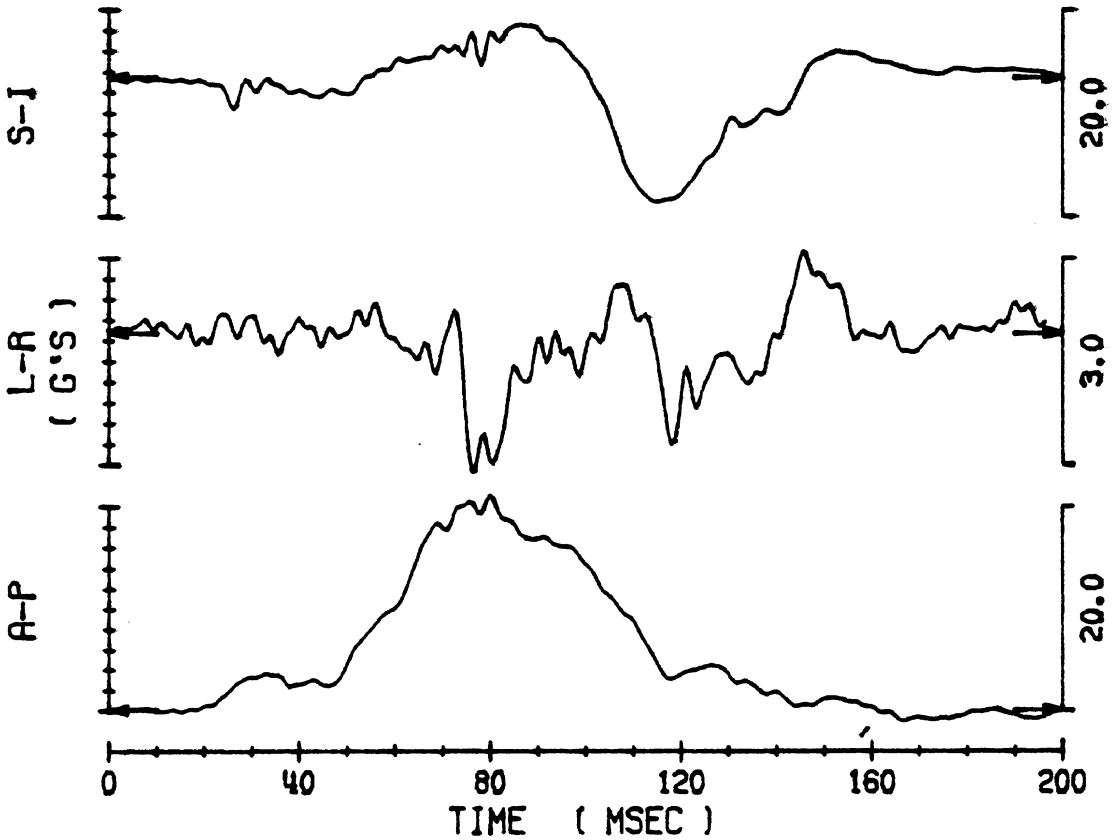
PELVIS

INTERNAL



THORAX: (GSI= 70)

INTERNAL



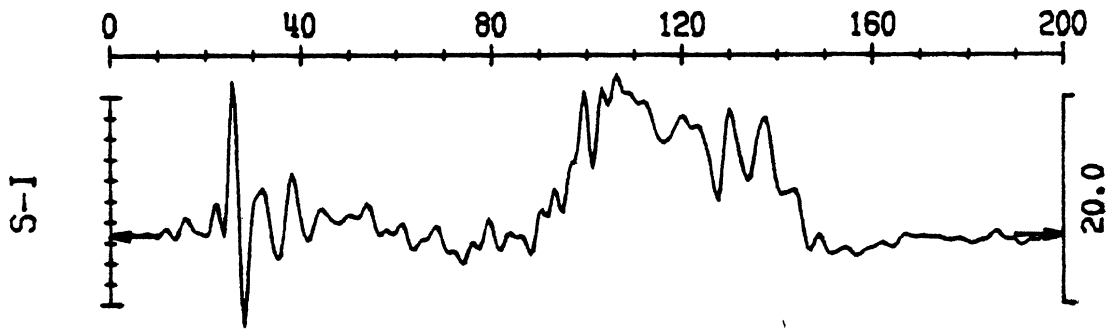
MEASURED ACCELERATIONS

FILE: 81

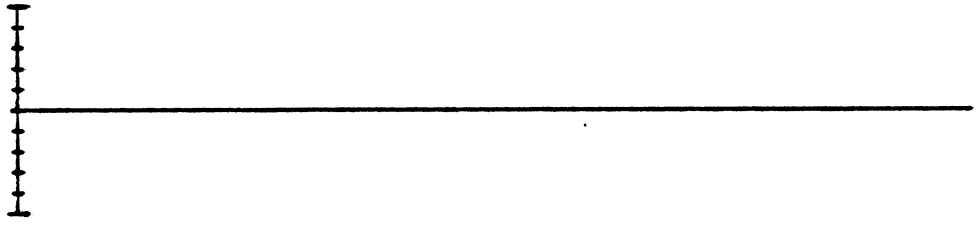
77B105-2: HYB-3M

PELVIS

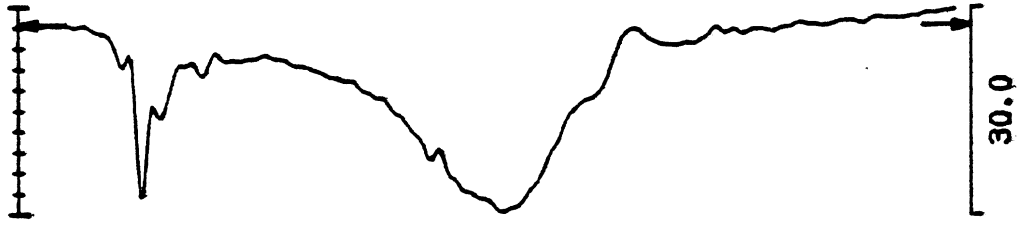
EXTERNAL



L-R
(G'S)



A-P



THORAX: (GSI= 101)

EXTERNAL



L-R
(G'S)



A-P



TIME (MSEC)

MEASURED ACCELERATIONS

LEFT SIDE

RIGHT SIDE

UPPER
SHOULDER

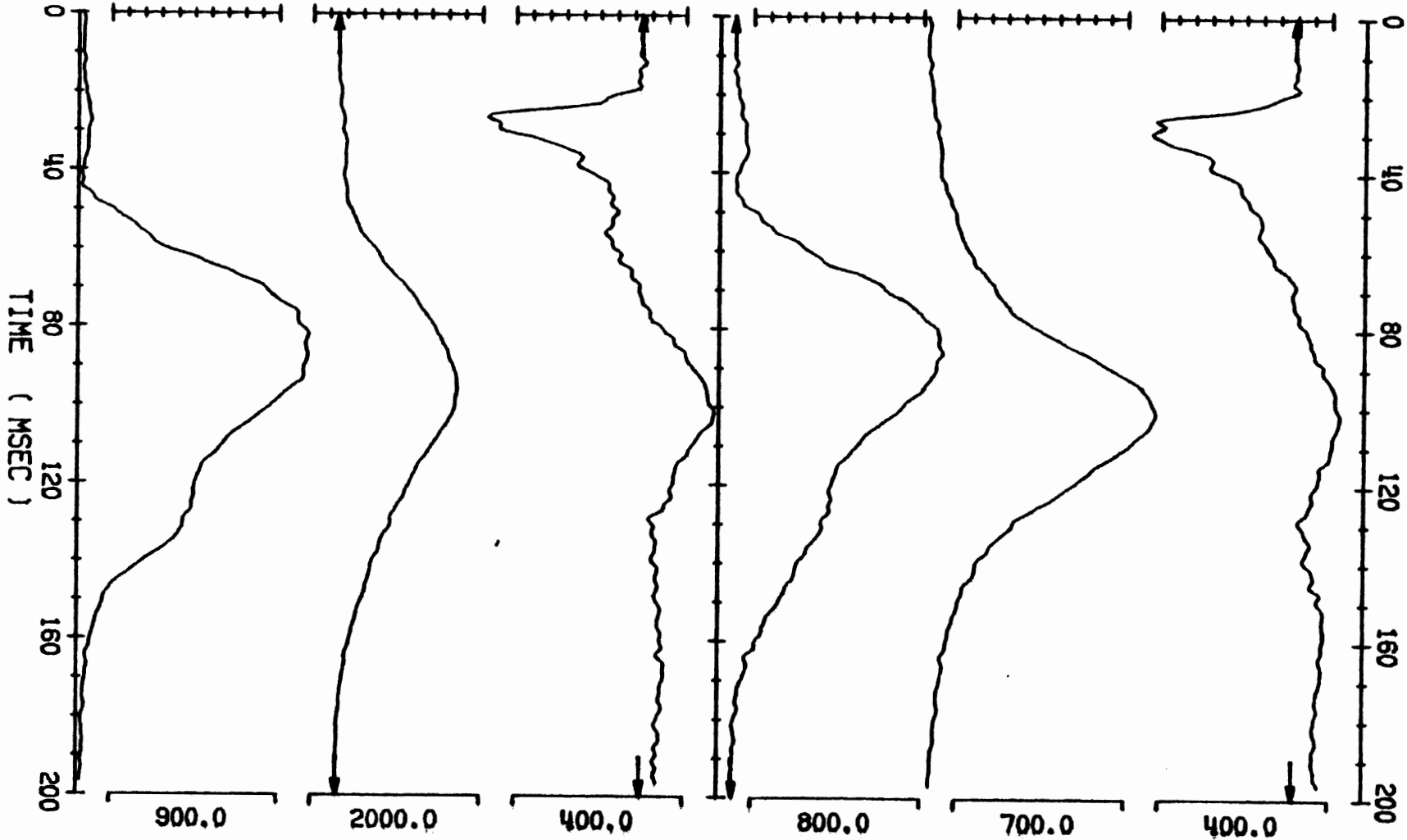
LAP BELT
(LBS)

FEMUR

LOWER
SHOULDER

LAP BELT
(LBS)

FEMUR



MEASURED FORCES

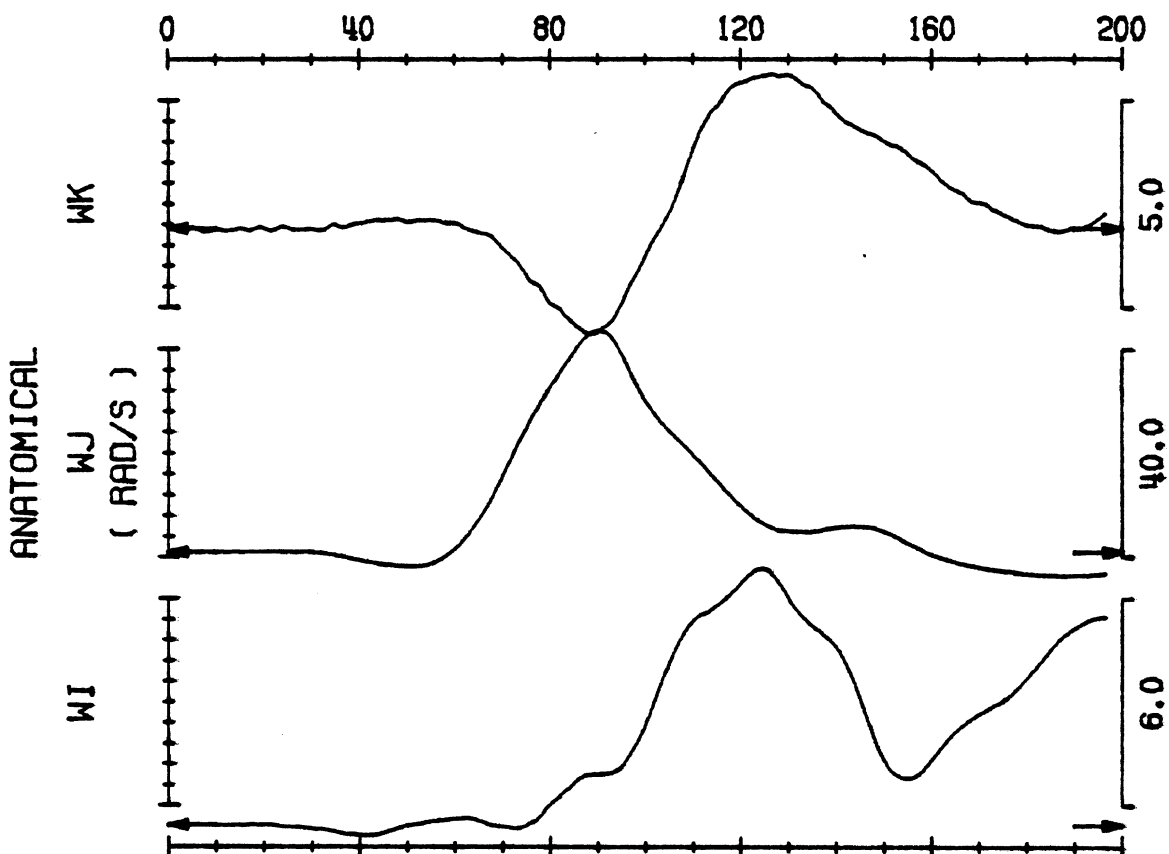
FILE: 82

77B105-2: HYB-3M

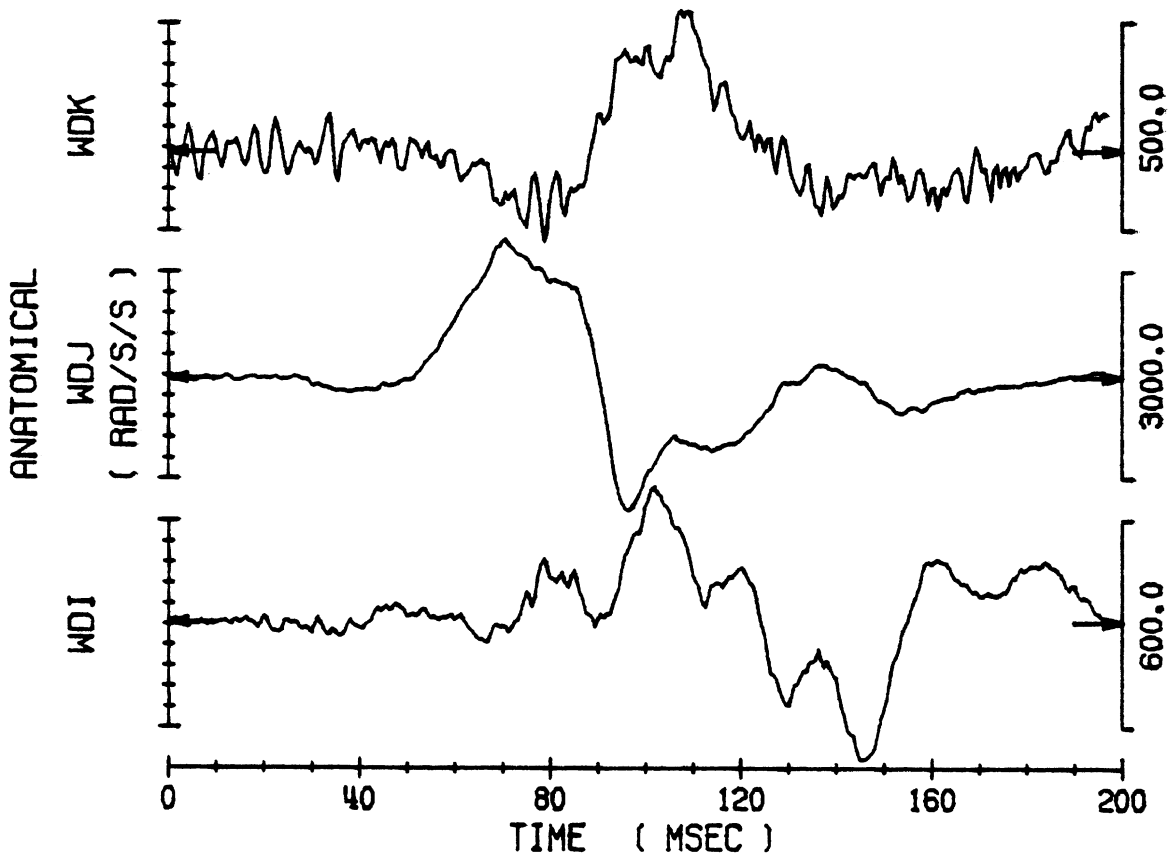
FILE: 76

77B105-1: HYB-3M

ANG VELOCITIES



ANG ACCELERATIONS



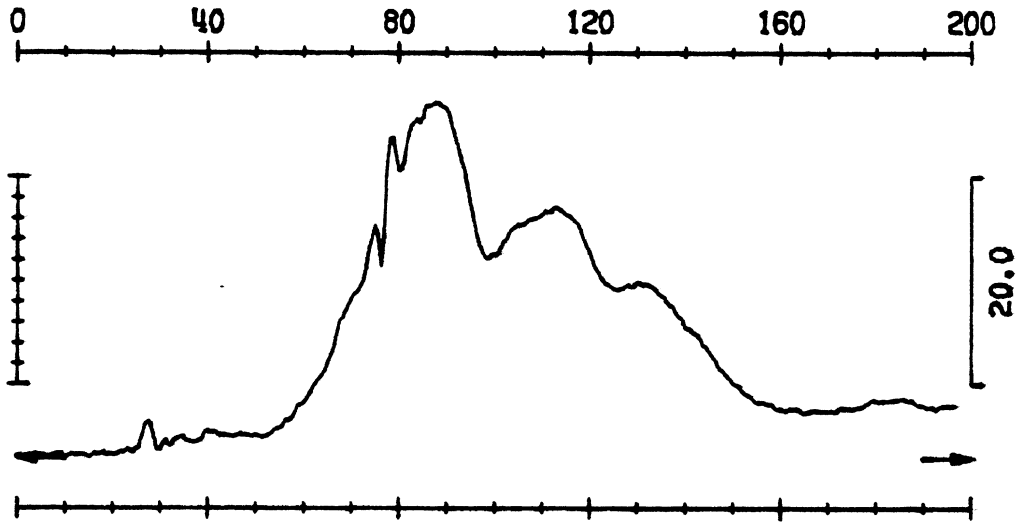
3-D ANGULAR MOTION

FILE: 83

77B105-3: HYB-3M

RESULTANT

GSI = 200
HIC = 168

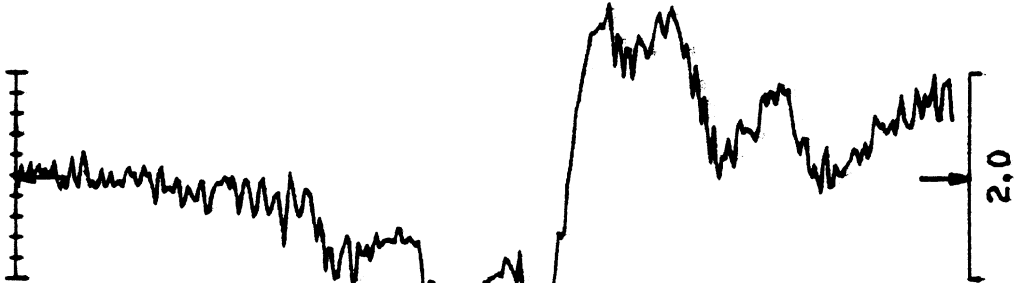


INTERNAL HEAD TRIAX

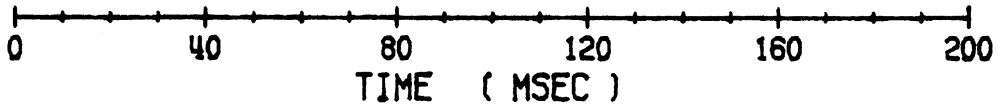
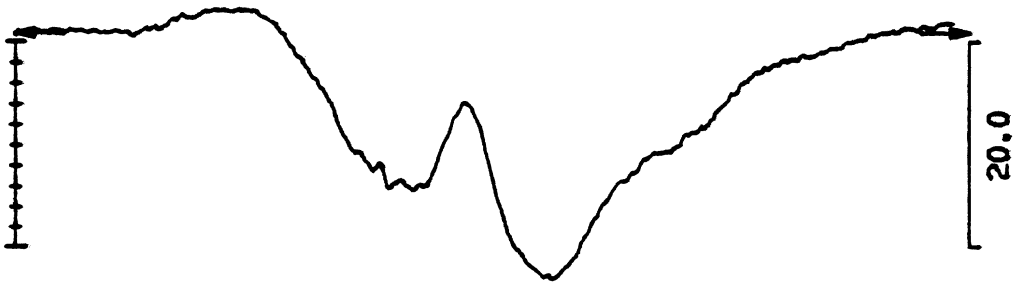
S-I



READINGS
L-R
(G'S)



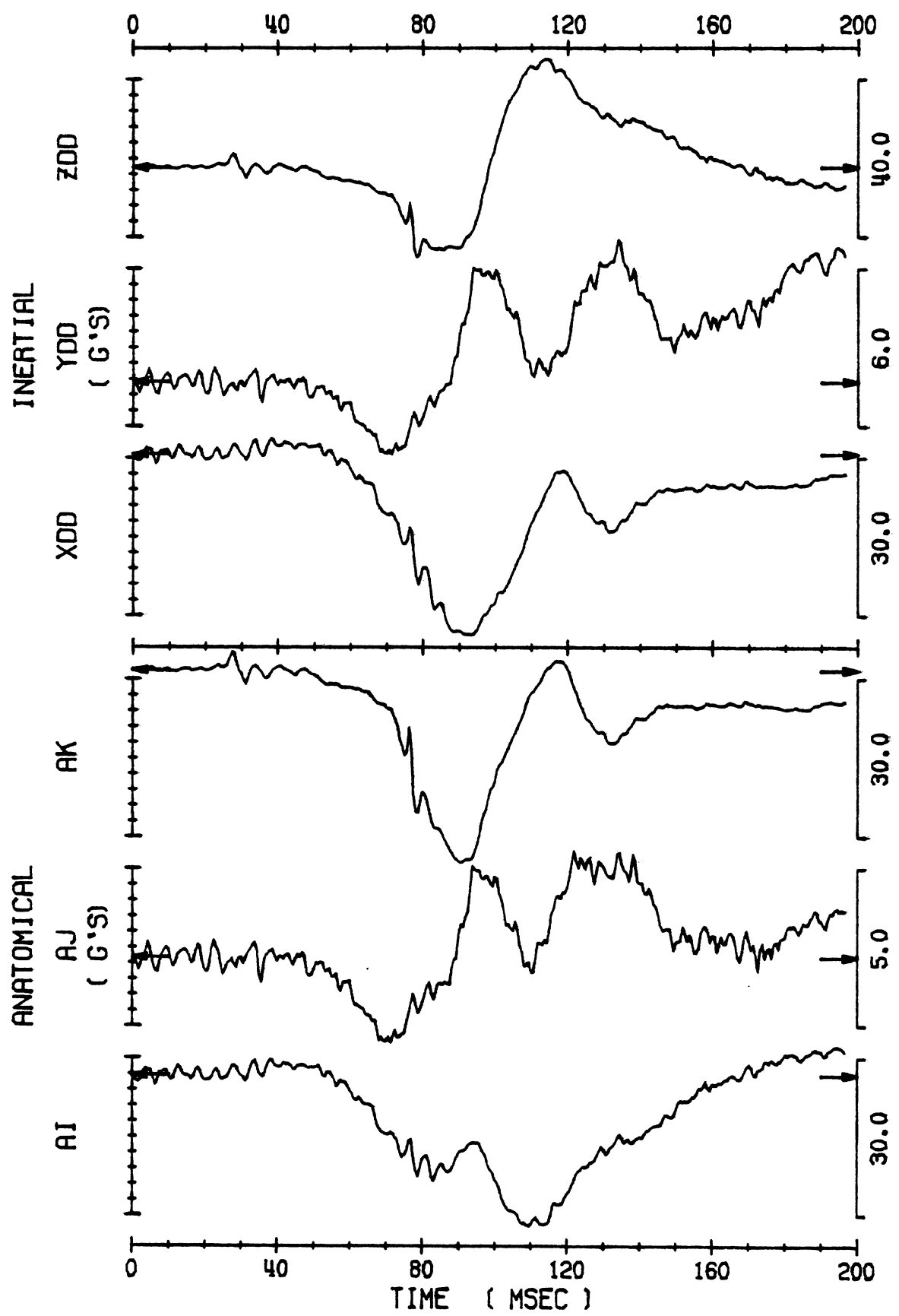
A-P



MEASURED ACCELERATIONS

ACC OF: HEAD C.G. GSI= 304, HIC= 253

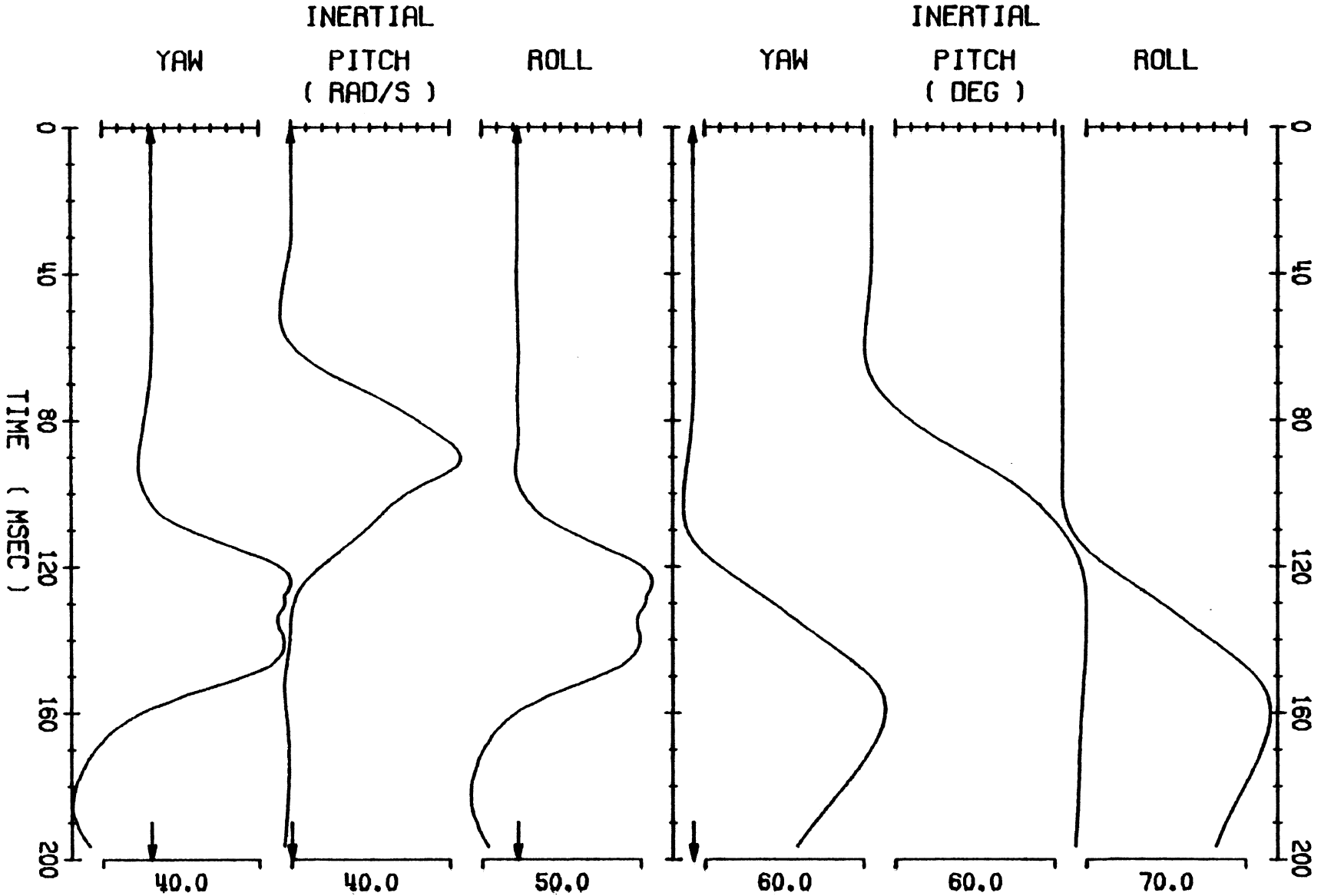
FILE: 78 77B105-1: HYB-3M



3-D ACCELERATIONS

EULER RATES

EULER ANGLES



FILE: 77

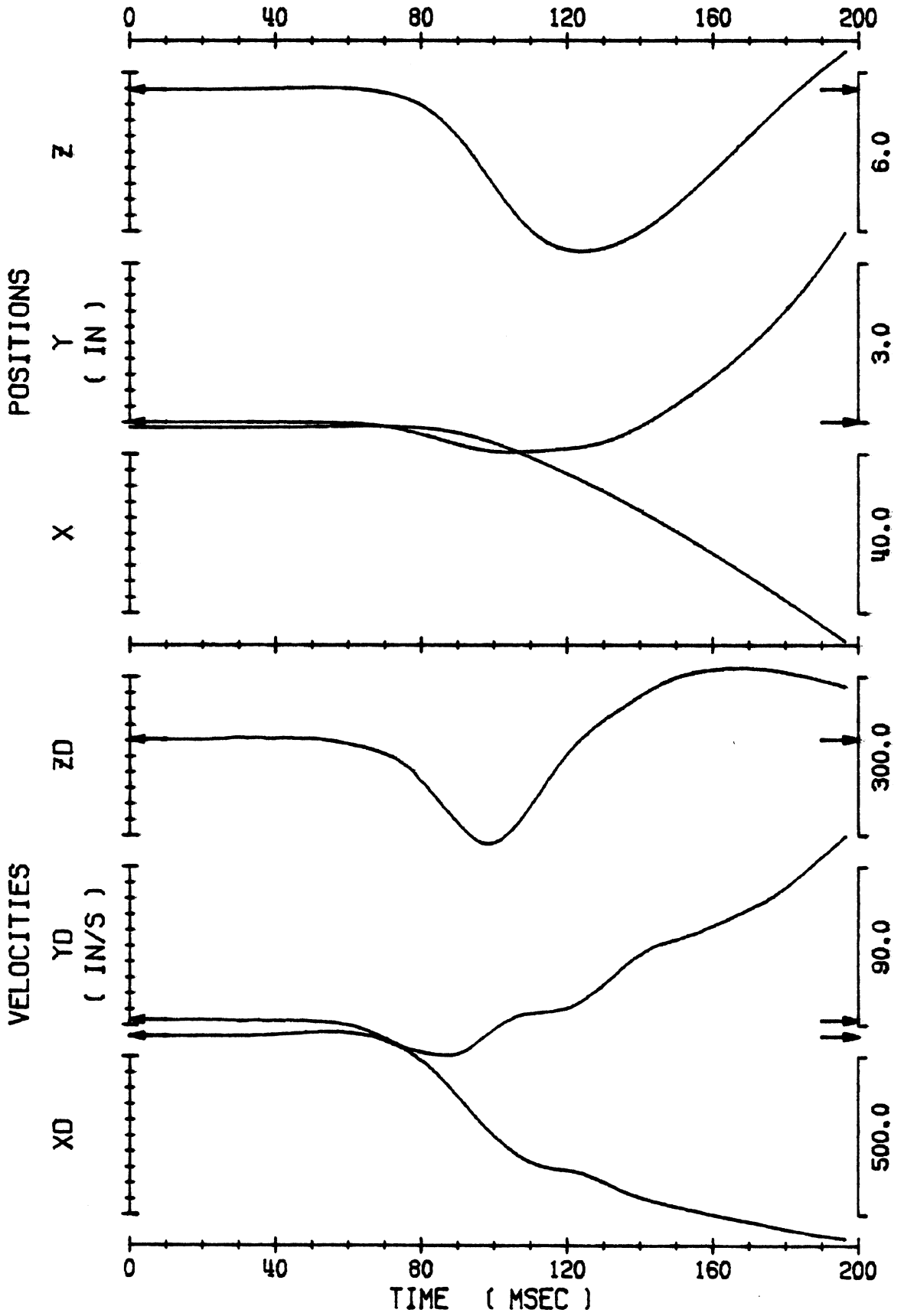
77B105-1: HYB-3M

3-D ROTATIONS

A-62

HEAD C.G.

INERTIAL MOTION OF:



3-D TRANSLATIONS

WHOLE BODY RESPONSE

SUMMARY

TEST NO.: 77B106

=====

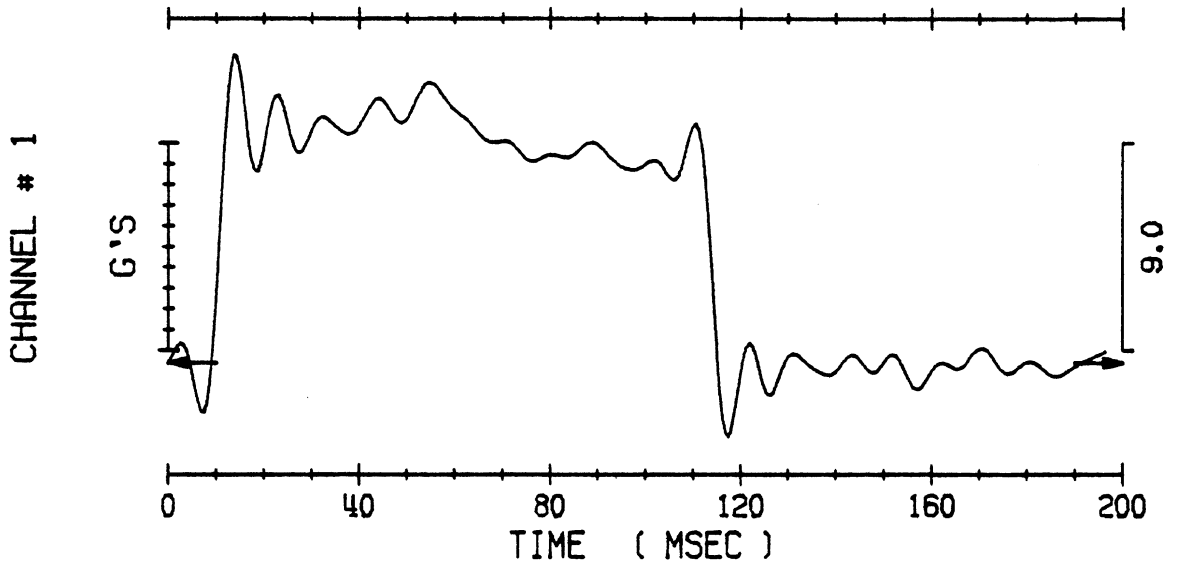
10.2 G-LEVEL
 106. MS LONG
 21.8 MPH DV
 (21.9 ACTUAL)

	SHOULDER BELT		LAP BELT		FEMURS	
	UPPER	LOWER	LEFT	RIGHT	LEFT	RIGHT
PEAK FORCES:	1201.	986.	1346.	837.	-403.	-278.
(LBS) @ (MS)	73.4	78.4	85.3	94.1	16.5	21.5
NECK FORCES:	AP= 275. LBS		SI= 320. LBS		MOM= 1020. IN-LB	
	@ 101. MS		@ 78. MS		@ 83. MS	

	RESULTANT PEAK	(A-P)		(L-R)		(S-I)	
		MIN	MAX	MIN	MAX	MIN	MAX
IN THORAX ACC:	22.	1.	21.	-2.	1.	-12.	6.
(G'S) @ (MS)	71.6	145.9	65.2	75.1	140.3	106.7	77.2
GSI=	72	DEFLECTION= 0.52 IN @ 85. MS					
IN PELVIS ACC:	24.	-1.	20.	-4.	1.	-0.	16.
(G'S) @	97.9	145.9	94.3	97.6	67.7	62.8	102.2
EX THORAX ACC:	29.	-26.	-1.	-1.	3.	-8.	16.
(G'S) @	64.7	64.8	109.2	139.4	74.7	75.1	104.8
GSI=	111						
EX PELVIS ACC:	32.	-28.	1.	0.	0.	-1.	14.
(G'S) @	95.9	94.3	143.4	0.0	0.0	143.0	99.6
.....							
HEAD ANG ACC :	2212.	-347.	387.	-2042.	1961.	-163.	353.
(RAD/S/S) @	62.9	126.9	95.1	87.0	65.9	66.6	89.8
HEAD ANG VEL :	44.4	3.7	9.3	-0.5	44.1	-3.2	3.8
(RAD/S) @	80.4	146.7	120.8	145.9	80.1	77.5	111.5
EULER ANGLES :			49.2		77.8		74.8
(DEGREES) @			146.2		117.3		149.2
.....							
HEAD C.G. ACC:	43.	-30.	2.	-2.	4.	-40.	2.
(G'S) @	82.2	99.1	35.3	61.4	85.7	81.1	108.1
HEAD C.G. HIC=	273						
HEAD C.G. VEL:	620.	-533.	3.	-14.	67.	-217.	97.
(IN/S) @	187.3	145.9	55.9	70.1	145.9	88.6	145.9
HEAD C.G. DIS:			-29.2		1.8		-6.8
(IN) @			145.9		145.9		116.1

FILE: 96

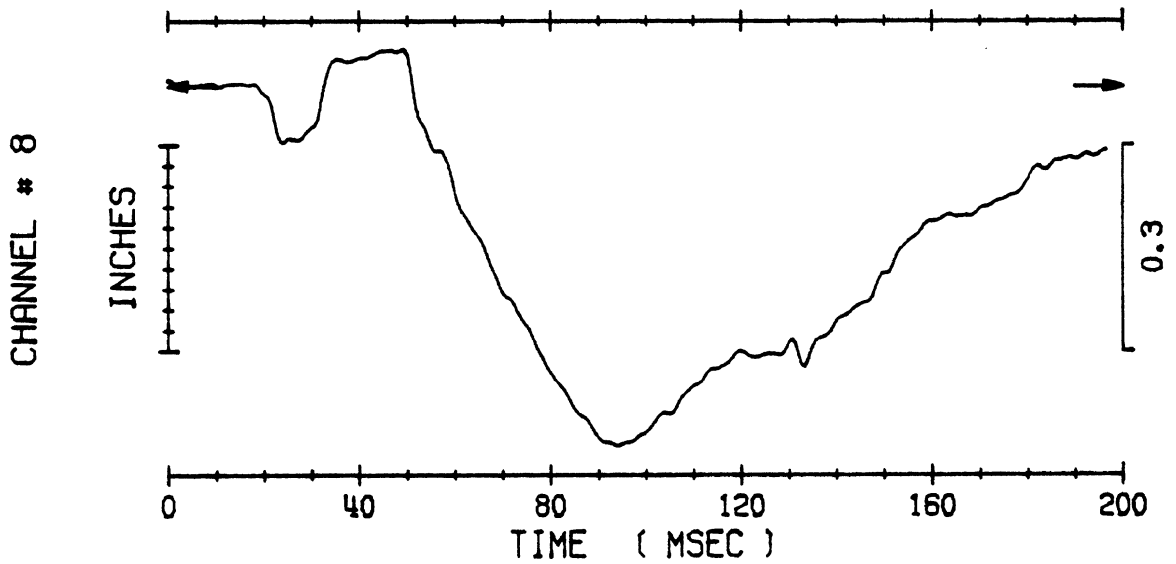
77B106-2: HYB-3M



SLED DECELERATION

FILE: 102

77B106-3: HYB-3M



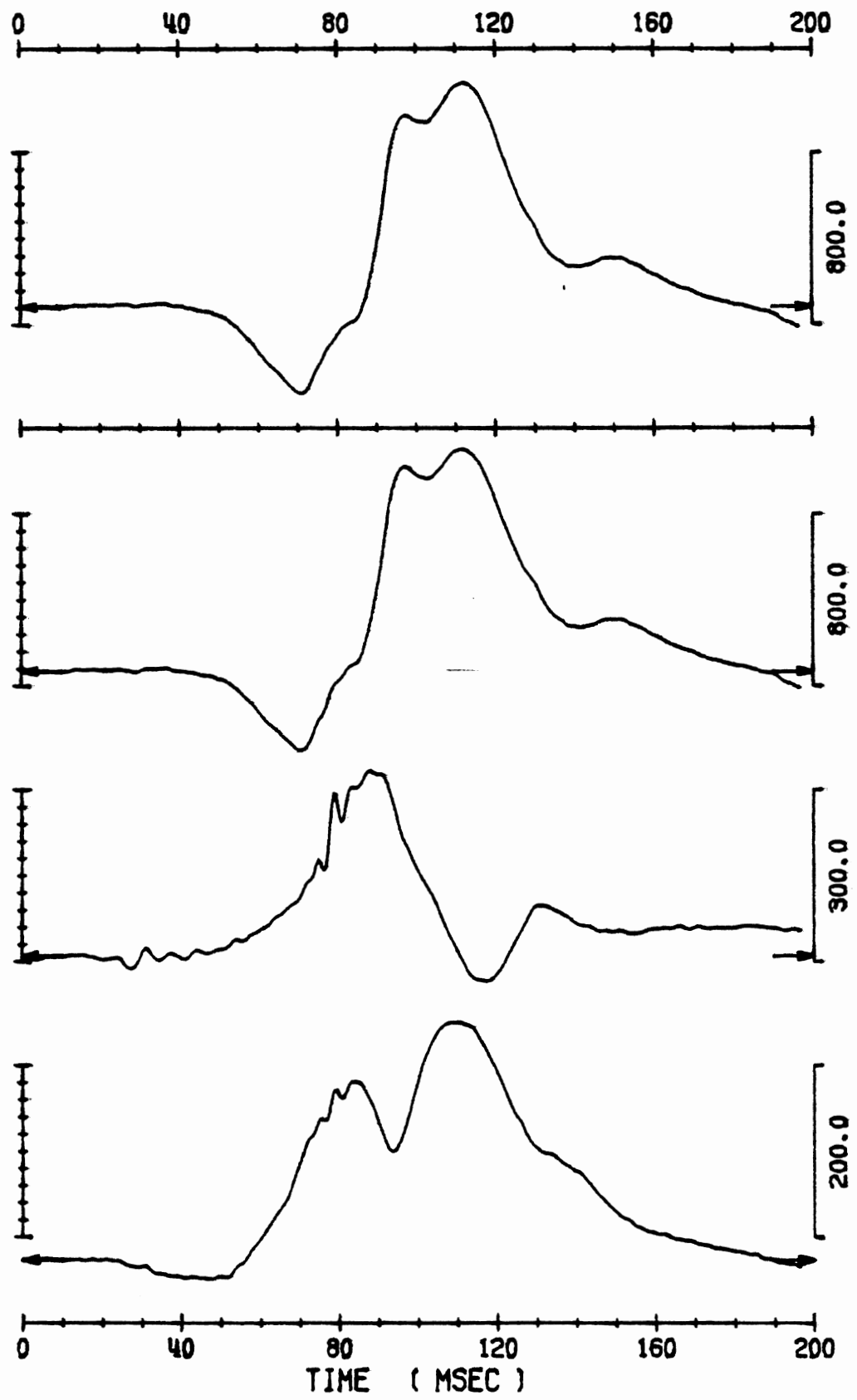
A-P CHEST DEFLECTION

MOMENT
MEASURED AT
AP= 0.0 IN
SI= 0.345 IN

NECK REACTIONS
MOMENT
L-R
(IN-LBS)

AXIAL
S-I
(LBS)

SHEAR
A-P
(LBS)



MEASURED FORCES

INTERNAL

INTERNAL

L-R
(G'S)

L-R
(G'S)

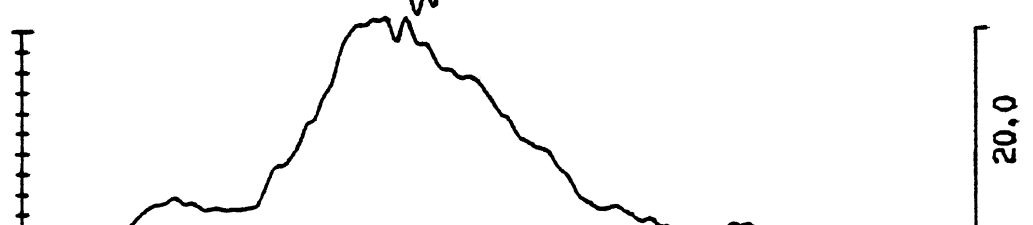
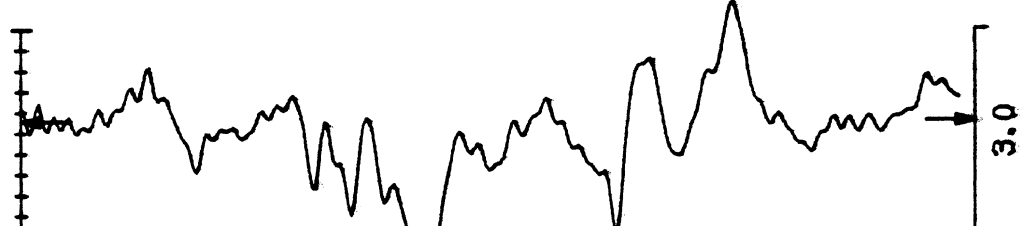
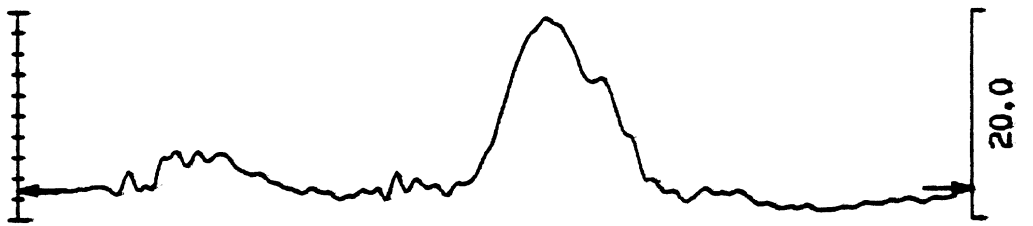
S-I

A-P

S-I

A-P

0 40 80 120 160 200



TIME (MSEC)

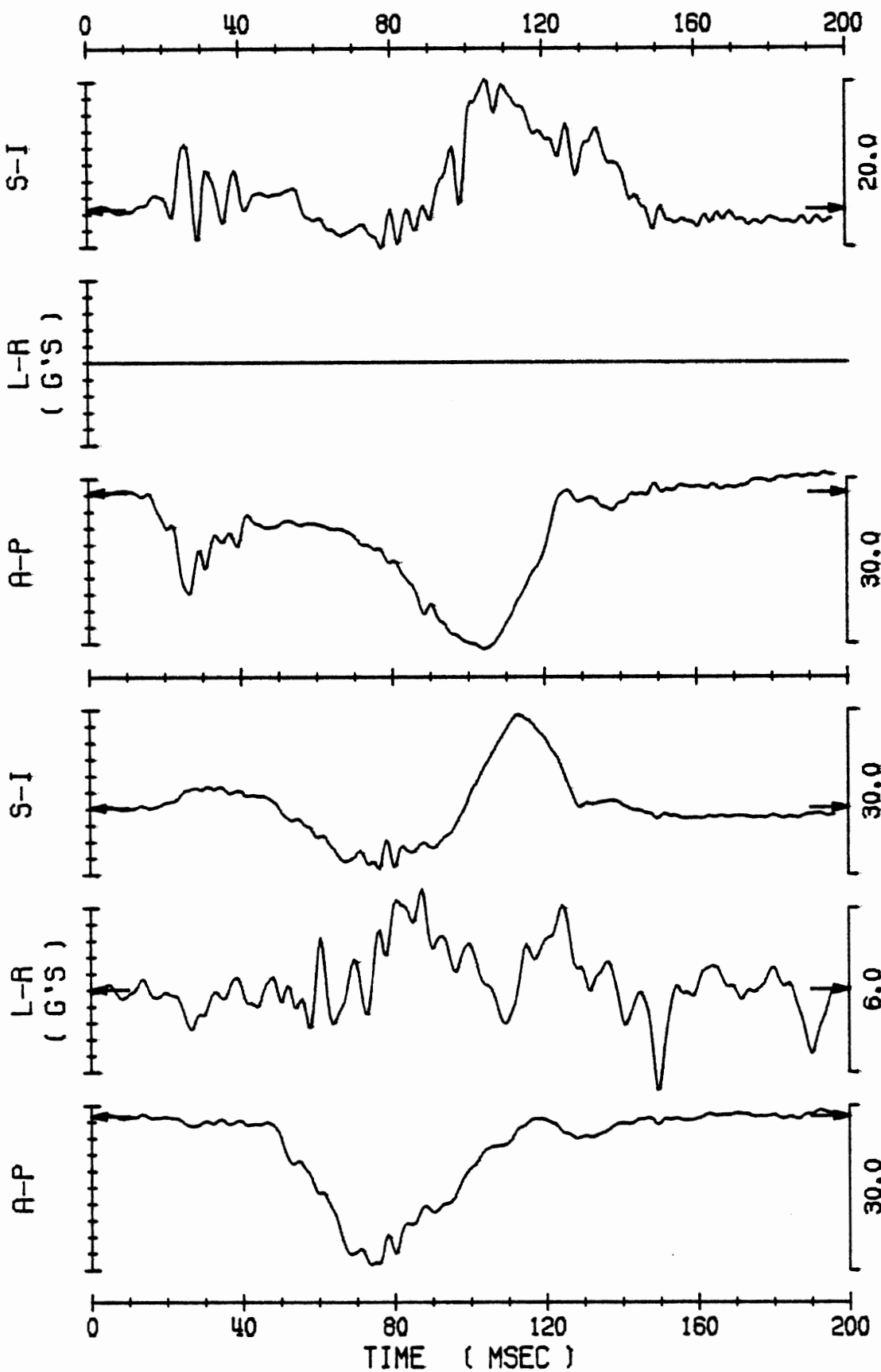
MEASURED ACCELERATIONS

PELVIS

THORAX: (GSI= 111)

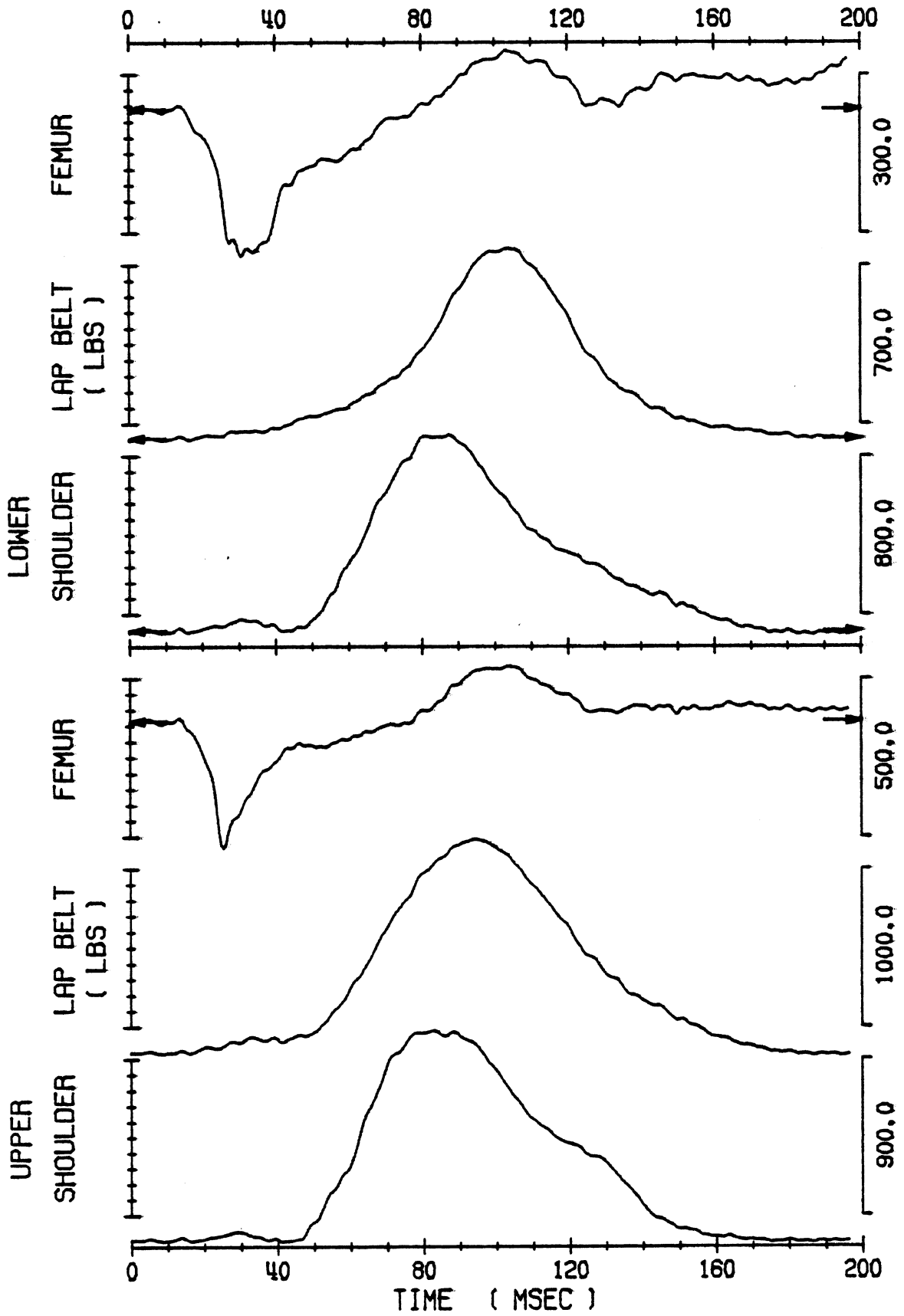
EXTERNAL

EXTERNAL



MEASURED ACCELERATIONS

RIGHT SIDE

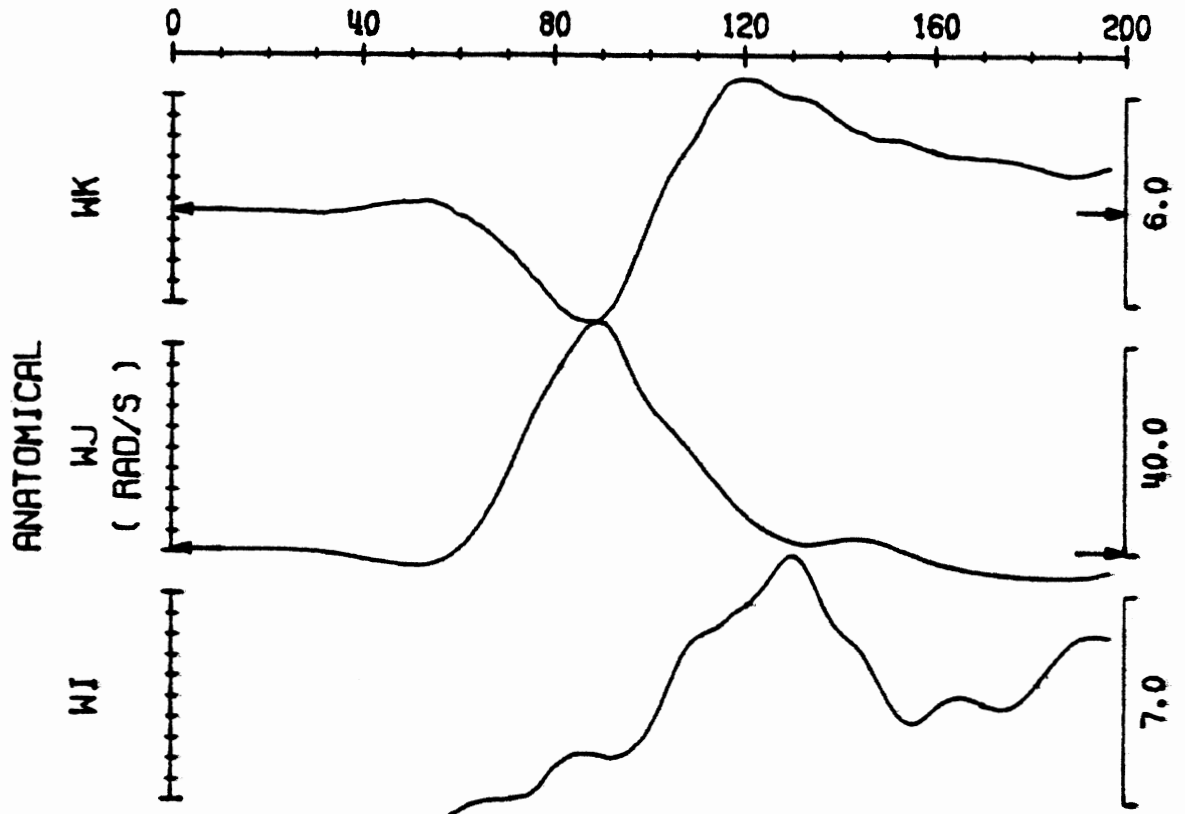


MEASURED FORCES

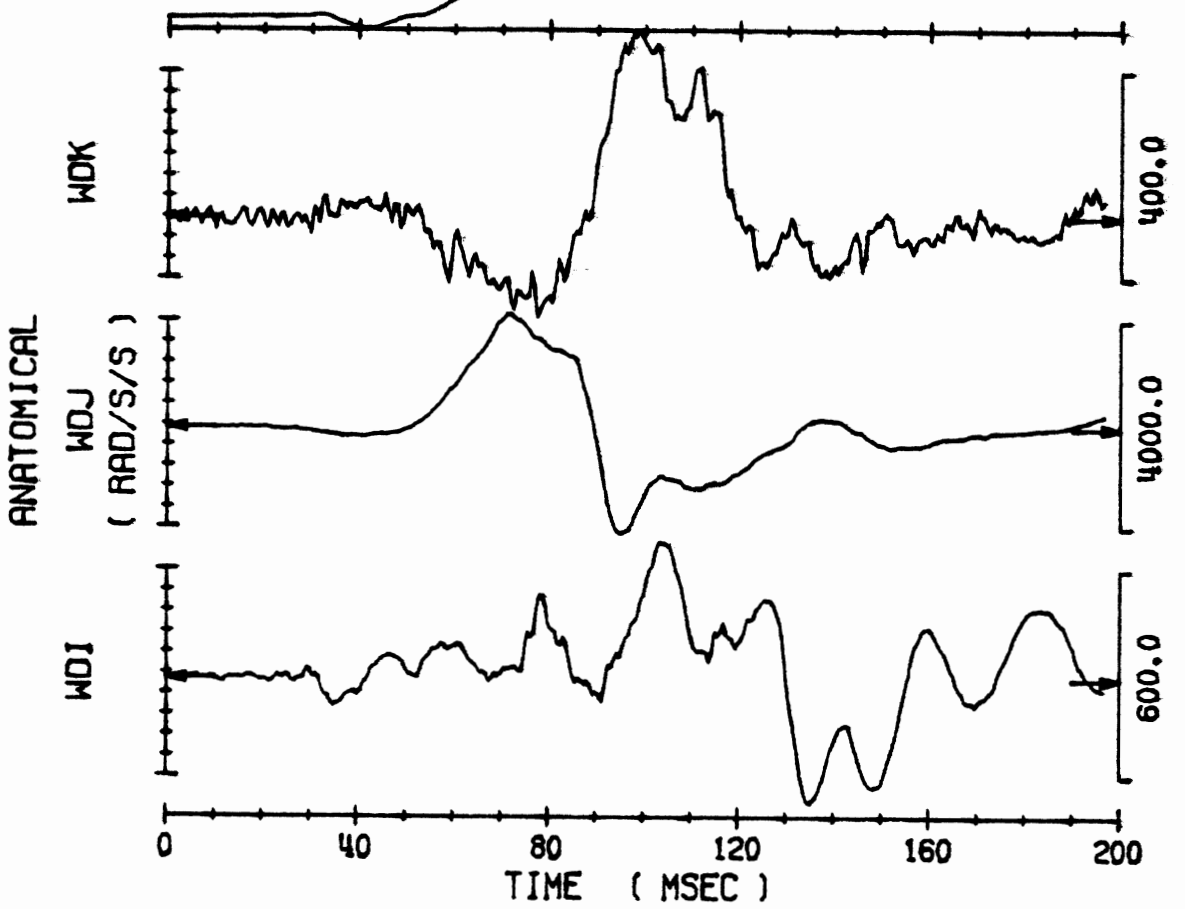
FILE: 90

77B106-1: HYB-3M

ANG VELOCITIES



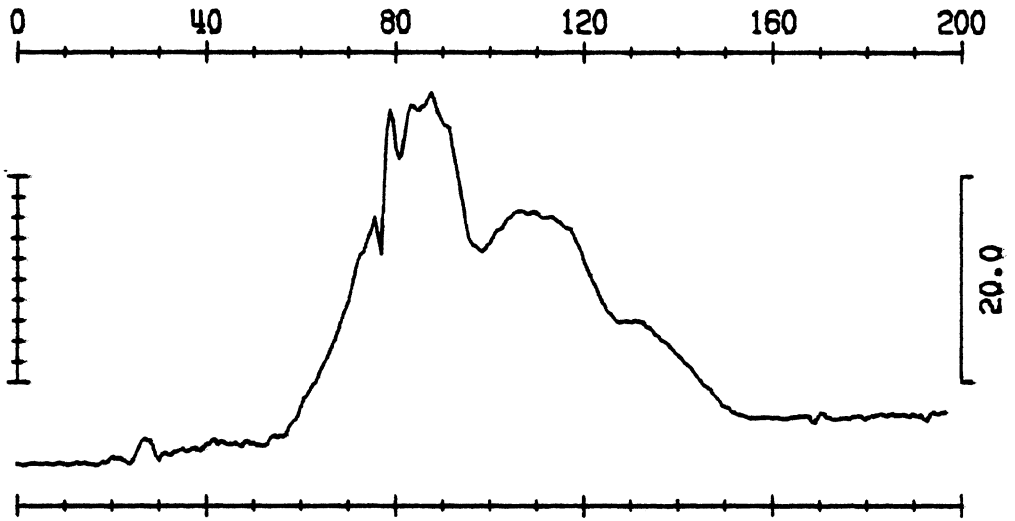
ANG ACCELERATIONS



3-D ANGULAR MOTION

RESULTANT

GSI = 214
HIC = 178



INTERNAL HEAD TRIAX

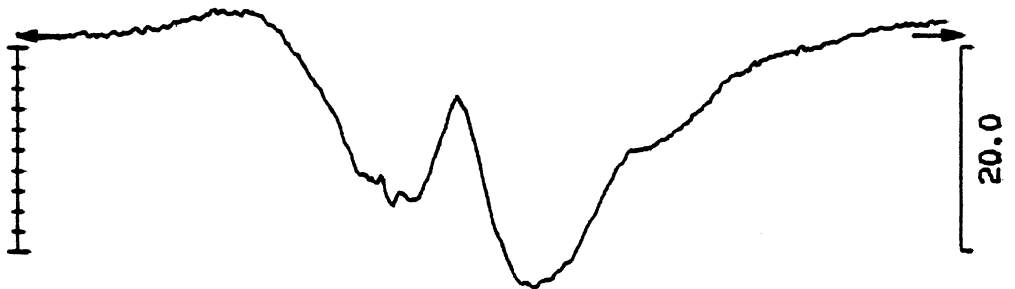
S-I



READINGS
L-R
(G'S)



A-P



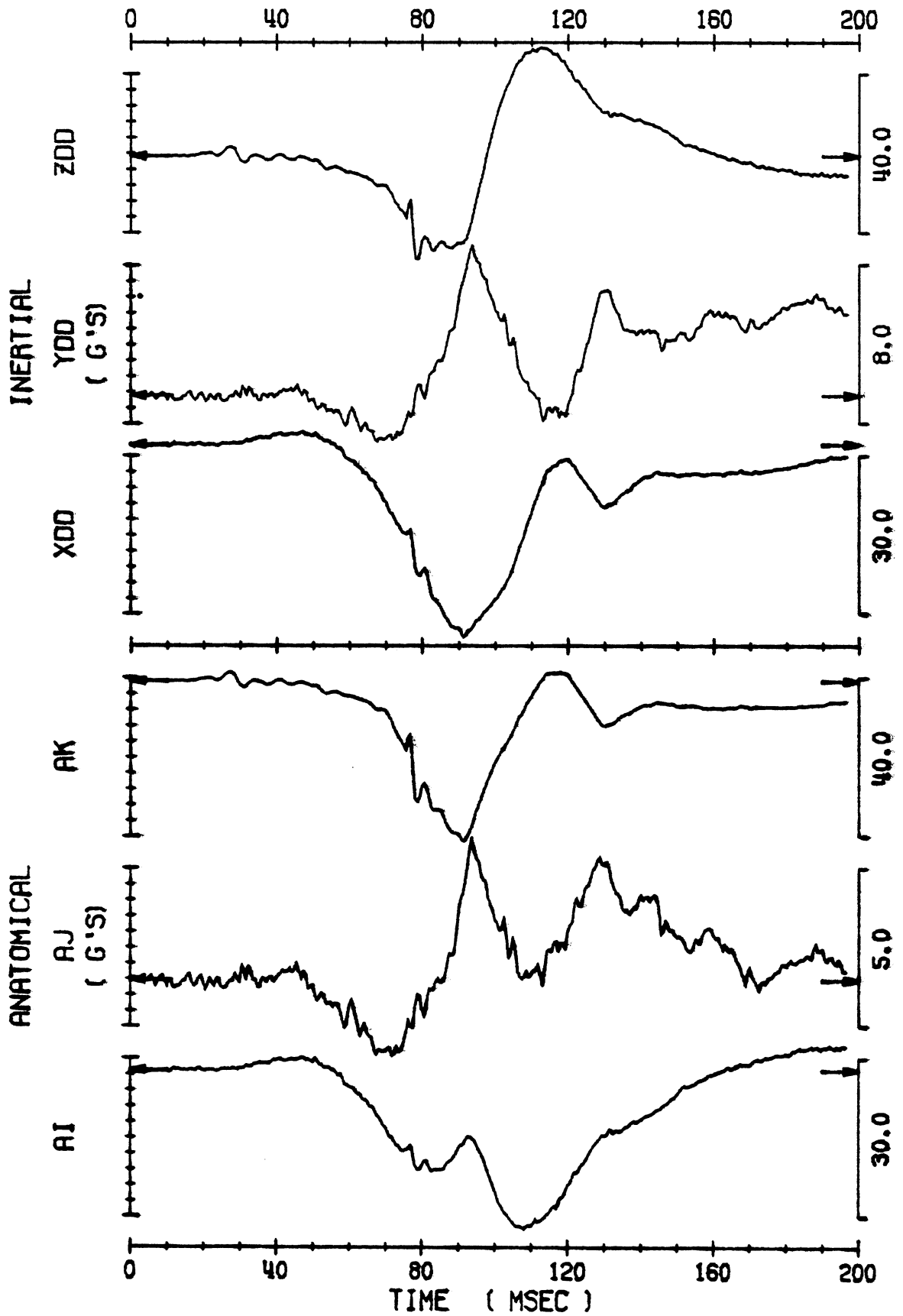
TIME (MSEC)

MEASURED ACCELERATIONS

ACC OF: HEAD C.G. GSI= 327, HIC= 273

FILE: 94

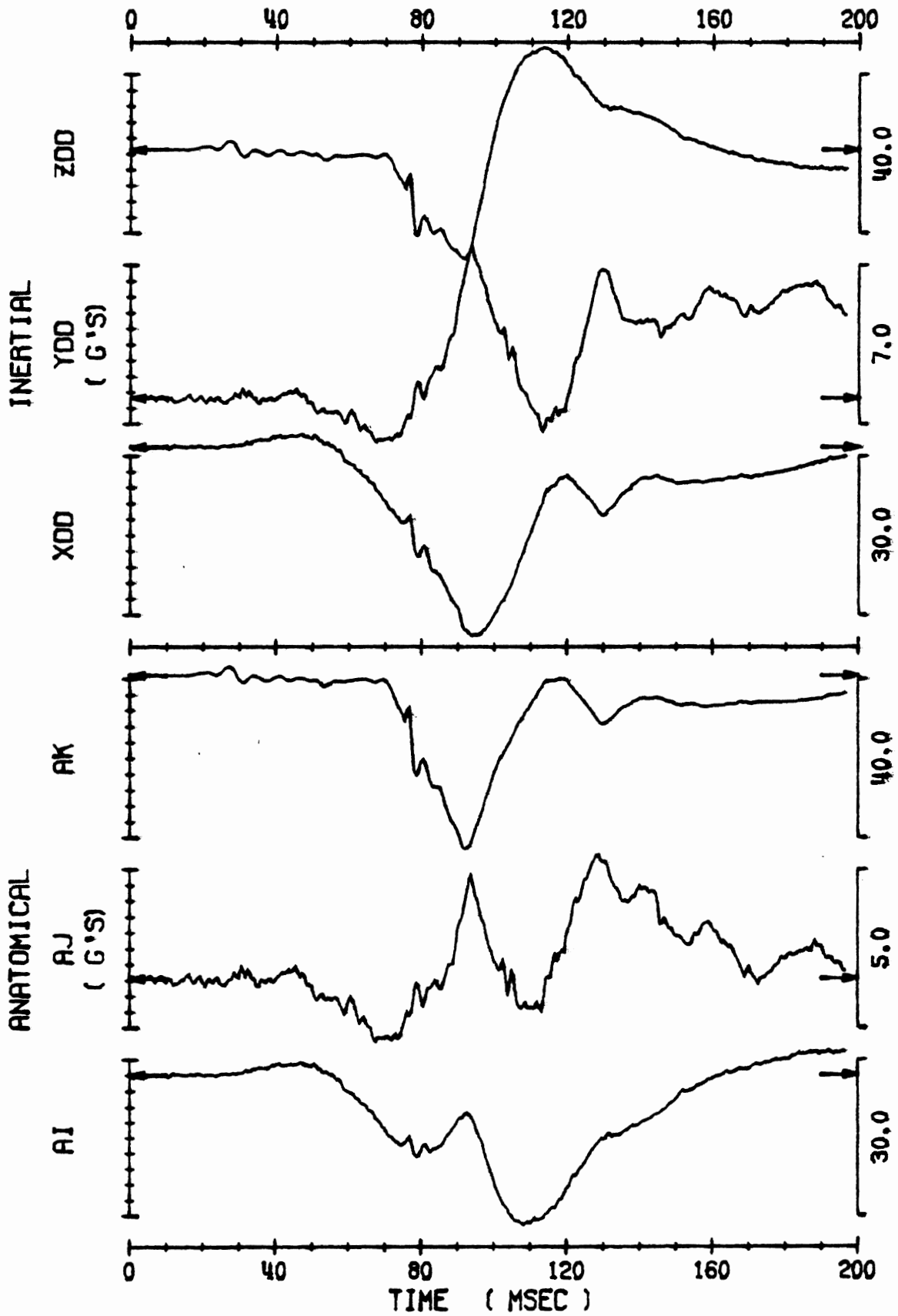
77B106-1: HYB-3M



3-D ACCELERATIONS

ACC OF: A-P ACC CENTER GSI= 303, HIC= 249

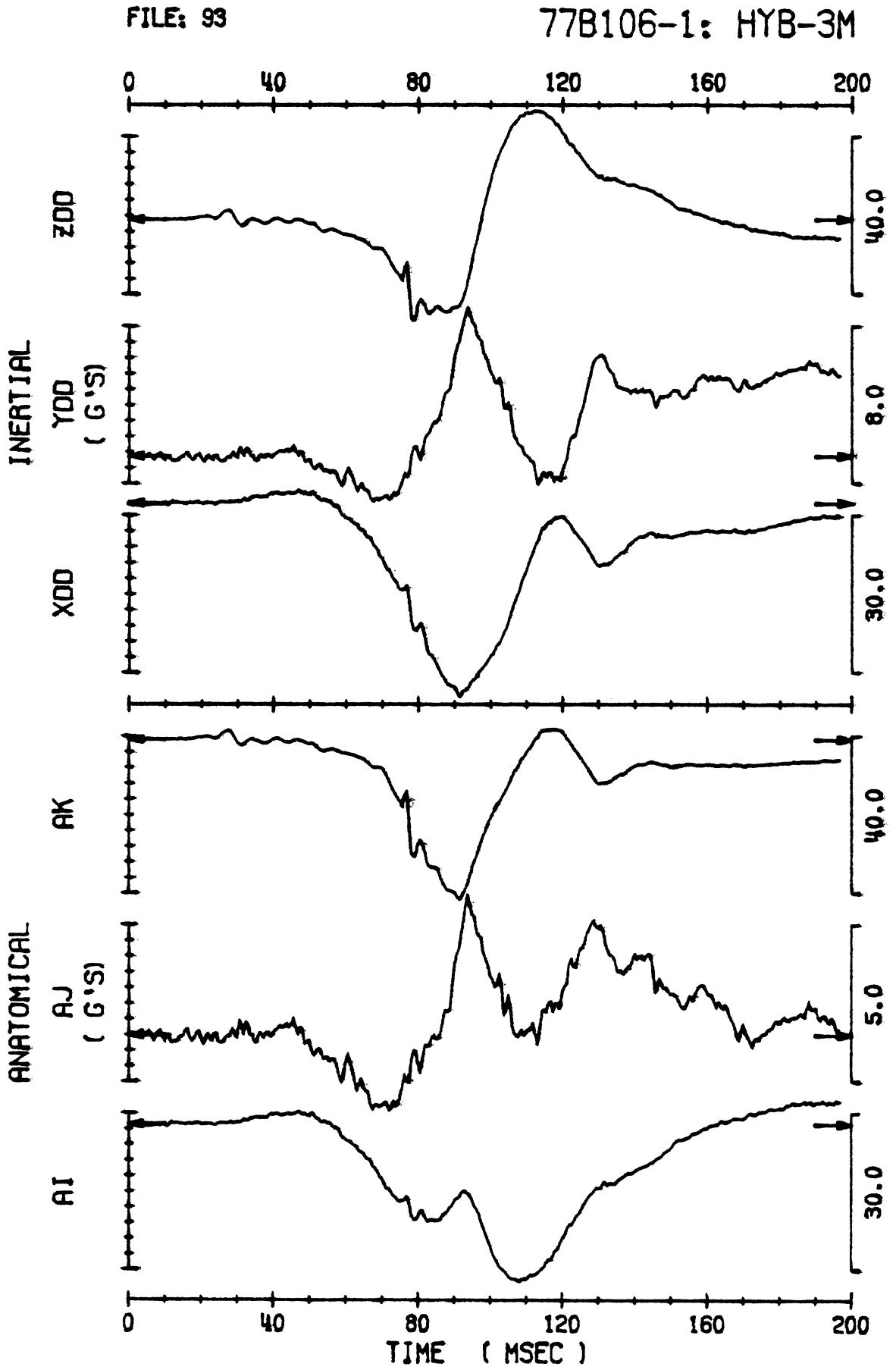
FILE: 92 77B106-1: HYB-3M



3-D ACCELERATIONS

ACC OF: L-R ACC CENTER GSI= 327, HIC= 273

FILE: 93 77B106-1: HYB-3M

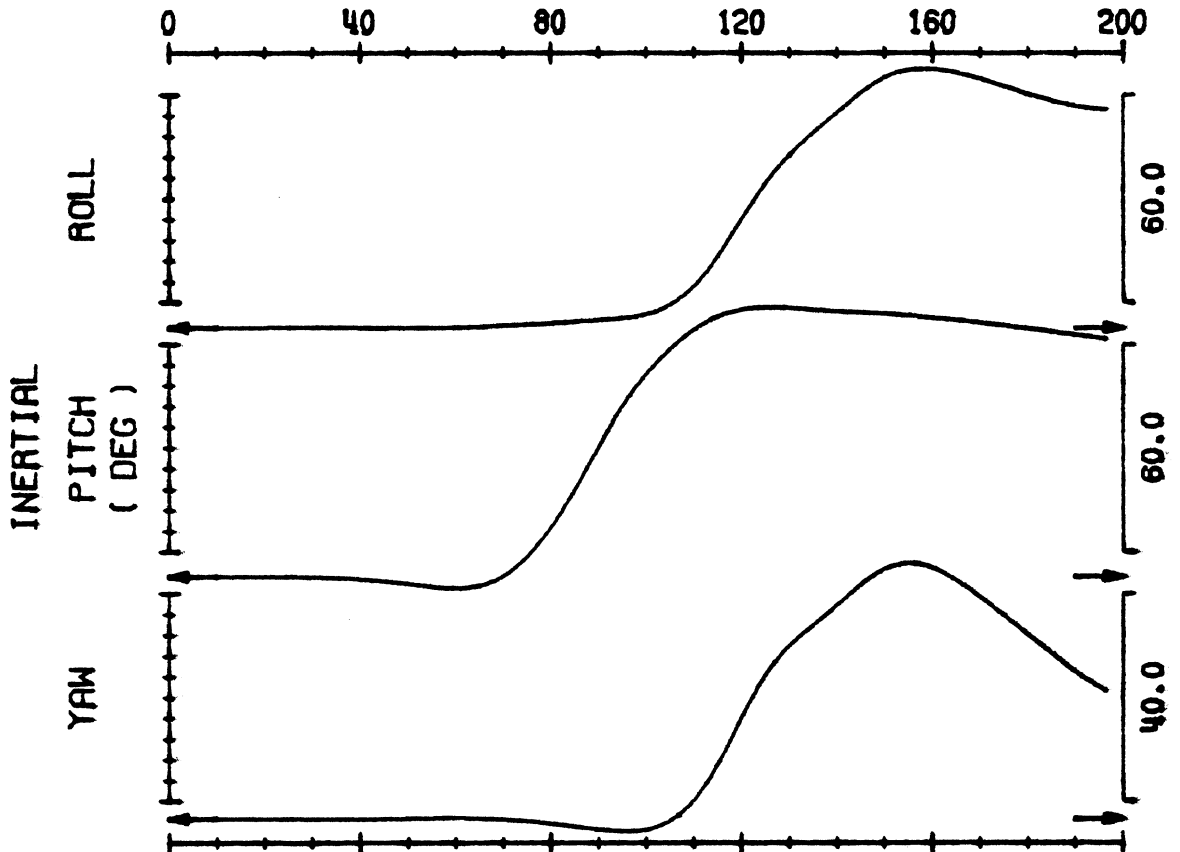


3-D ACCELERATIONS

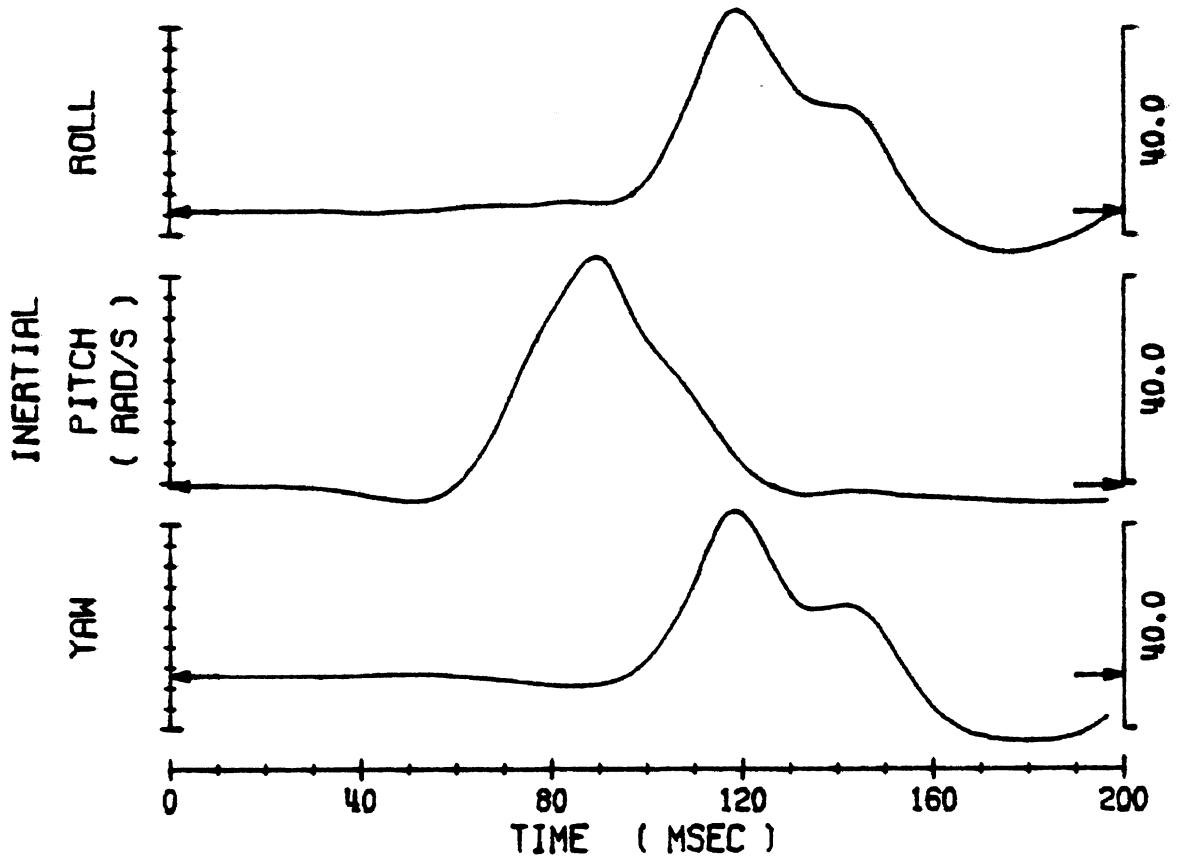
FILE: 91

77B106-1: HYB-3M

EULER ANGLES



EULER RATES



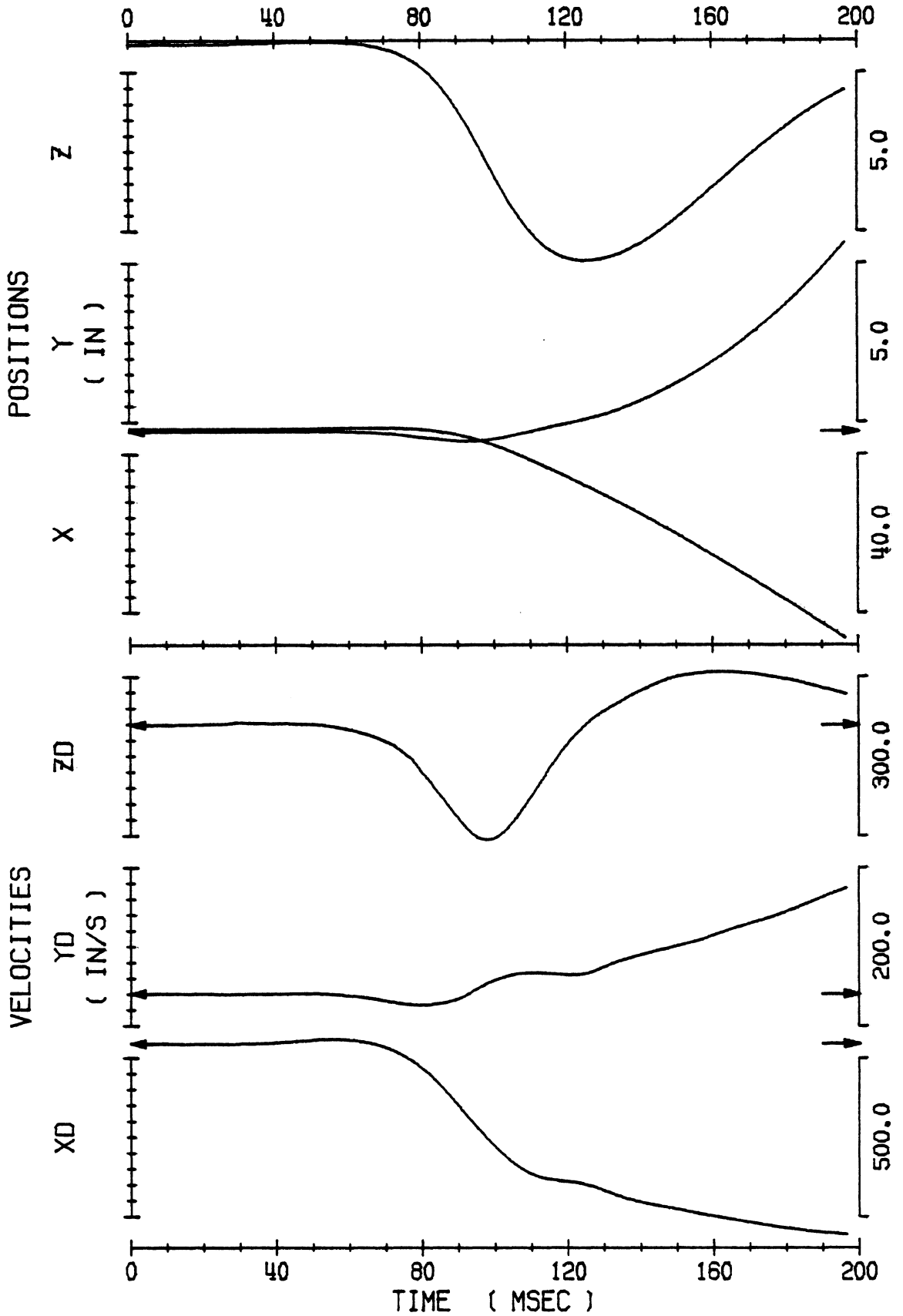
3-D ROTATIONS

FILE: 95

77B106-1: HYB-3M

HEAD C.G.

INERTIAL MOTION OF:



3-D TRANSLATIONS

WHOLE BODY RESPONSE

SUMMARY

TEST NO.: 77B107

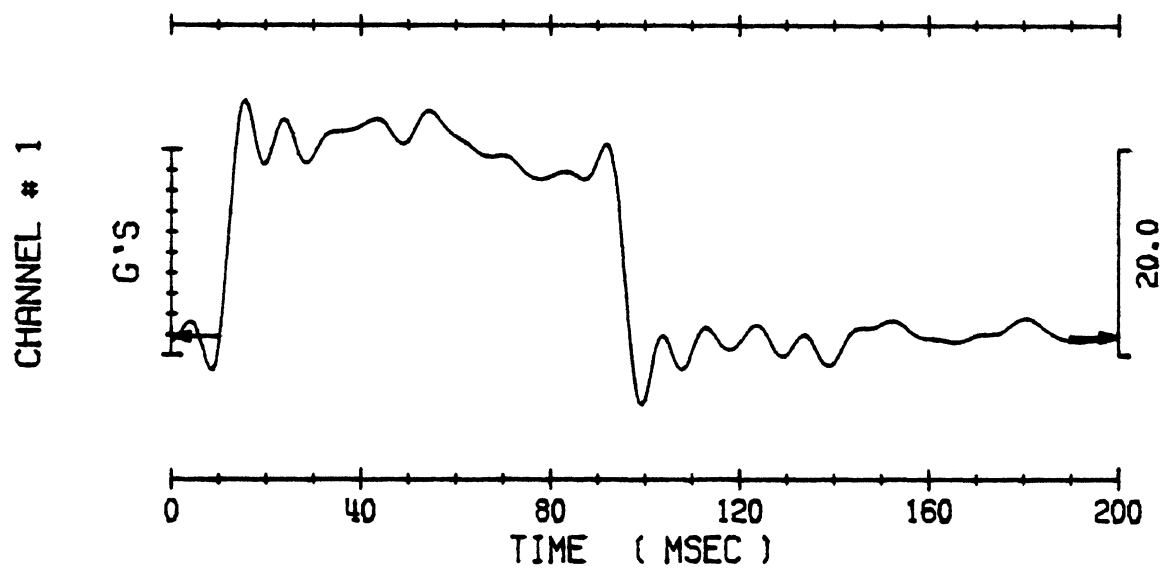
19.4 G-LEVEL
87. MS LONG
32.9 MPH DV
(32.1 ACTUAL)

	SHOULDER BELT		LAP BELT		FEMURS	
	UPPER	LOWER	LEFT	RIGHT	LEFT	RIGHT
PEAK FORCES:	1873.	1533.	2565.	1685.	-725.	-701.
(LBS) @ (MS)	65.4	65.4	70.4	76.7	16.0	16.6
NECK FORCES:	AP= 390. LBS		SI= 530. LBS		MOM= 1340. IN-LB	
	@ 83. MS		@ 65. MS		@ 70. MS	

	RESULTANT PEAK	(A-P)		(L-R)		(S-I)	
		MIN	MAX	MIN	MAX	MIN	MAX
IN THORAX ACC:	33.	-5.	30.	-4.	1.	-24.	11.
(G'S) @ (MS)	62.2	146.1	62.2	85.7	105.0	87.8	64.1
GSI=	247	DEFLECTION= 0.94 IN @ 87. MS					
IN PELVIS ACC:	48.	-2.	41.	-6.	2.	-1.	32.
(G'S) @	79.8	141.4	76.6	80.4	43.7	55.2	83.8
EX THORAX ACC:	42.	-38.	5.	-2.	5.	-14.	34.
(G'S) @	55.4	54.0	145.5	105.8	90.6	55.2	85.6
GSI=	353						
EX PELVIS ACC:	62.	-51.	3.	0.	0.	-4.	29.
(G'S) @	77.9	77.2	142.5	0.0	0.0	57.2	79.4
.....							
HEAD ANG ACC :	3541.	-491.	435.	-2871.	3503.	-310.	489.
(RAD/S/S) @	50.4	108.5	74.8	73.7	50.4	54.1	84.1
HEAD ANG VEL :	57.4	3.3	10.5	-4.5	56.8	-4.1	6.9
(RAD/S) @	67.2	124.7	100.5	145.6	66.7	63.2	103.1
EULER ANGLES :			127.9		87.4		149.7
(DEGREES) @			115.8		93.7		117.7
.....							
HEAD C.G. ACC:	69.	-46.	6.	-4.	5.	-65.	5.
(G'S) @	66.0	83.9	154.7	50.0	94.7	67.2	86.6
HEAD C.G. HIC=	859						
HEAD C.G. VEL:	941.	-789.	8.	-25.	134.	-314.	181.
(IN/S) @	186.1	144.7	44.7	62.5	144.7	74.1	144.5
HEAD C.G. DIS:			-51.9		4.7		-8.9
(IN) @			144.7		144.7		101.4

FILE: 111

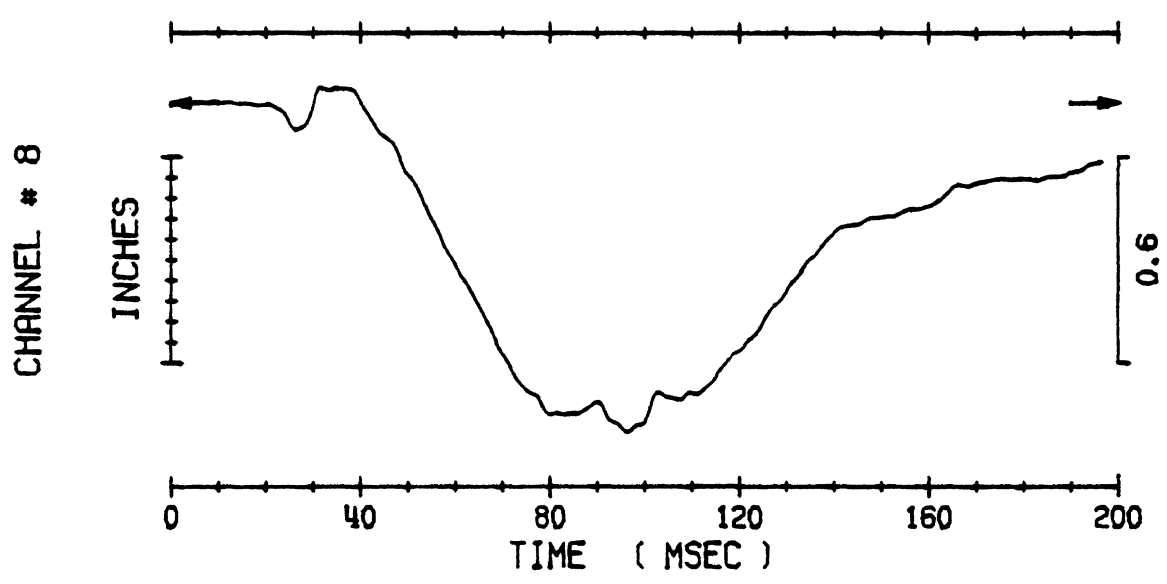
77B107-2: HYB-3H



SLED DECELERATION

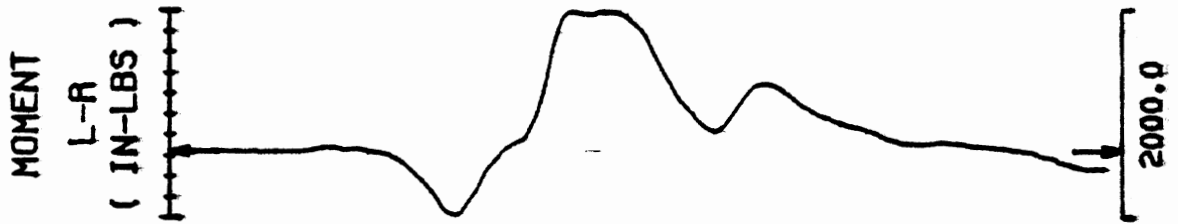
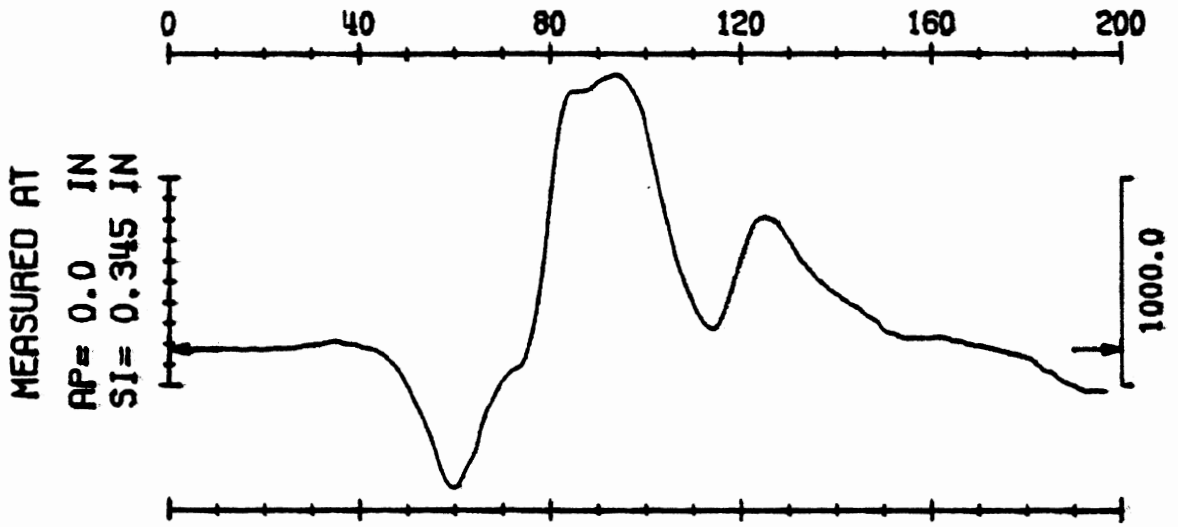
FILE: 116

77B107-3: HYB-3H

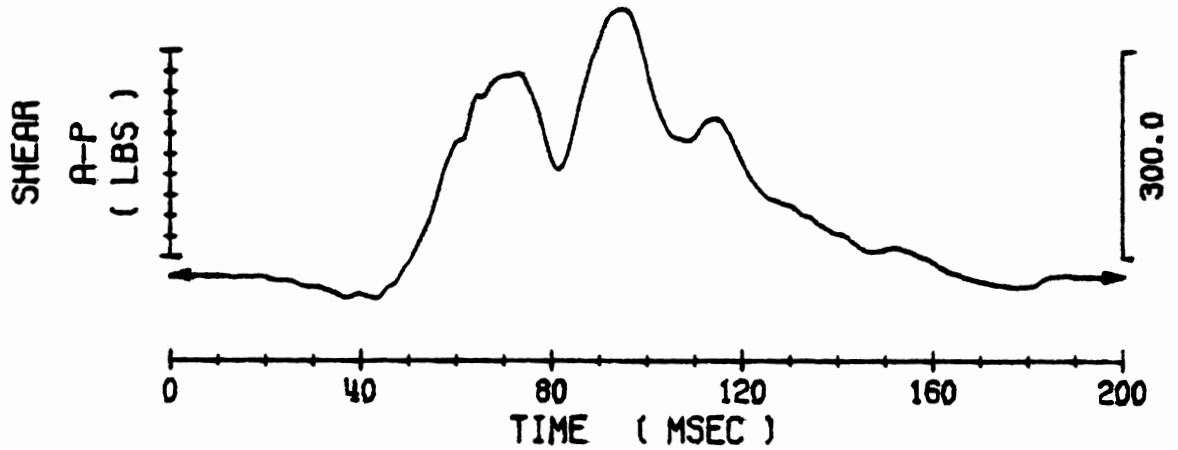


A-P CHEST DEFLECTION

MOMENT



NECK REACTIONS



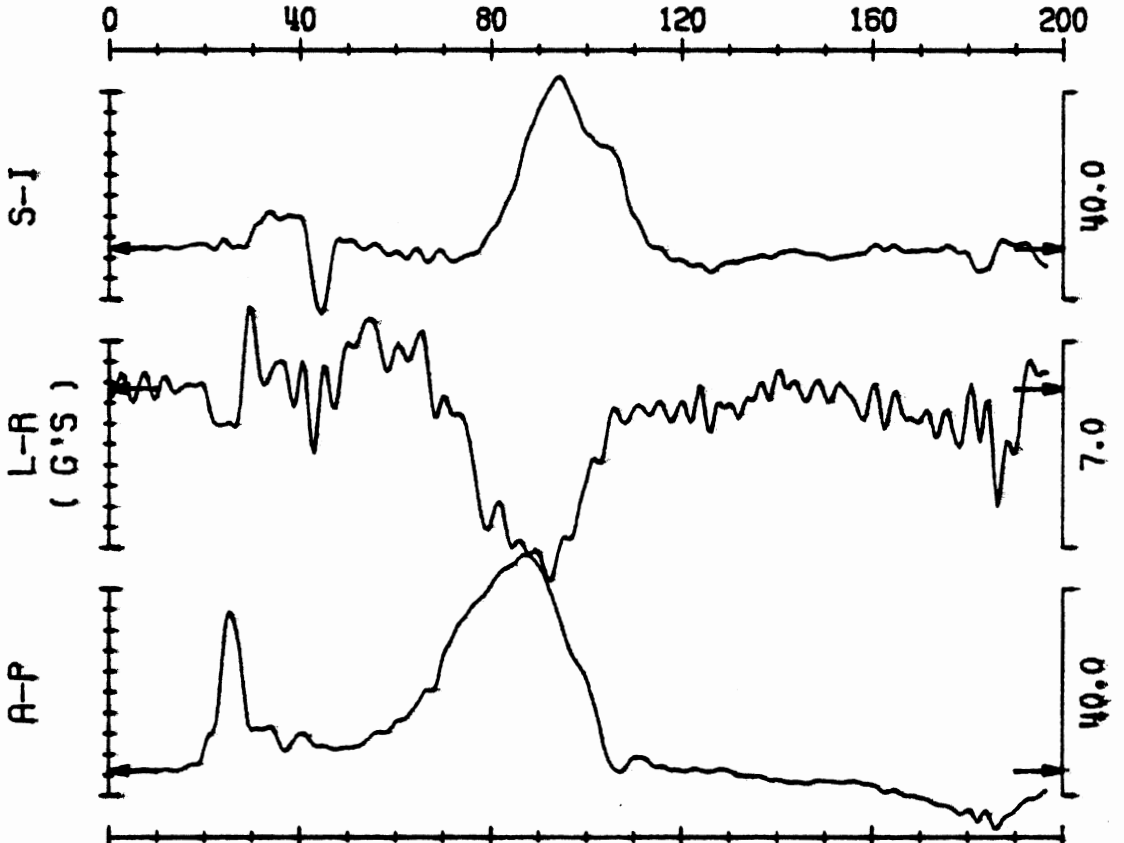
MEASURED FORCES

FILE# 117

77B107-1: HYB-3H

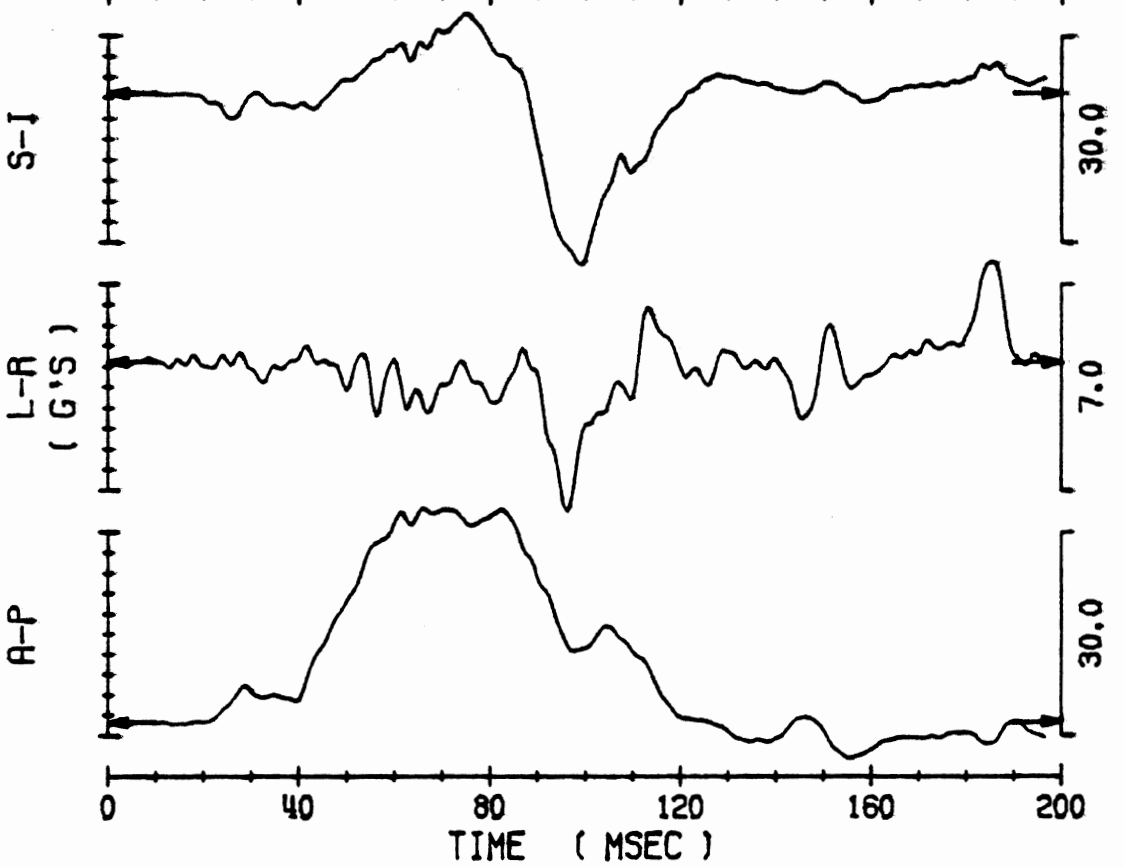
PELVIS

INTERNAL



THORAX: (GSI= 247)

INTERNAL



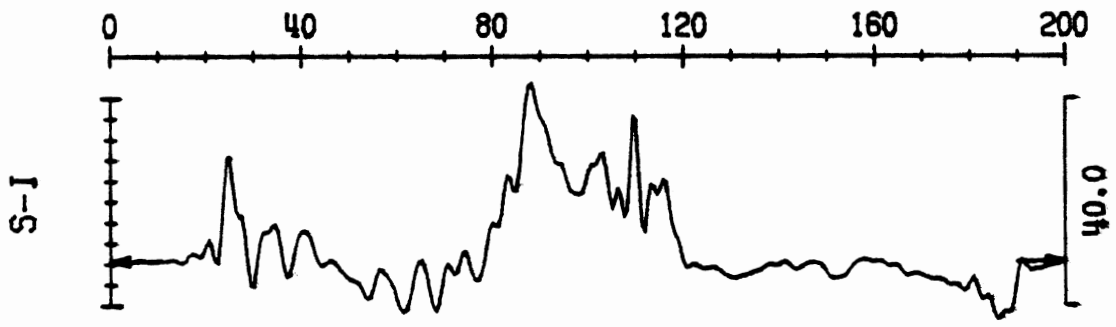
MEASURED ACCELERATIONS

FILE: 112

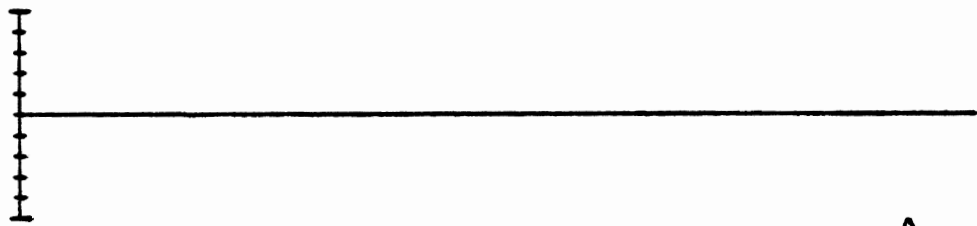
77B107-2: HYB-3H

PELVIS

EXTERNAL



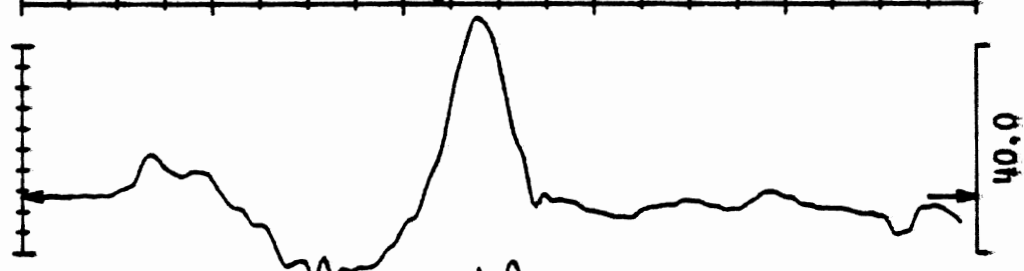
L-R
(G'S)



A-P



S-I

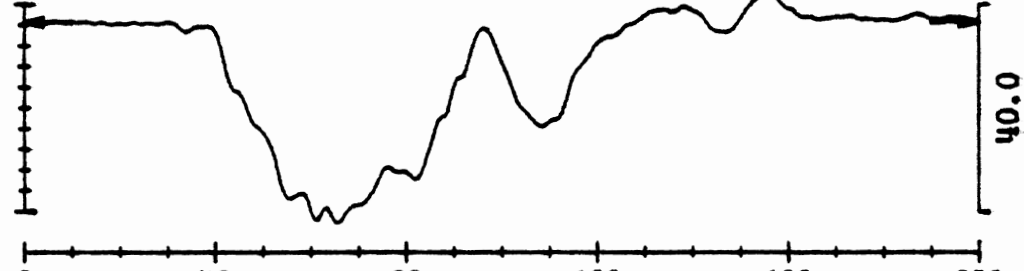


EXTERNAL

L-R
(G'S)



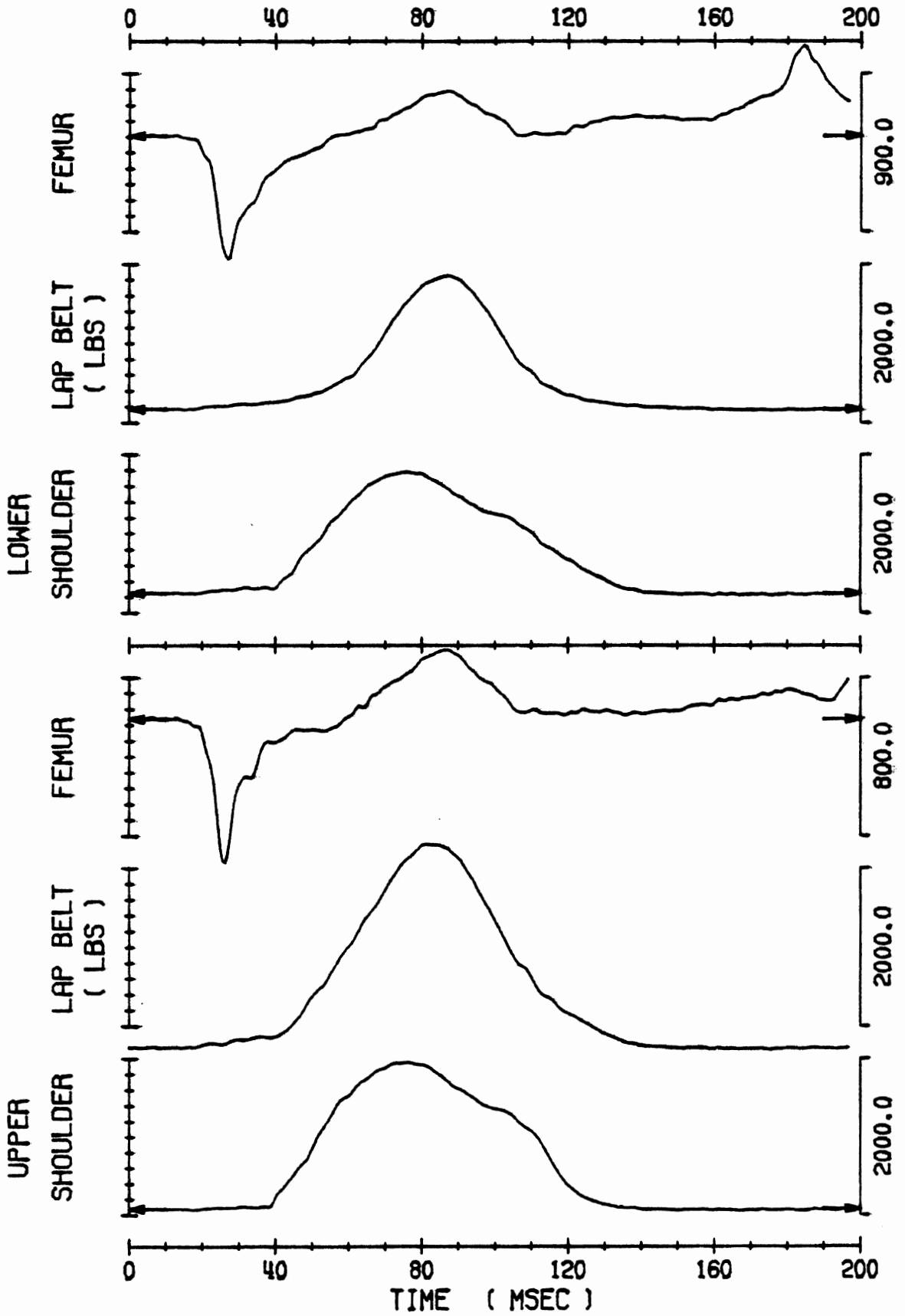
A-P



TIME (MSEC)

MEASURED ACCELERATIONS

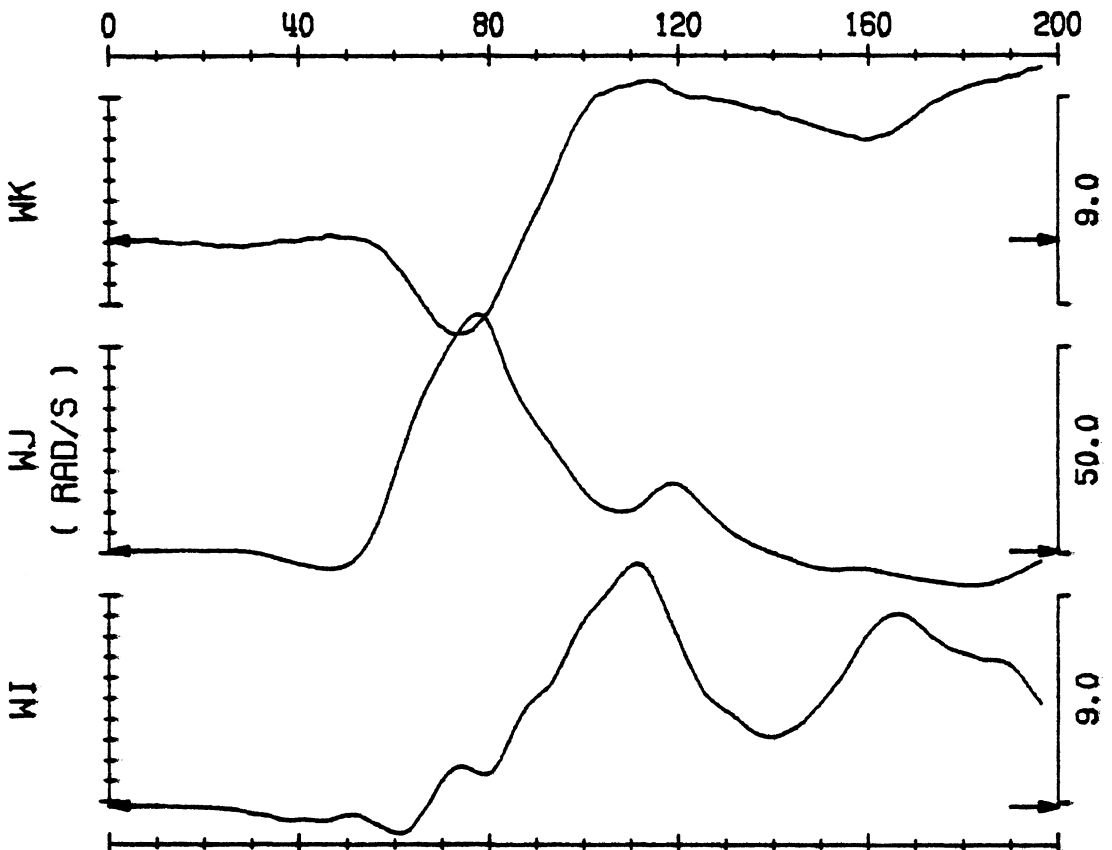
RIGHT SIDE



MEASURED FORCES

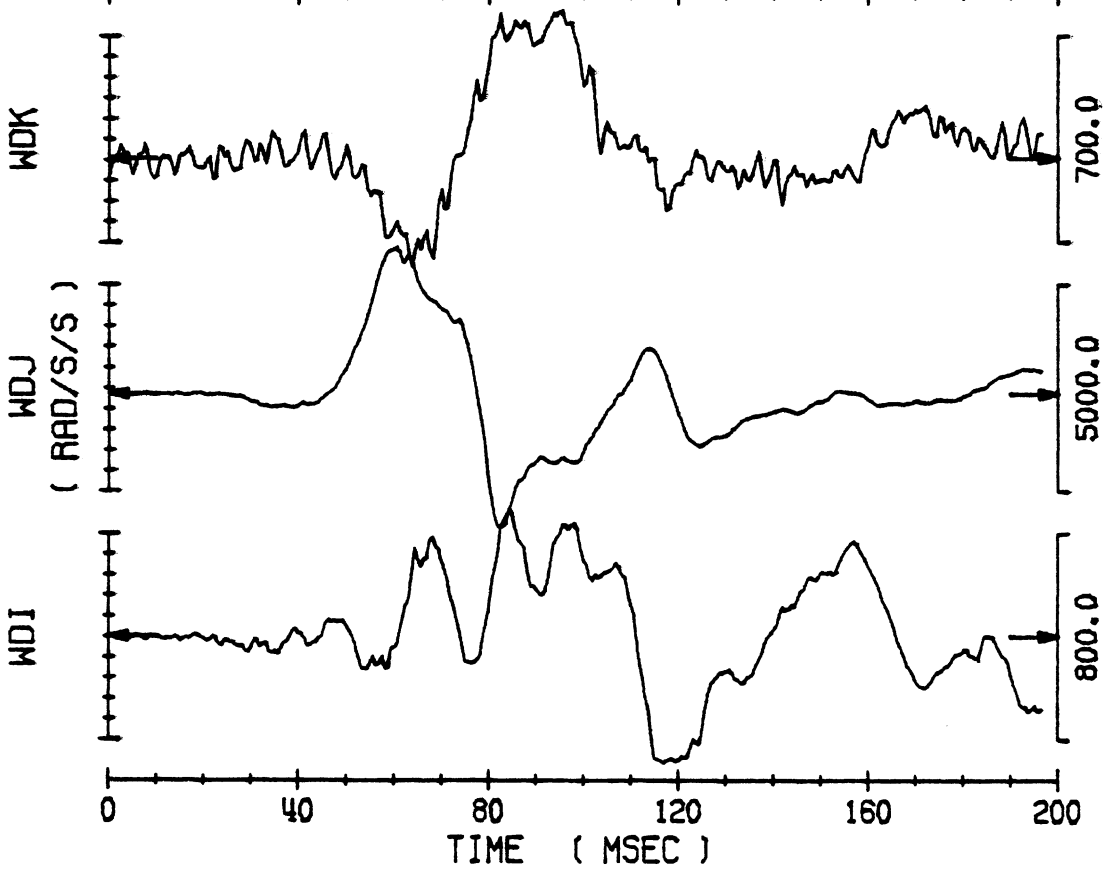
ANG VELOCITIES

ANATOMICAL



ANG ACCELERATIONS

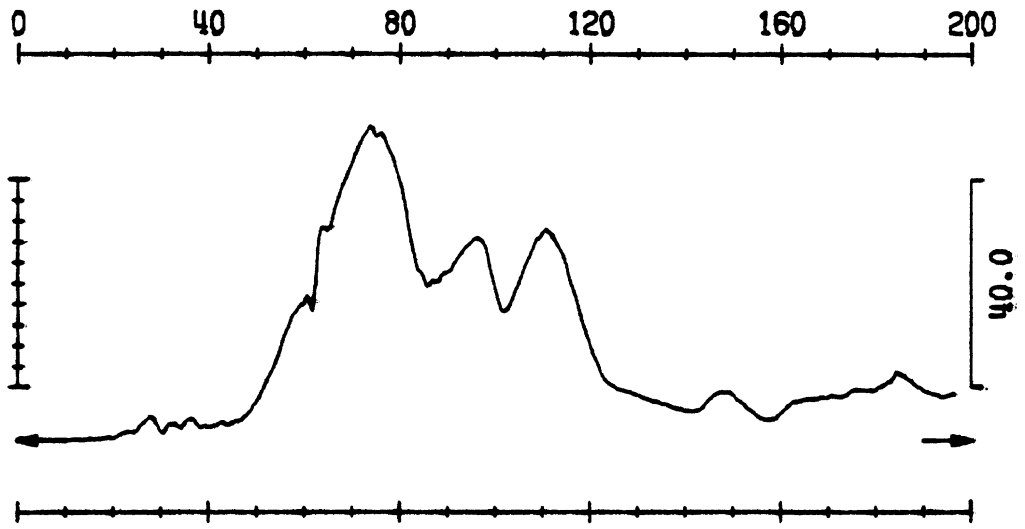
ANATOMICAL



3-D ANGULAR MOTION

RESULTANT

GSJ = 669
HIC = 561

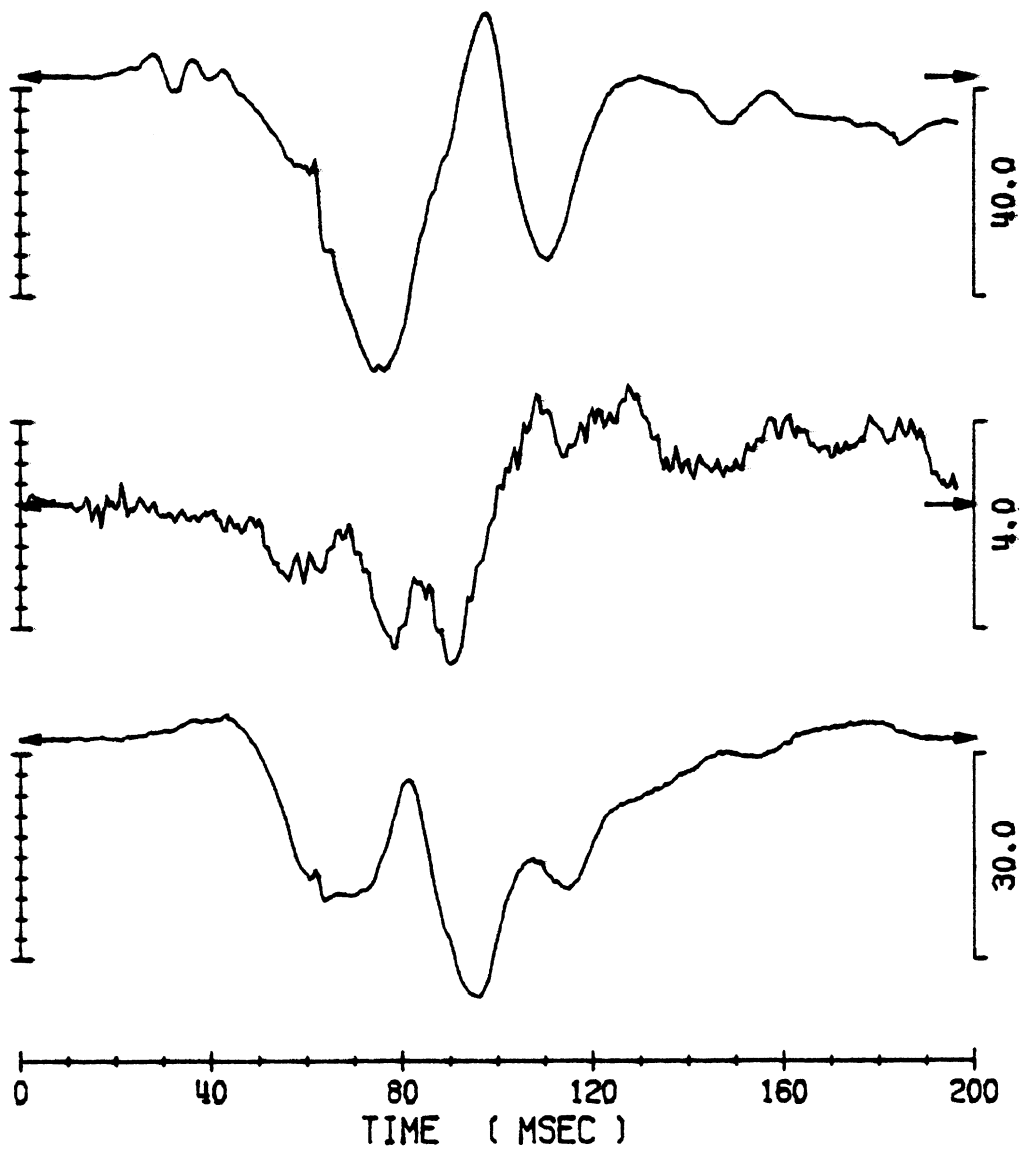


INTERNAL HEAD TRIAX

READINGS
L-R
(G'S)

S-J

A-P

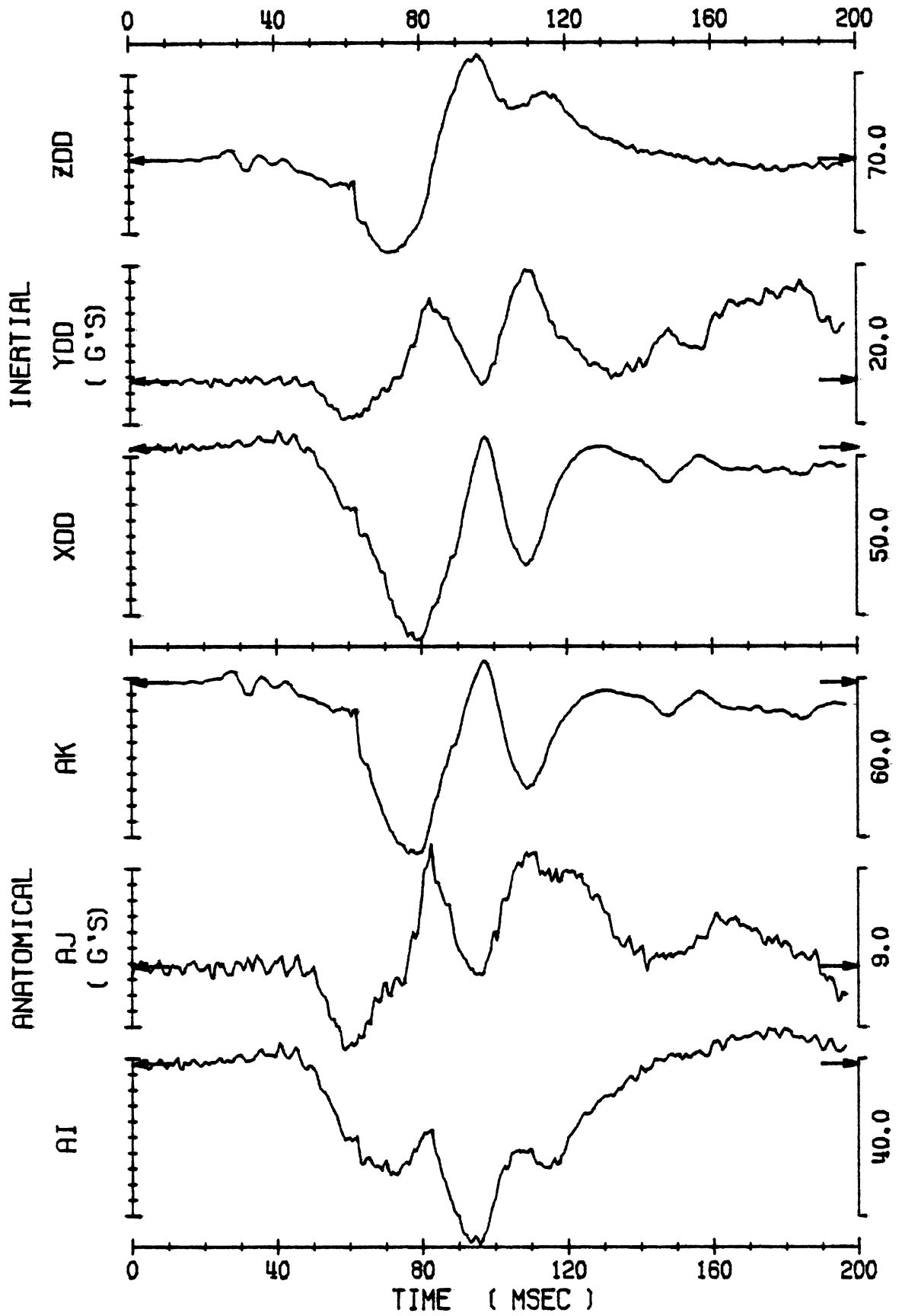


MEASURED ACCELERATIONS

ACC OF: HEAD C.G. GSI=1010, HIC= 859

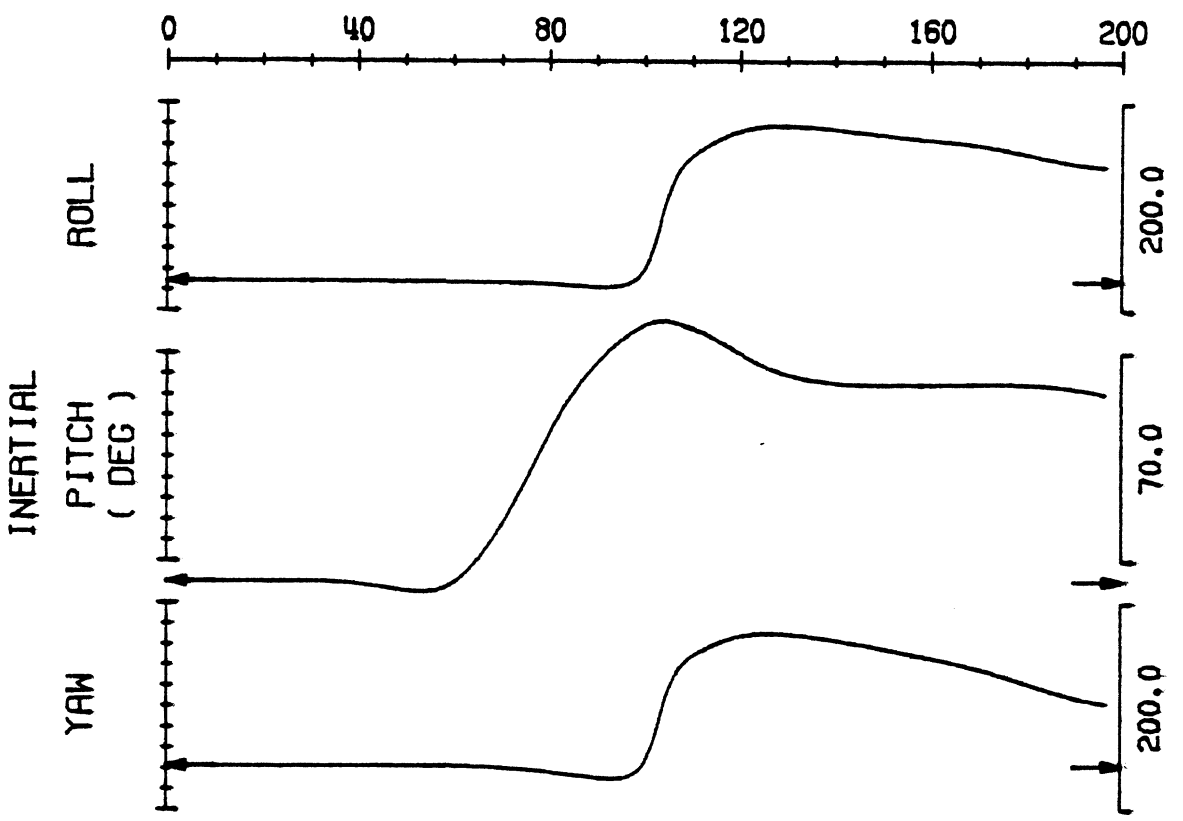
FILE: 109

77B107-1: HYB-3H

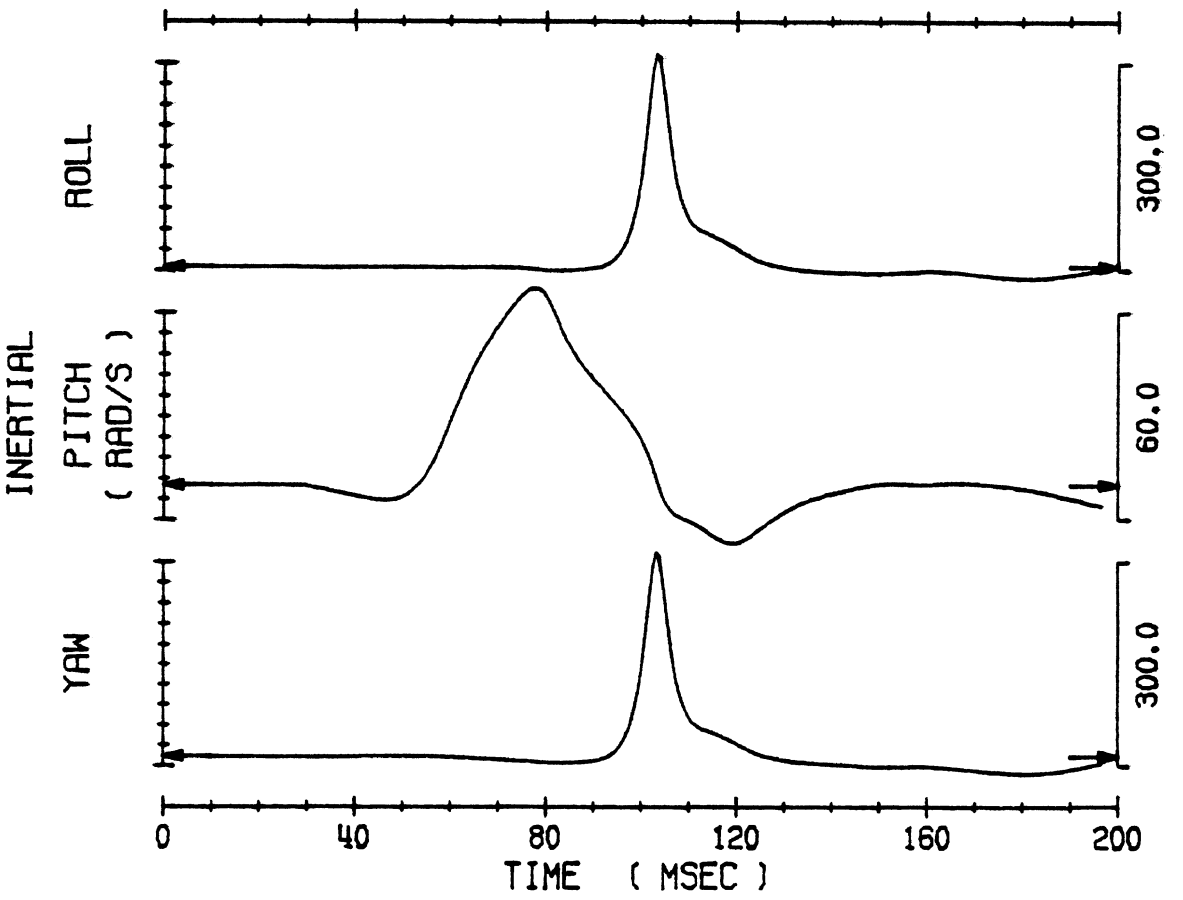


3-D ACCELERATIONS

EULER ANGLES



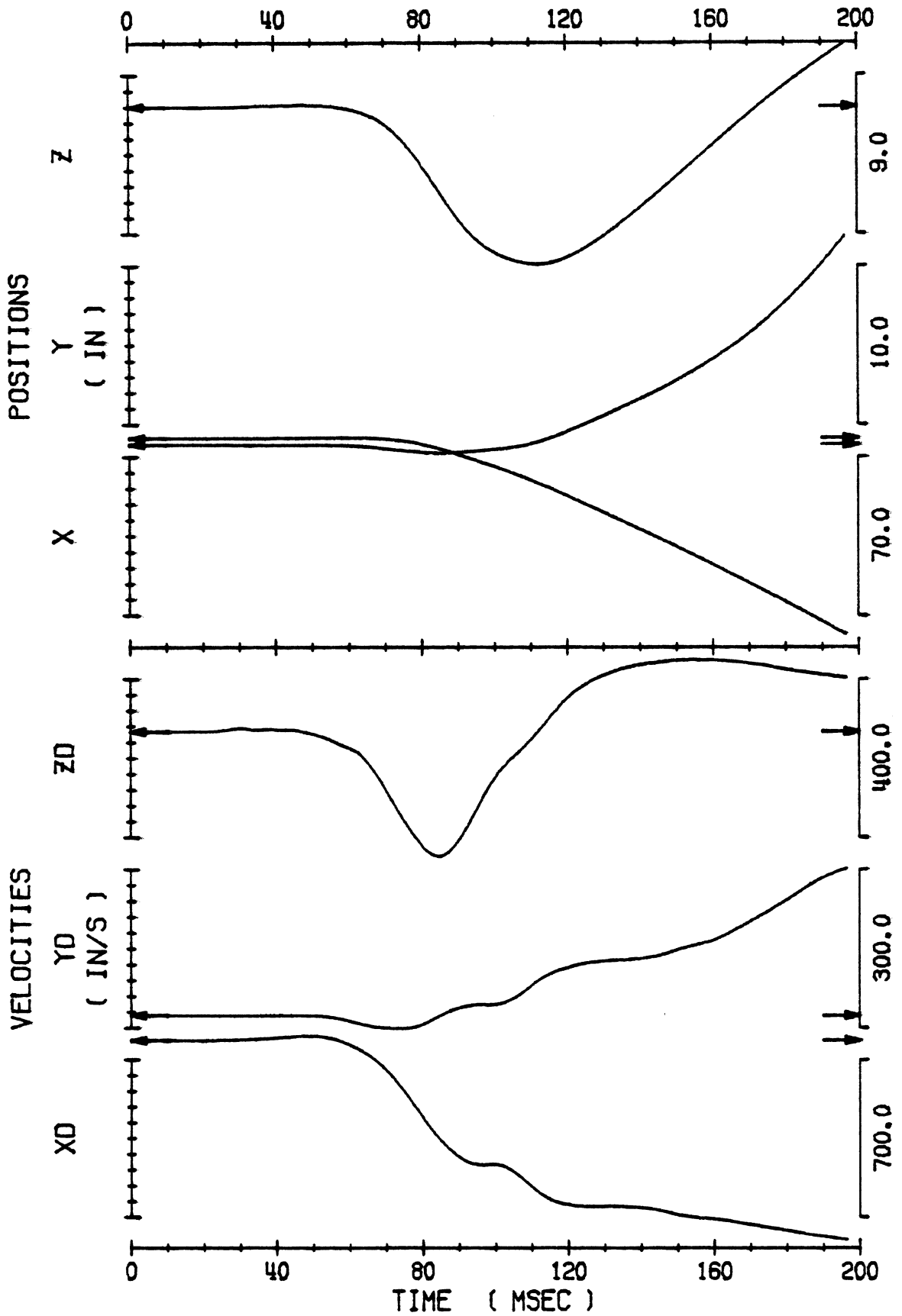
EULER RATES



3-D ROTATIONS

HEAD C.G.

INERTIAL MOTION OF:



3-D TRANSLATIONS

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WHOLE BODY RESPONSE

SUMMARY

TEST NO.: 77B108

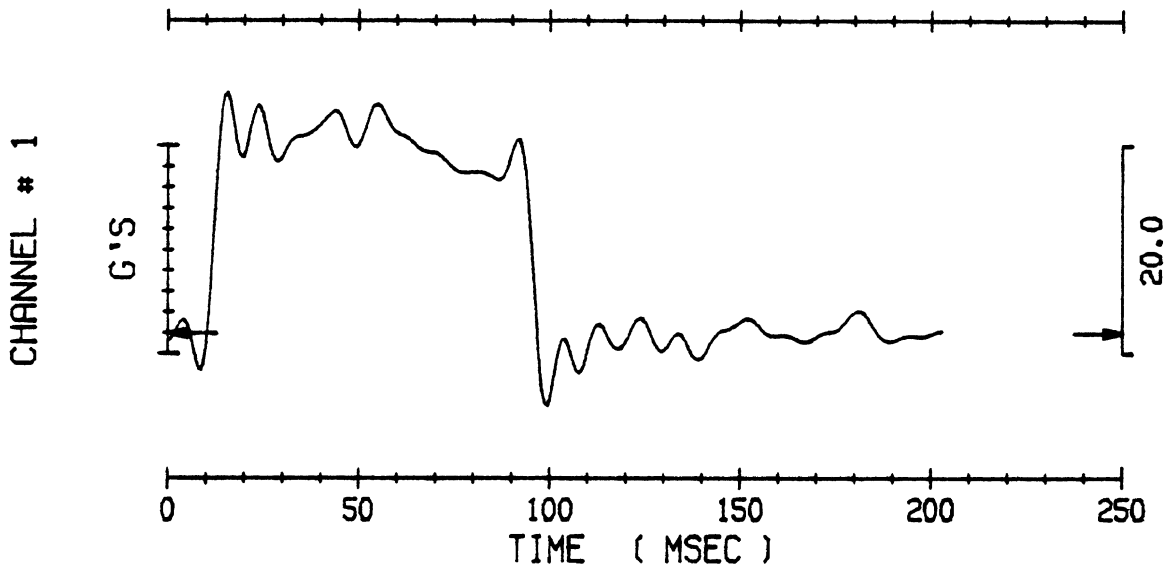
19.1 G-LEVEL
86. MS LONG
32.1 MPH DV
(32.3 ACTUAL)

	SHOULDER BELT		LAP BELT		FEMURS	
	UPPER	LOWER	LEFT	RIGHT	LEFT	RIGHT
PEAK FORCES: (LBS) @ (MS)	1881. 66.0	1502. 66.0	2498. 74.7	1741. 76.0	-504. 15.9	546. 171.7
NECK FORCES:	AP= 380. LBS @ 88. MS		SI= 540. LBS @ 67. MS		MOM= 1420. IN-LB @ 73. MS	

	RESULTANT PEAK	(A-P)		(L-R)		(S-I)	
		MIN	MAX	MIN	MAX	MIN	MAX
IN THORAX ACC: (G'S) @ (MS) GSI=	34. 61.6 249	-4. 141.7	32. 60.6	-5. 90.3	2. 73.9	-20. 86.9	9. 63.7
DEFLECTION= 1.00 IN @ 87. MS							
IN PELVIS ACC: (G'S) @	47. 77.9	-3. 143.0	42. 75.5	-6. 72.2	2. 42.6	-5. 114.0	26. 84.1
EX THORAX ACC: (G'S) @ GSI=	42. 52.2 324	-37. 54.8	5. 140.4	-6. 75.1	10. 89.7	-13. 53.4	29. 85.5
EX PELVIS ACC: (G'S) @	68. 76.0	-55. 76.2	4. 142.2	0. 0.0	0. 0.0	-4. 49.7	15. 98.9
.....							
HEAD ANG ACC : (RAD/S/S) @	3584. 51.6	-331. 104.7	783. 81.1	-2983. 74.7	3422. 51.7	-269. 54.7	503. 84.3
HEAD ANG VEL : (RAD/S) @	57.5 68.5	-1.4 52.5	10.1 88.5	-5.4 144.7	57.2 68.1	-2.9 63.7	7.9 106.1
EULER ANGLES : (DEGREES) @			113.0 117.0		85.9 93.8		133.9 119.8
.....							
HEAD C.G. ACC: (G'S) @	67. 67.9	2. 144.7	-44. 84.3	-5. 51.2	5. 99.1	-63. 68.2	-6. 144.7
HEAD C.G. HIC=	799						
HEAD C.G. VEL: (IN/S) @	939. 192.4	-796. 144.7	15. 40.5	-33. 65.9	88. 144.7	-306. 75.0	166. 146.5
HEAD C.G. DIS: (IN) @			-52.3 144.7		2.3 144.7		-8.5 102.6

FILE: 125

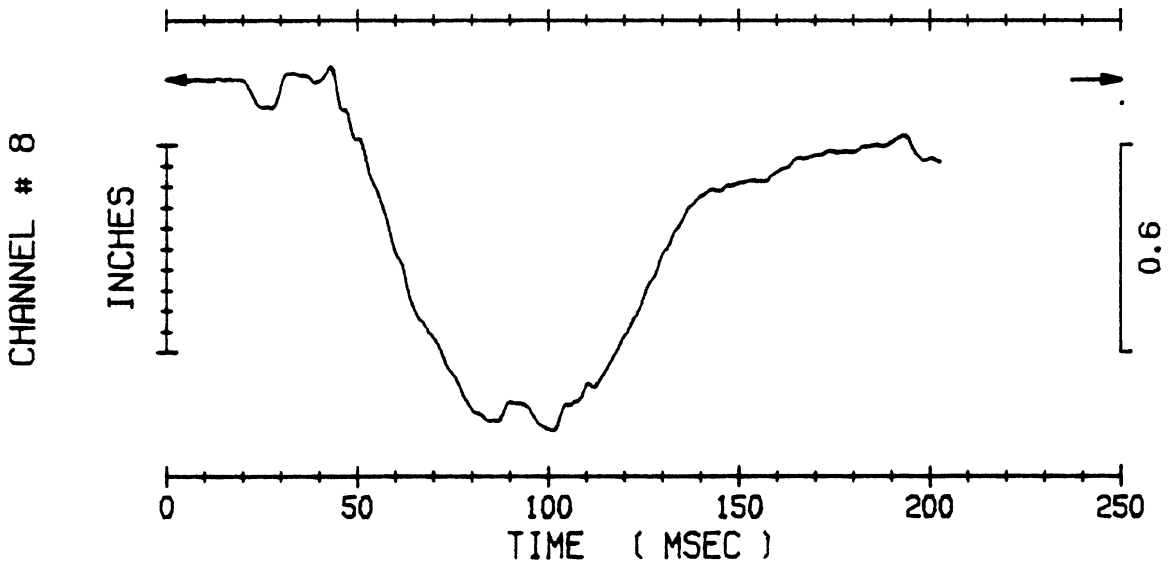
77B108-2: HYB-3H



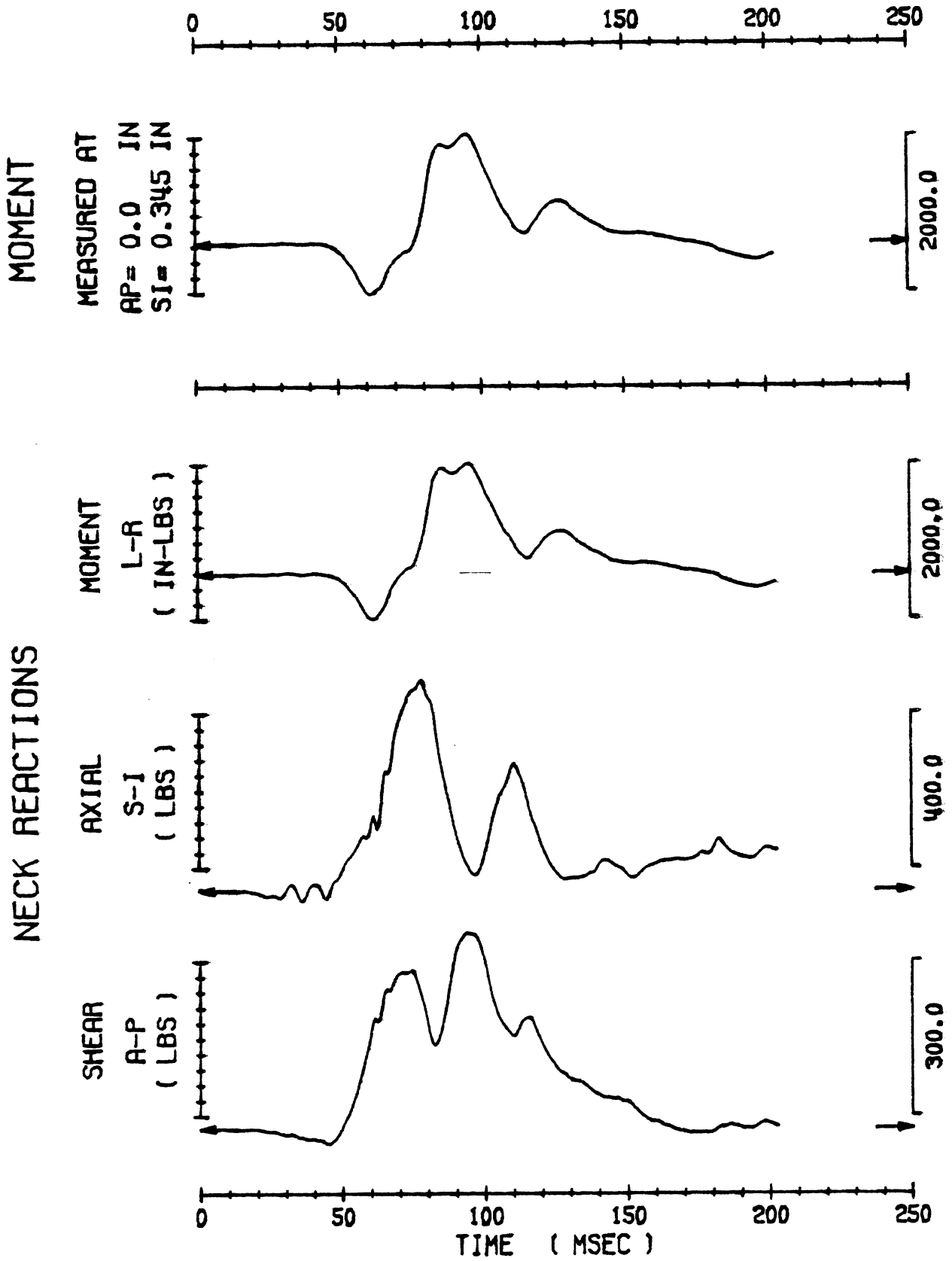
SLED DECELERATION

FILE: 130

77B108-3: HYB-3H



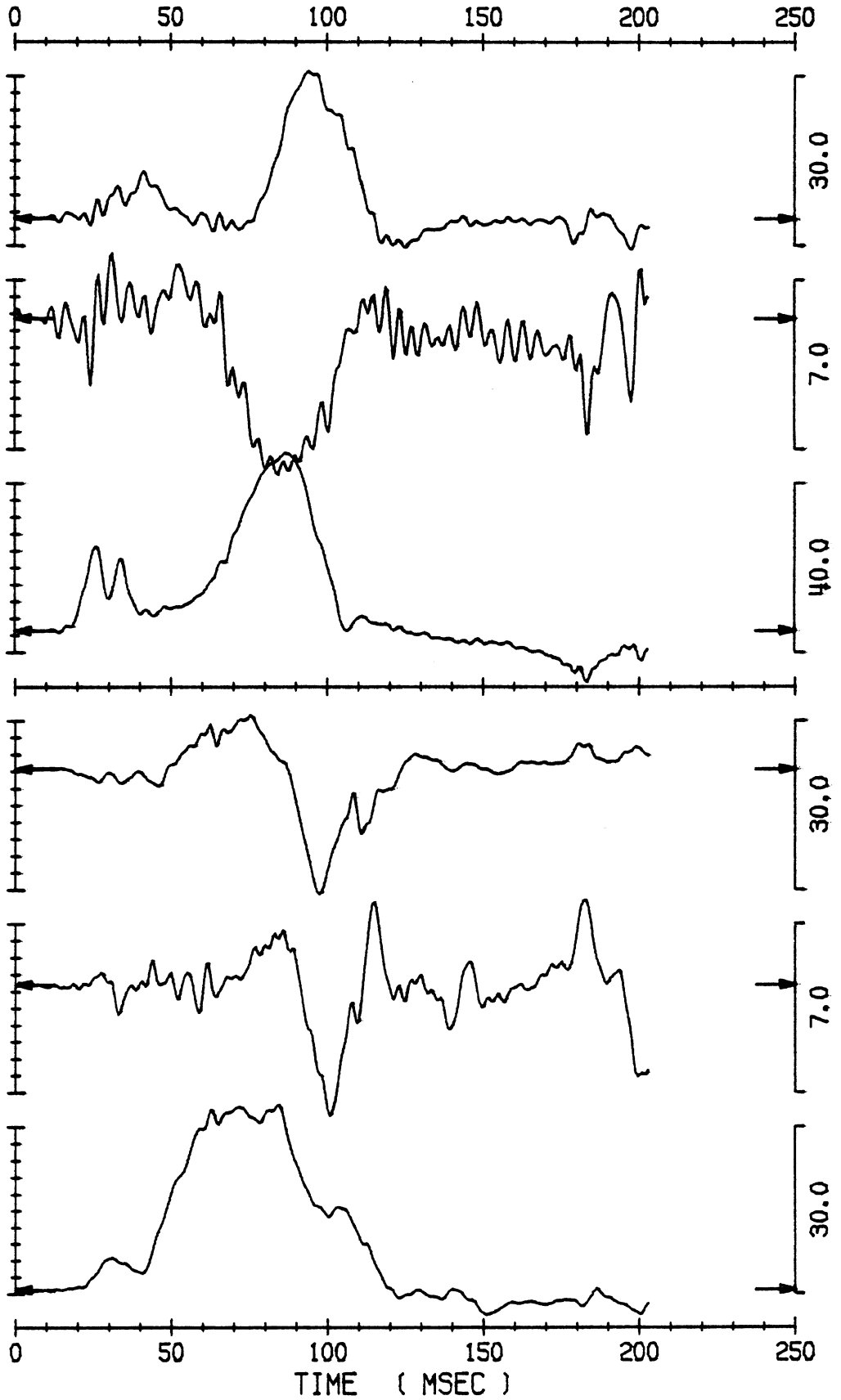
A-P CHEST DEFLECTION



MEASURED FORCES

INTERNAL
L-R
(G'S)

INTERNAL
L-R
(G'S)



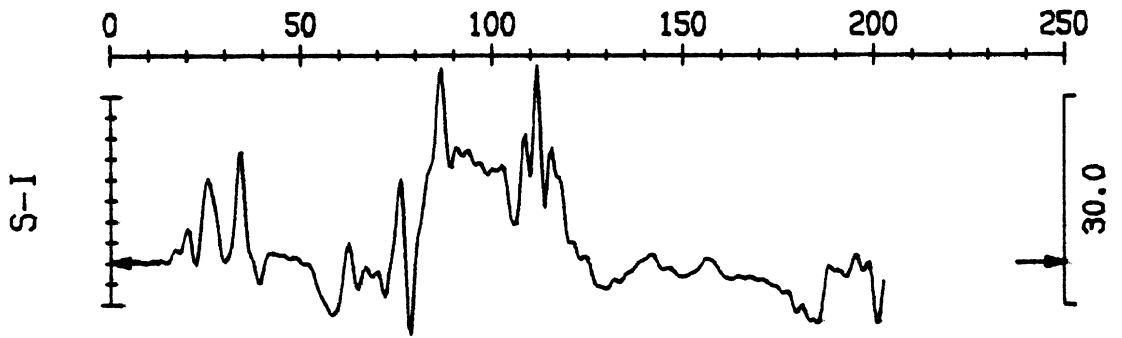
MEASURED ACCELERATIONS

FILE: 126

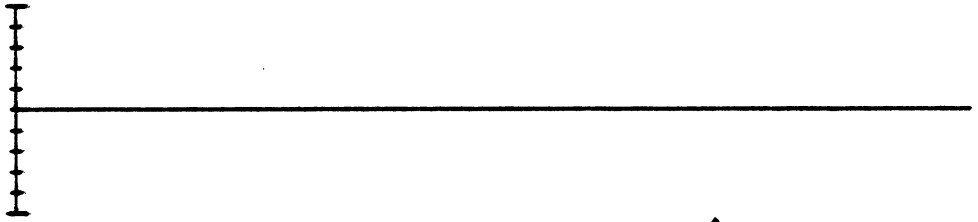
77B108-2: HYB-3H

PELVIS

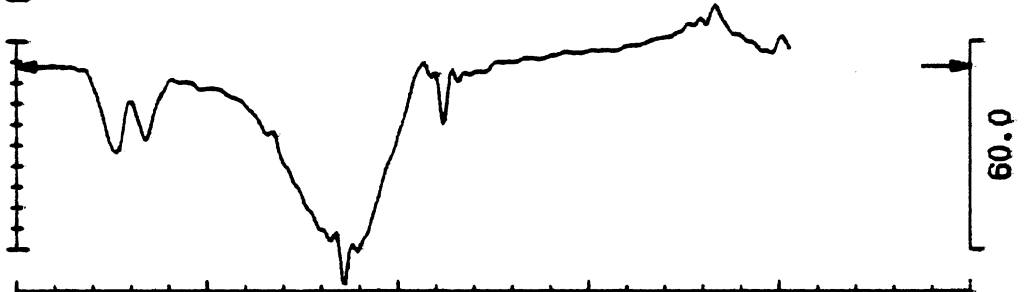
EXTERNAL



L-R
(G'S)



A-P



THORAX: (GSI= 325)

EXTERNAL



L-R
(G'S)



A-P



TIME (MSEC)

MEASURED ACCELERATIONS

LEFT SIDE

RIGHT SIDE

UPPER
SHOULDER

LAP BELT
(LBS)

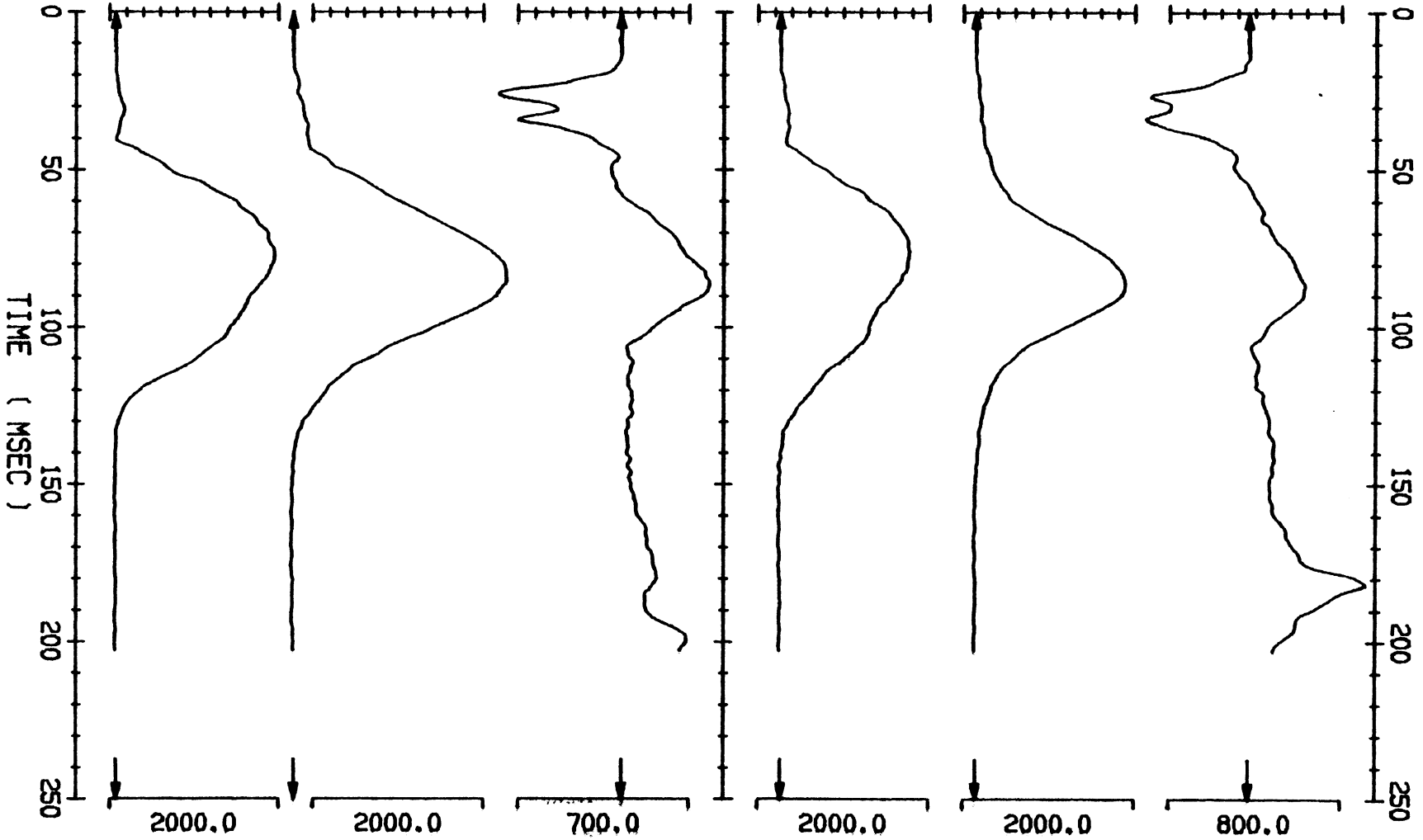
FEMUR

LOWER
SHOULDER

LAP BELT
(LBS)

FEMUR

MEASURED FORCES



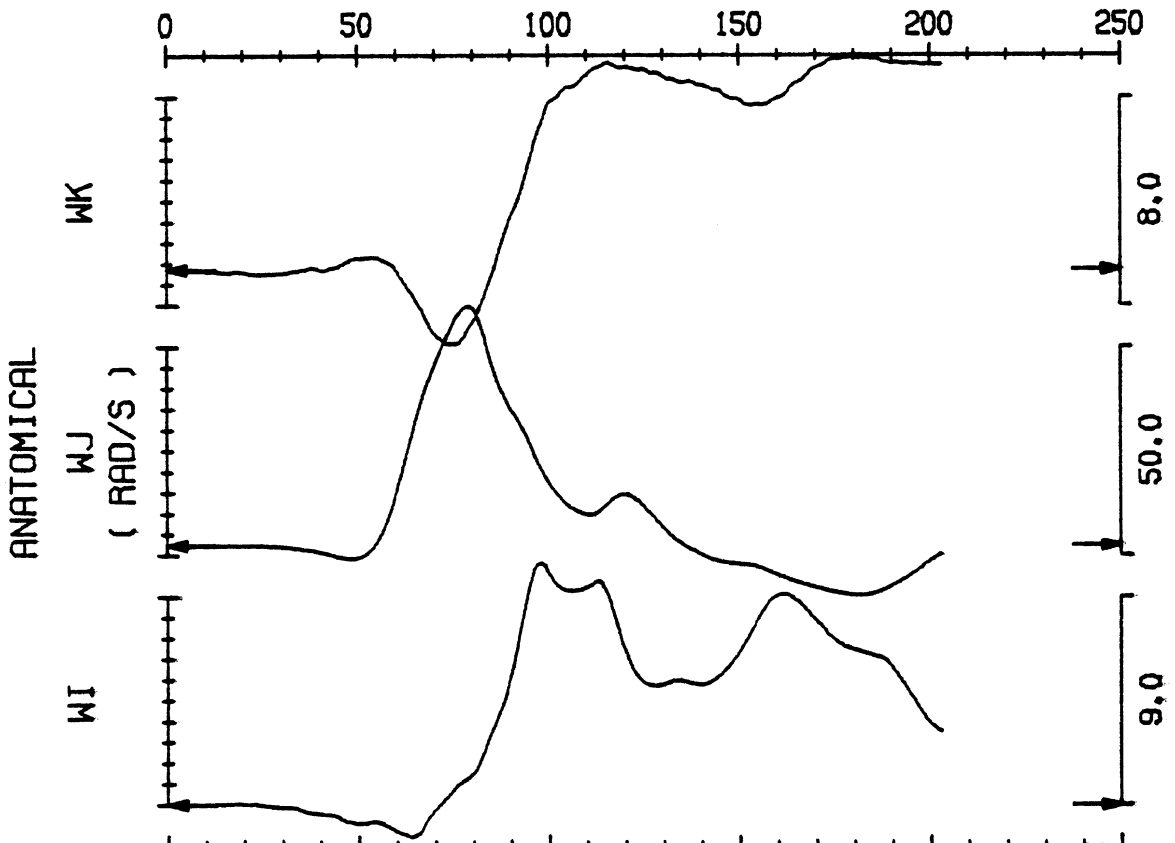
FILE: 127

77B108-2: HYB-3H

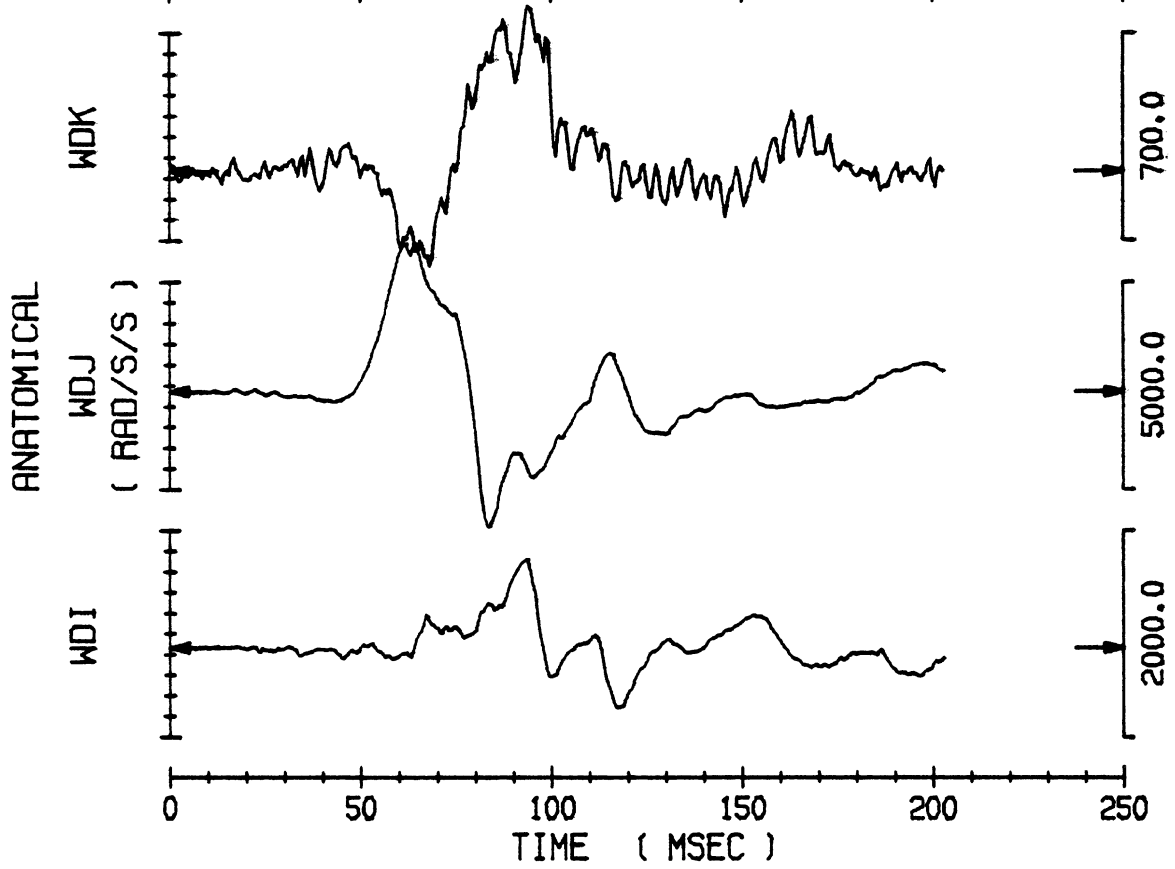
FILE: 121

77B108-1: HYB-3H

ANG VELOCITIES



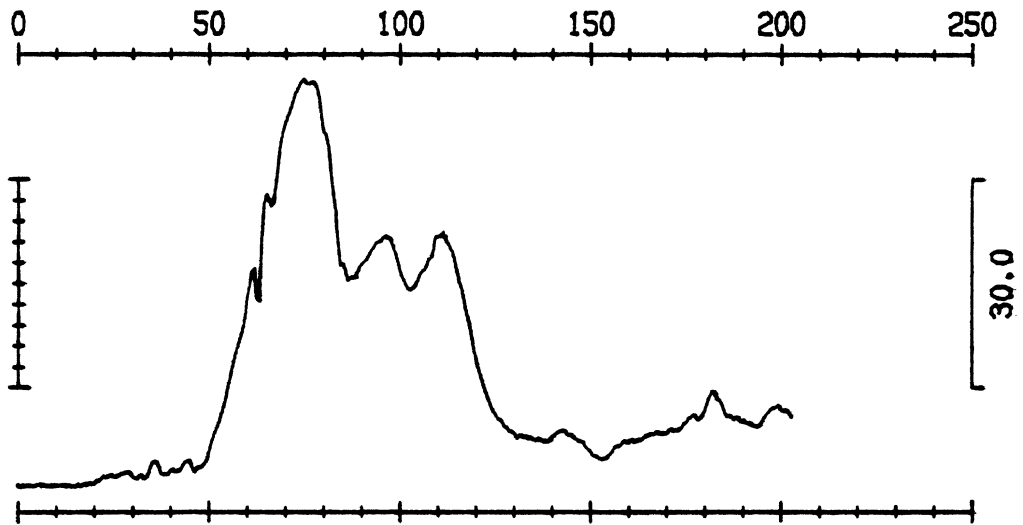
ANG ACCELERATIONS



3-D ANGULAR MOTION

RESULTANT

GSI = 641
HIC = 535

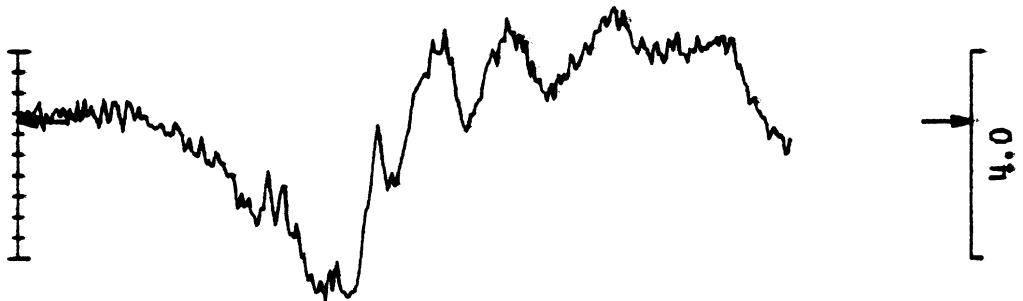


INTERNAL HEAD TRIAX

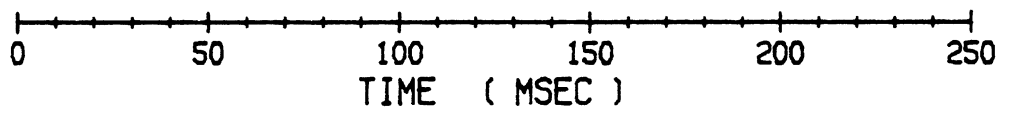
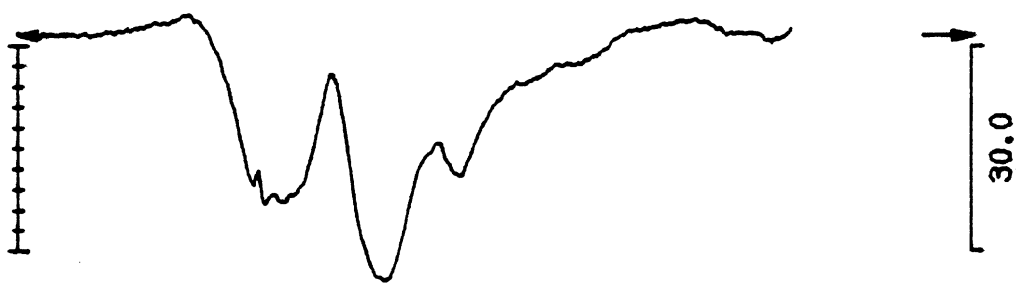
S-I



READINGS
L-R
(G'S)



A-P



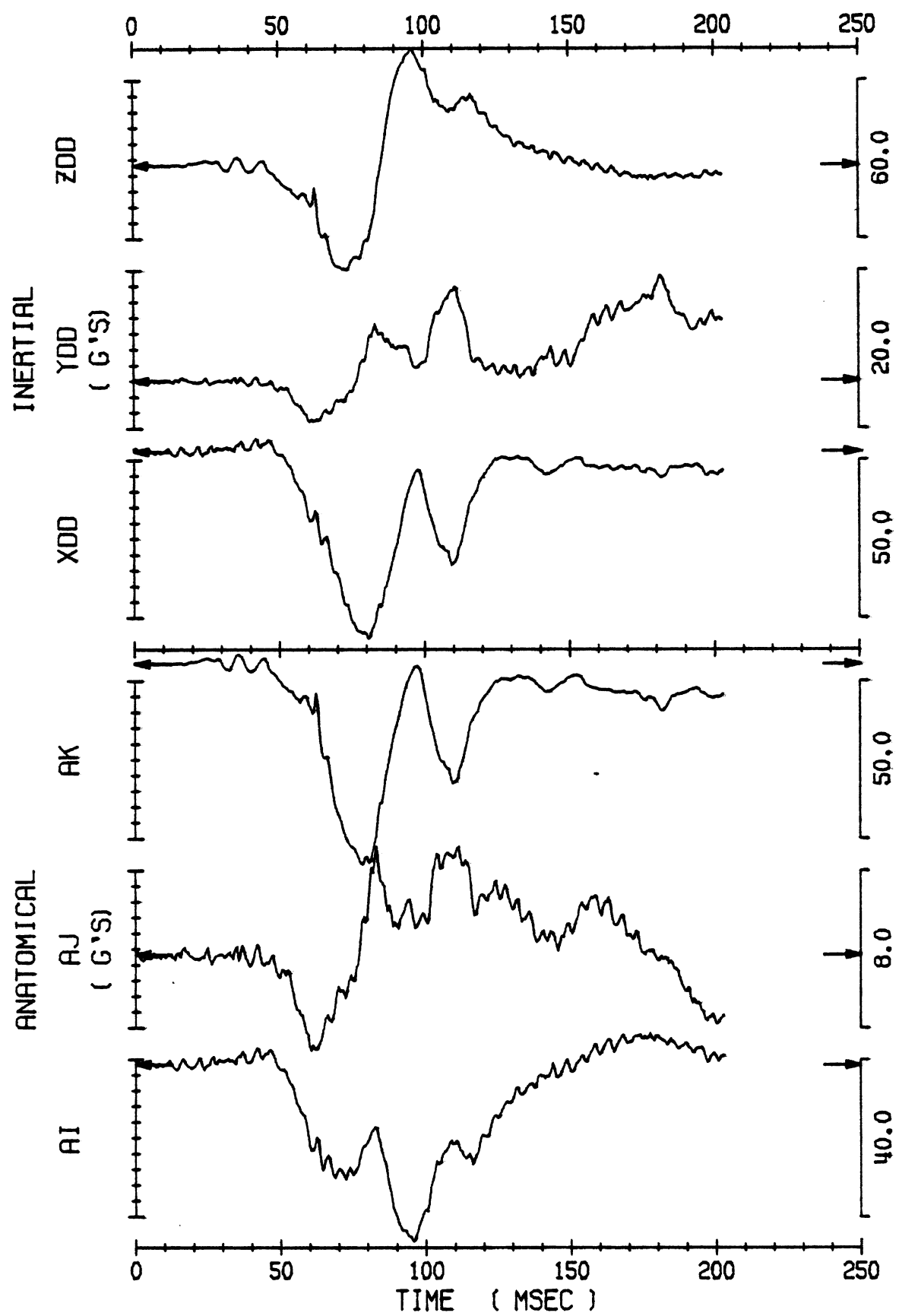
MEASURED ACCELERATIONS

GSI= 940, HIC= 799

ACC OF: HEAD C.G.

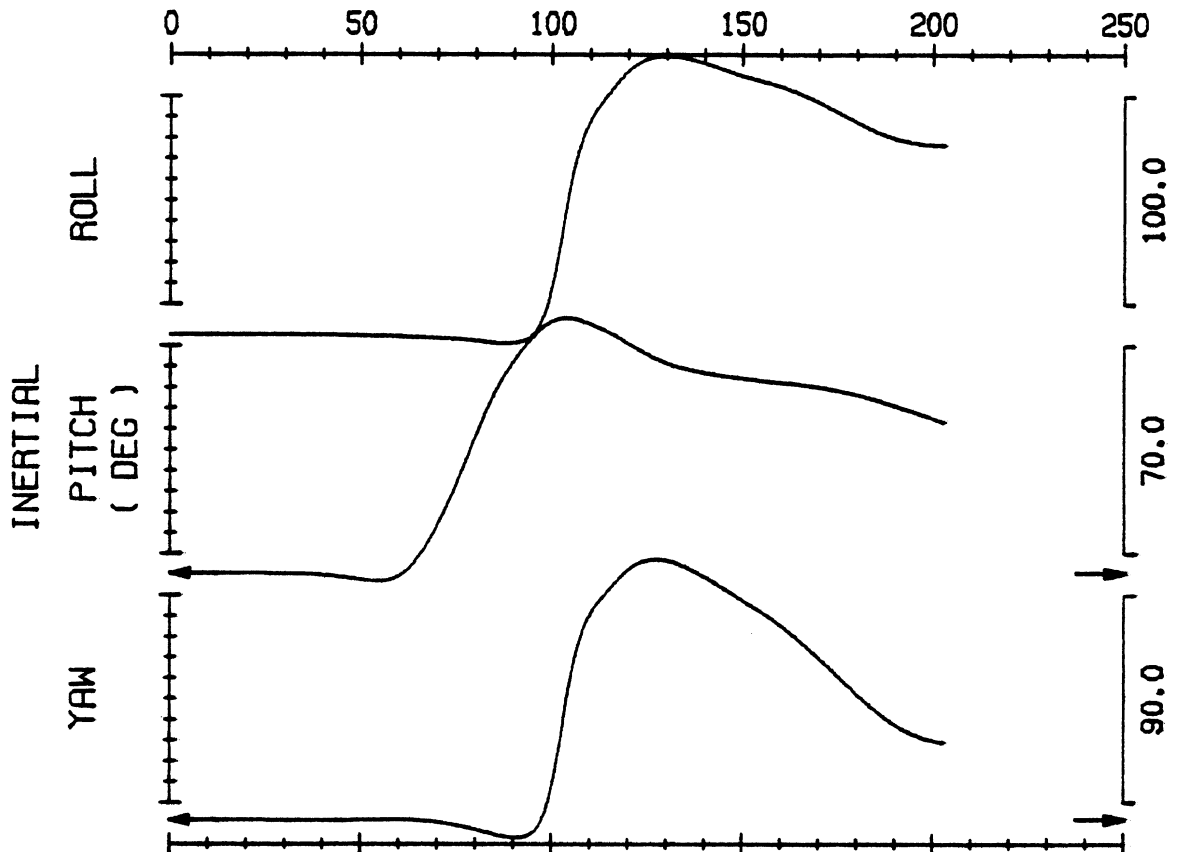
FILE: 123

77B108-1: HYB-3H

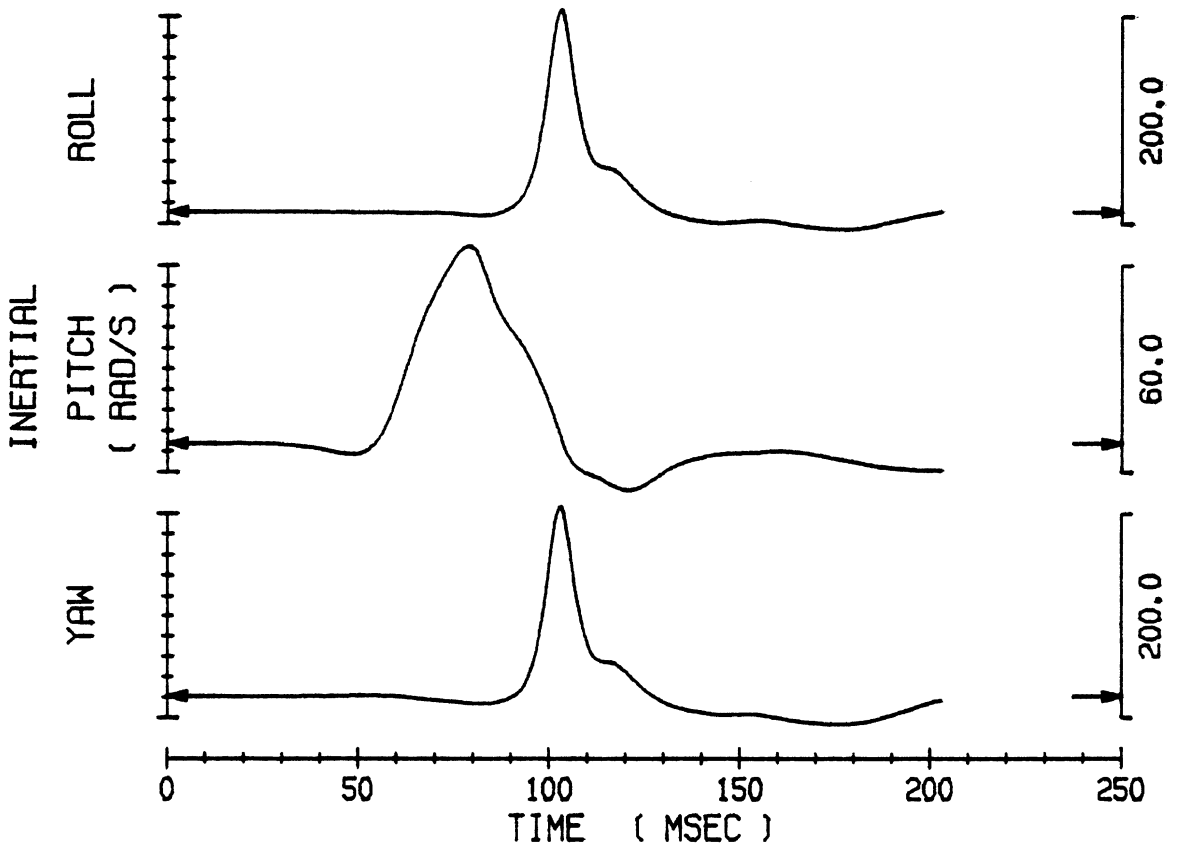


3-D ACCELERATIONS

EULER ANGLES



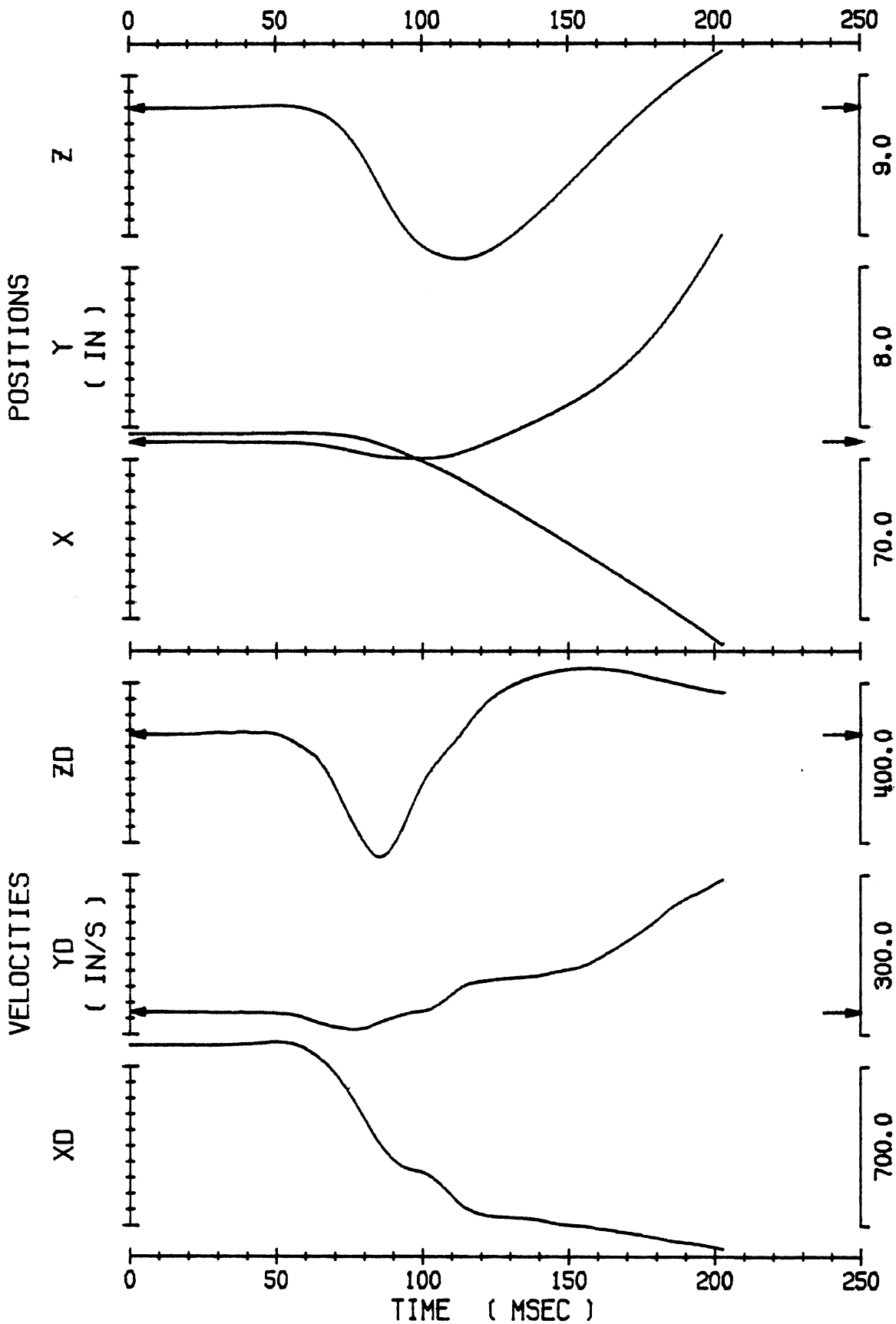
EULER RATES



3-D ROTATIONS

HEAD C.G.

INERTIAL MOTION OF:



3-D TRANSLATIONS

WHOLE BODY RESPONSE

SUMMARY

TEST NO.: 77B109

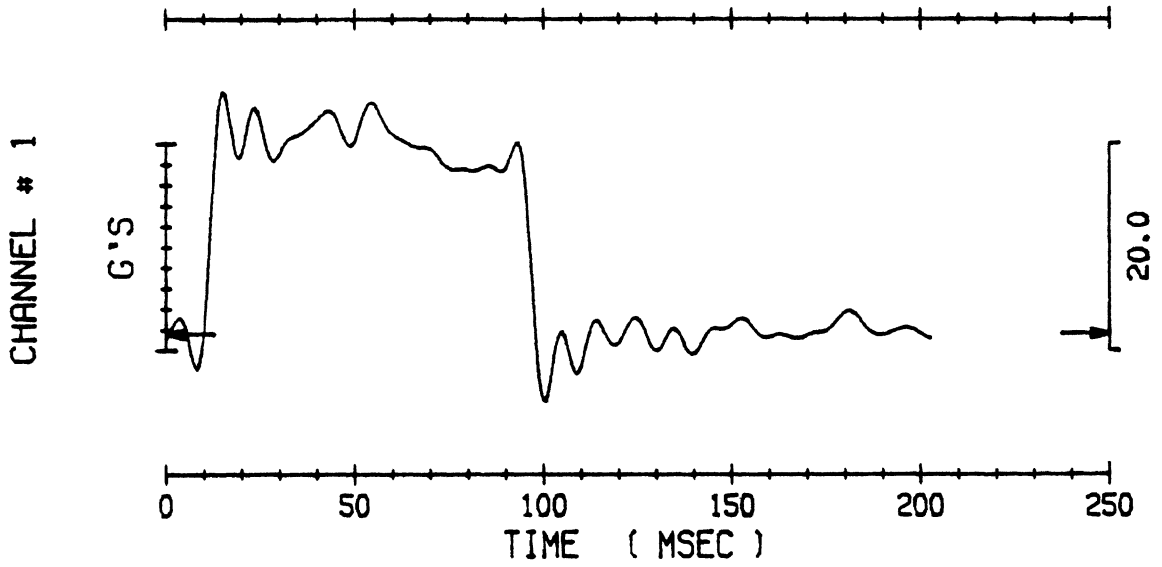
19.4 G-LEVEL
88. MS LONG
34.1 MPH DV
(32.7 ACTUAL)

	SHOULDER BELT		LAP BELT		FEMURS	
	UPPER	LOWER	LEFT	RIGHT	LEFT	RIGHT
PEAK FORCES: (LBS) @ (MS)	1891. 68.2	1518. 64.4	2383. 74.4	1646. 76.3	-564. 16.3	606. 169.5
NECK FORCES:	AP= 390. LBS @ 81. MS		SI= 570. LBS @ 64. MS		MOM= 1460. IN-LB @ 69. MS	

	RESULTANT PEAK	(A-P)		(L-R)		(S-I)	
		MIN	MAX	MIN	MAX	MIN	MAX
IN THORAX ACC: (G'S) @ (MS) GSI=	34. 60.7 245	-4. 145.4	32. 58.9	-7. 94.0	3. 108.0	-20. 86.7	11. 64.6
DEFLECTION= 0.96 IN @ 83. MS							
IN PELVIS ACC: (G'S) @	48. 78.8	-3. 145.0	42. 77.5	-3. 70.5	1. 109.2	-1. 145.1	27. 83.3
EX THORAX ACC: (G'S) @ GSI=	42. 51.9 344	-38. 53.0	3. 145.6	-5. 106.8	13. 93.8	-15. 53.2	30. 84.8
EX PELVIS ACC: (G'S) @	66. 76.9	-60. 77.0	6. 145.0	0. 0.0	0. 0.0	-5. 57.1	20. 81.7
.....							
HEAD ANG ACC : (RAD/S/S) @	3862. 53.8	-530. 110.5	516. 83.7	-2789. 74.5	3761. 52.1	-268. 54.7	519. 74.4
HEAD ANG VEL : (RAD/S) @	58.1 67.5	-1.0 53.3	9.3 152.5	-6.7 155.0	57.5 67.3	-4.0 64.3	8.8 186.0
EULER ANGLES : (DEGREES) @			141.6 105.0		83.5 105.0		152.3 105.0
.....							
HEAD C.G. ACC: (G'S) @	69. 67.5	-45. 84.3	8. 164.8	-4. 51.2	5. 73.0	-66. 67.9	-2. 85.3
HEAD C.G. HIC=	844						
HEAD C.G. VEL: (IN/S) @	1003. 192.6	-831. 145.0	17. 40.6	-23. 62.3	120. 145.0	-322. 74.6	145. 142.6
HEAD C.G. DIS: (IN) @			-53.7 145.0		4.5 145.0		-9.1 102.6

FILE: 141

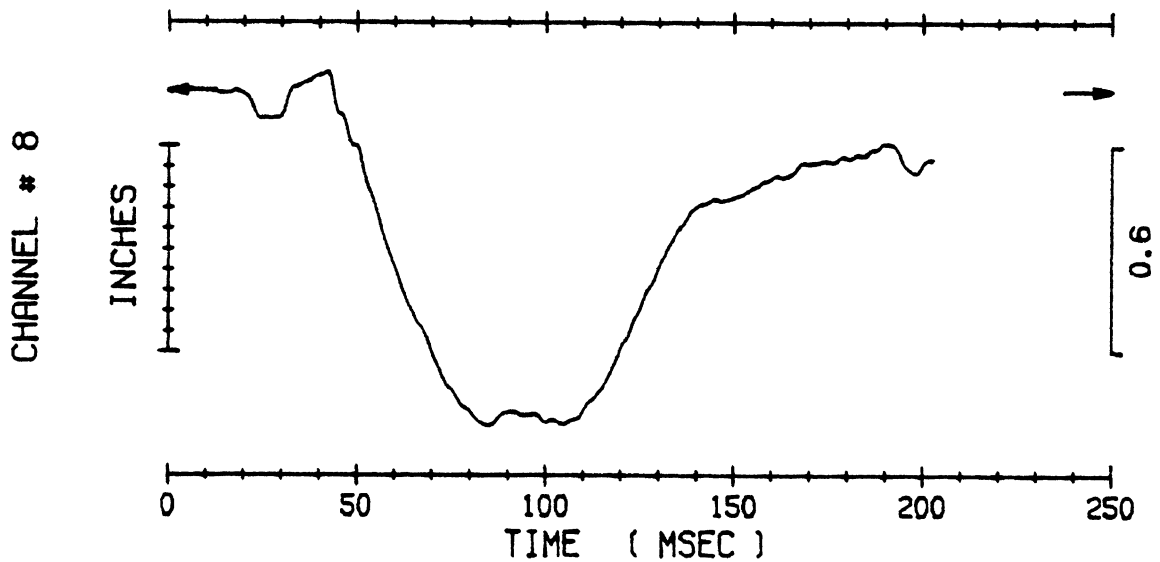
77B109-2: HYB-3H



SLED DECELERATION

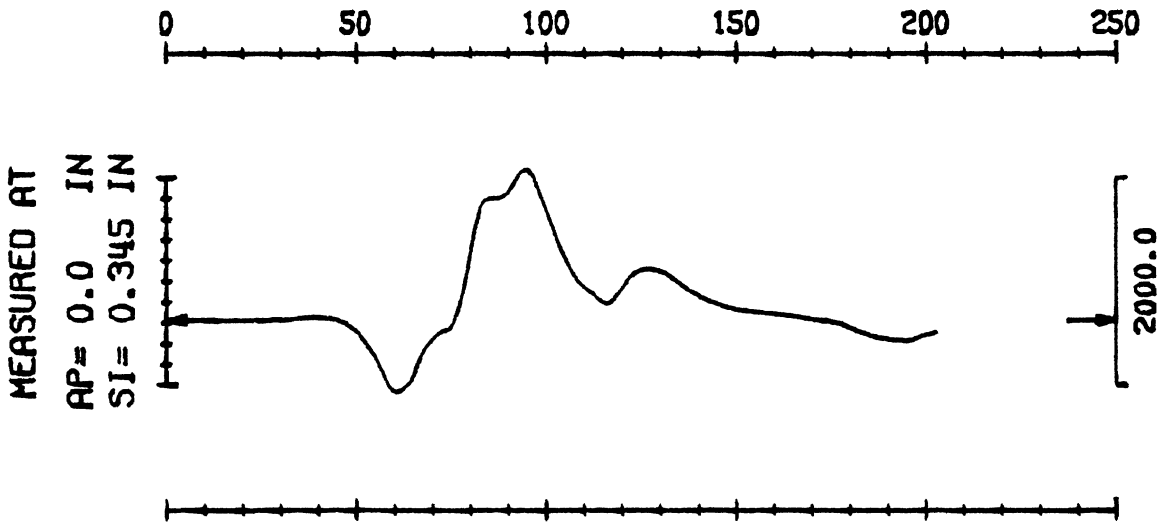
FILE: 147

77B109-3: HYB-3H

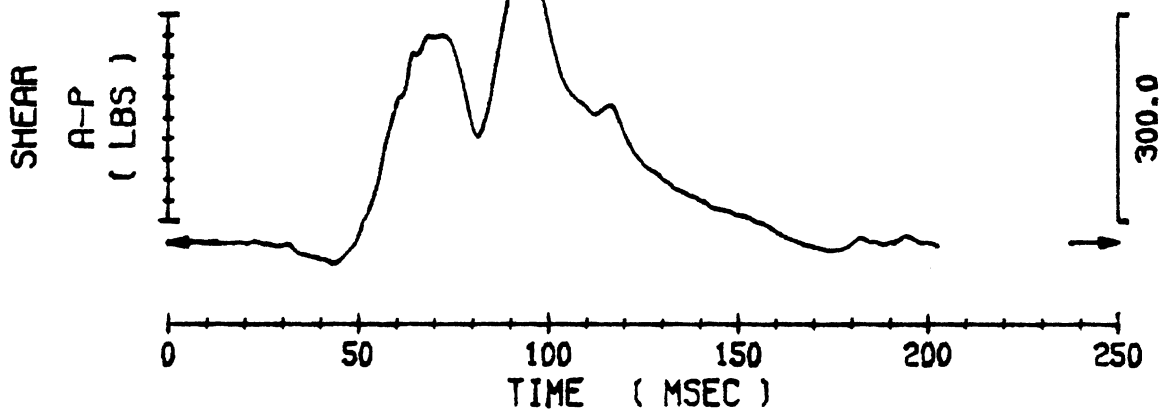
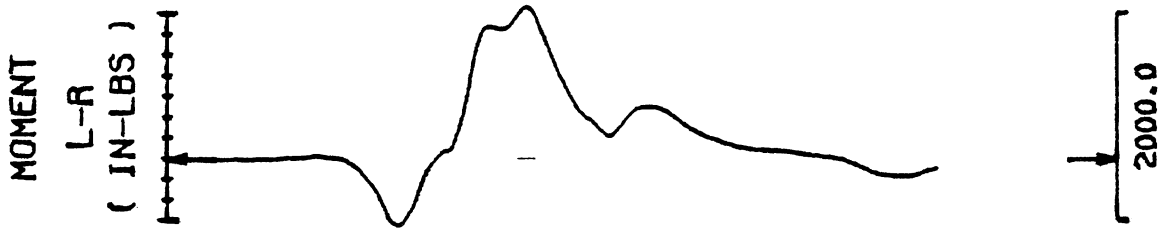


A-P CHEST DEFLECTION

MOMENT



NECK REACTIONS



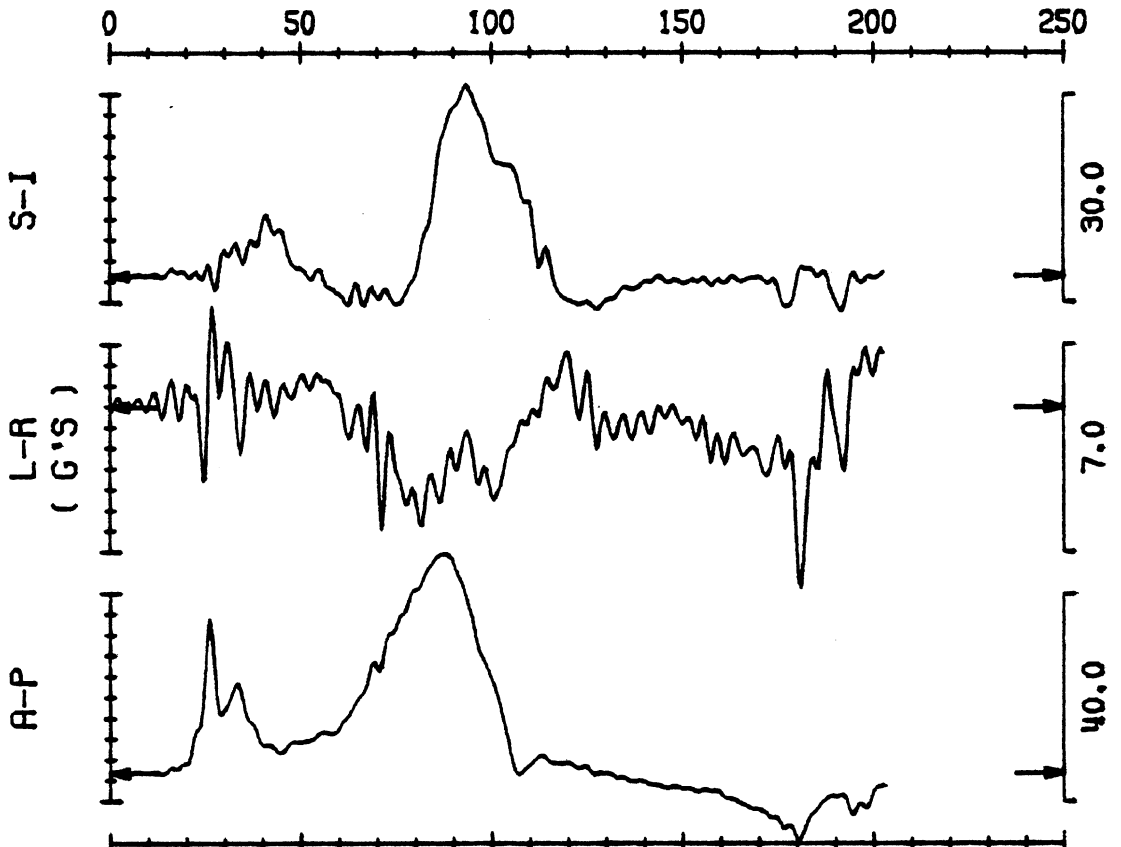
MEASURED FORCES

FILE: 148

77B109-1: HYB-3H

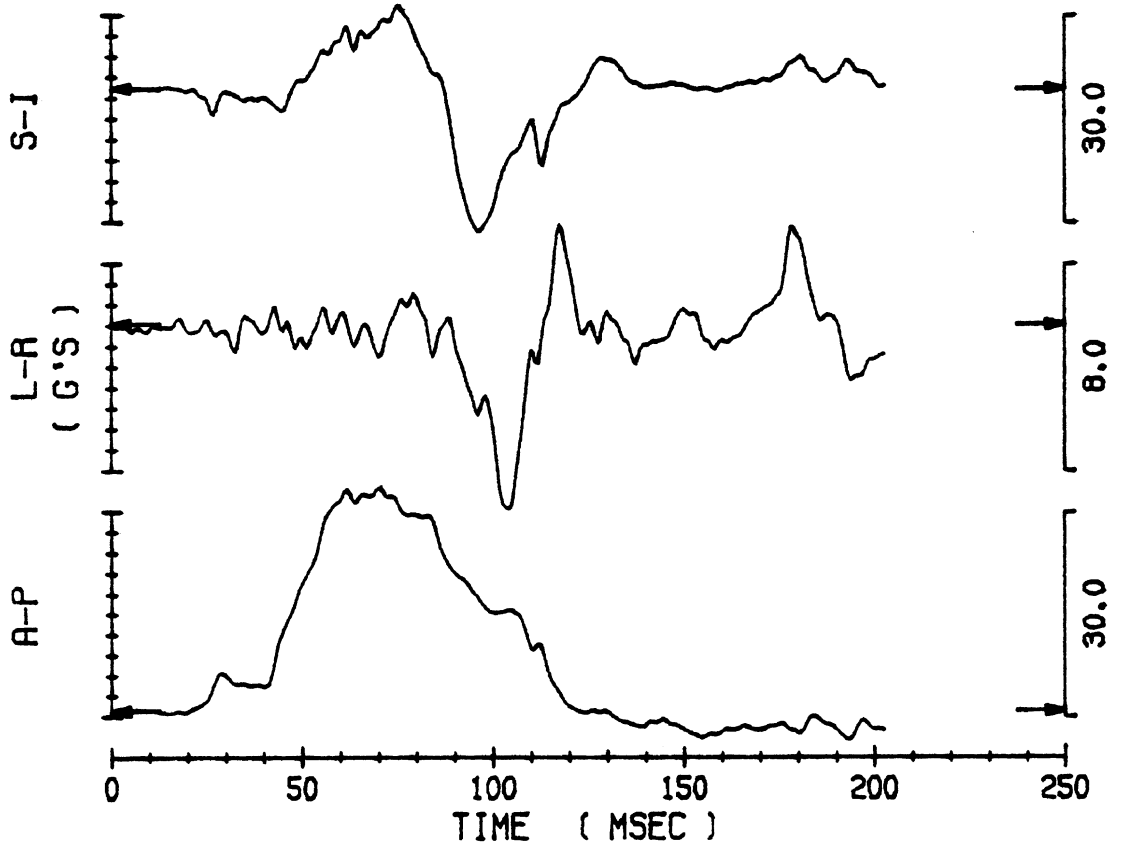
PELVIS

INTERNAL



THORAX: (GSI= 246)

INTERNAL



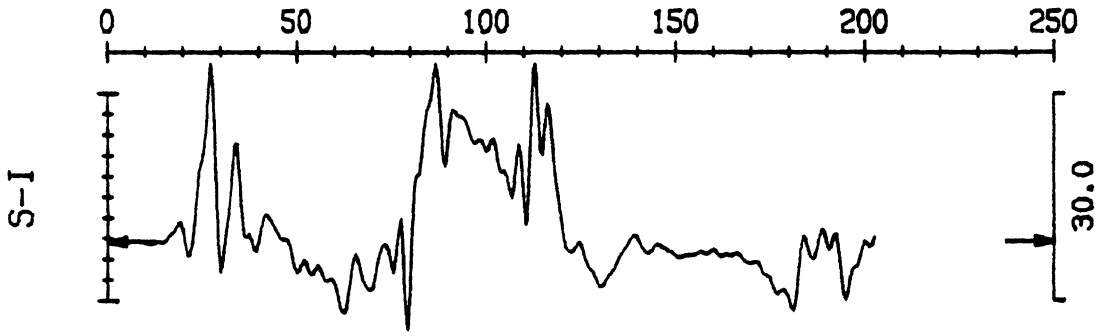
MEASURED ACCELERATIONS

FILE: 142

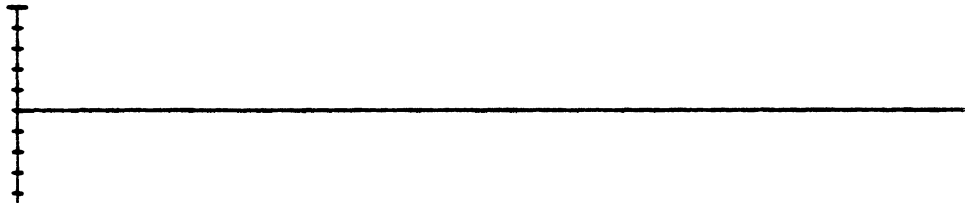
77B109-2: HYB-3H

PELVIS

EXTERNAL



L-R
(G'S)



A-P



THORAX: (GSI= 344)

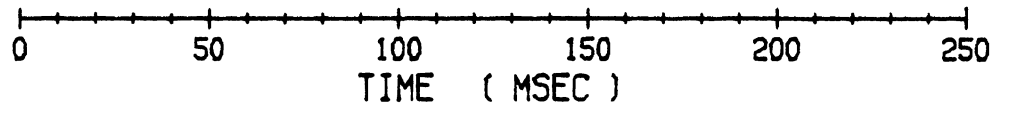
EXTERNAL



L-R
(G'S)

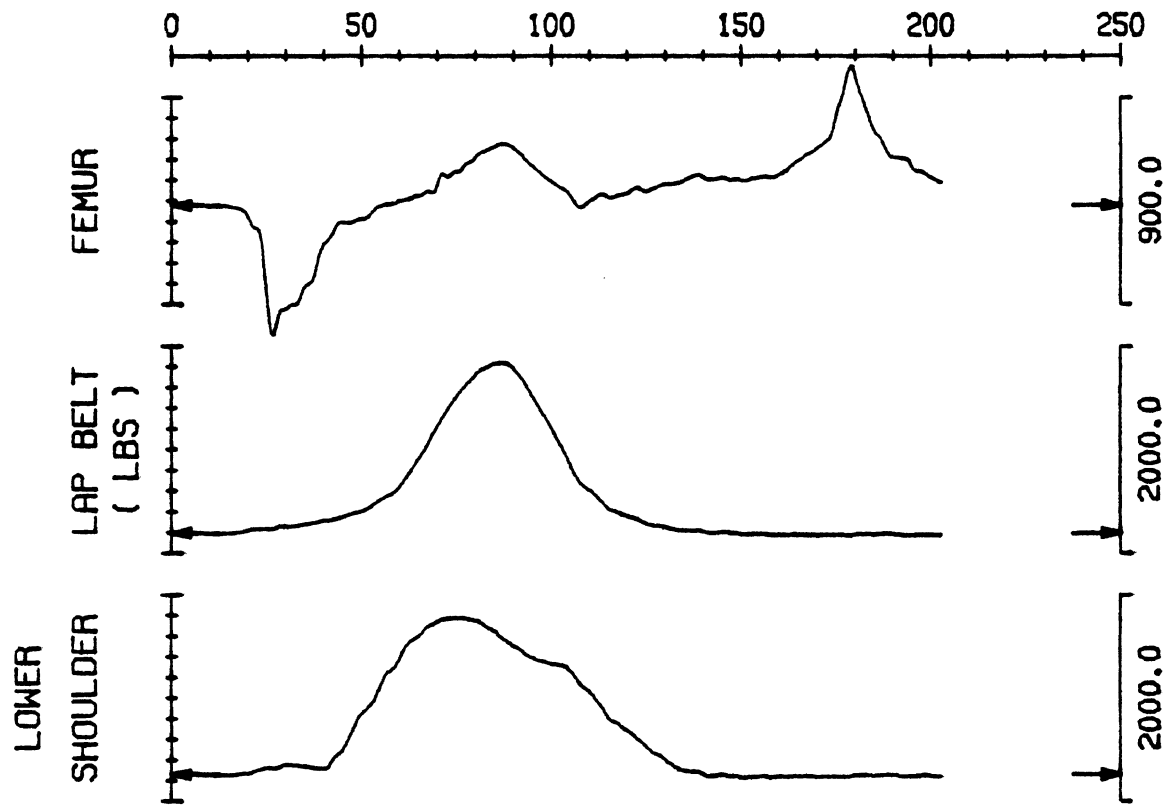


A-P

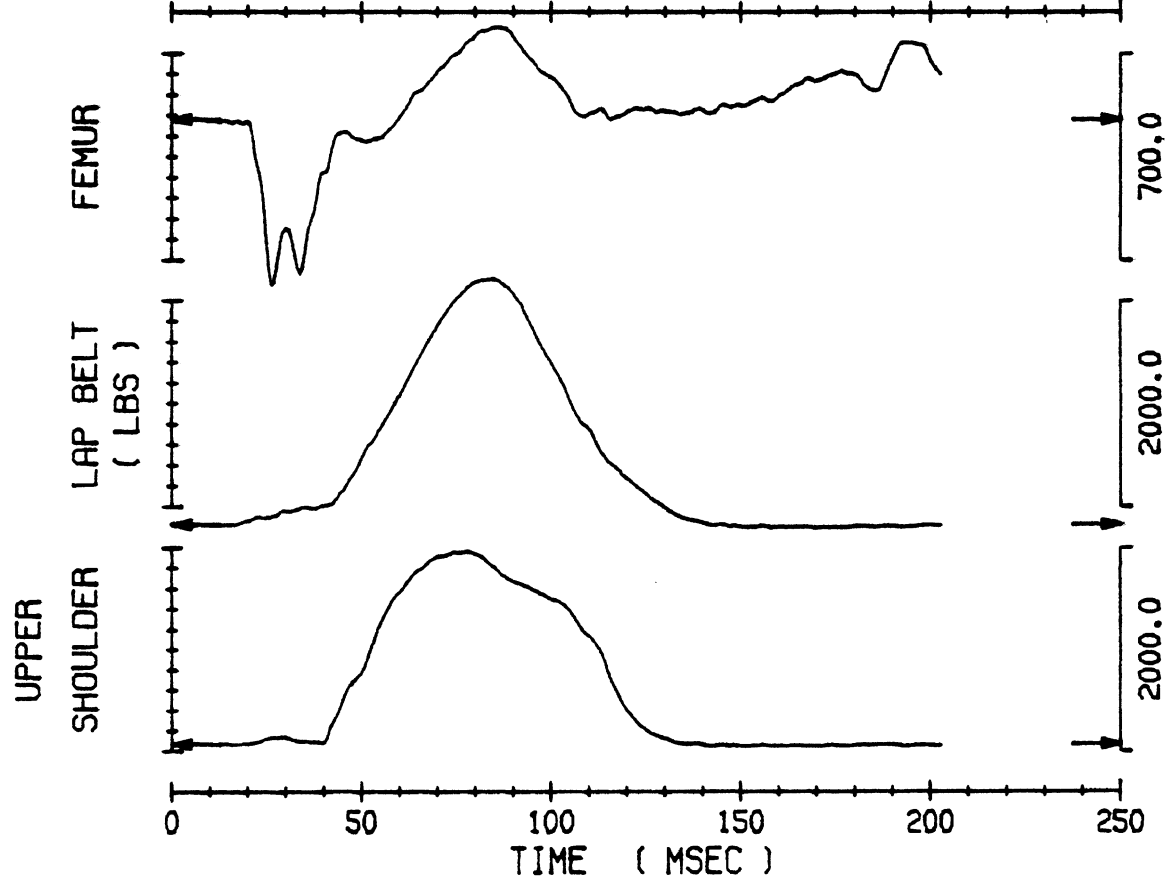


MEASURED ACCELERATIONS

RIGHT SIDE

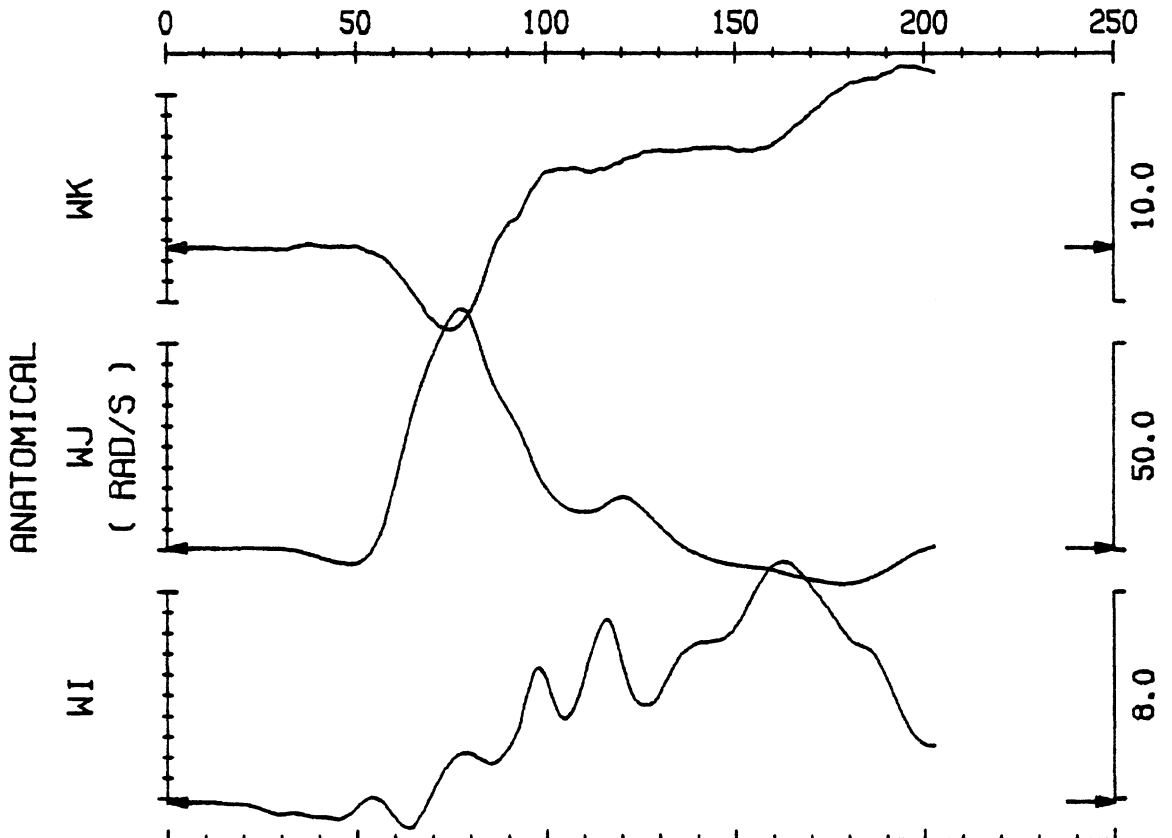


LEFT SIDE

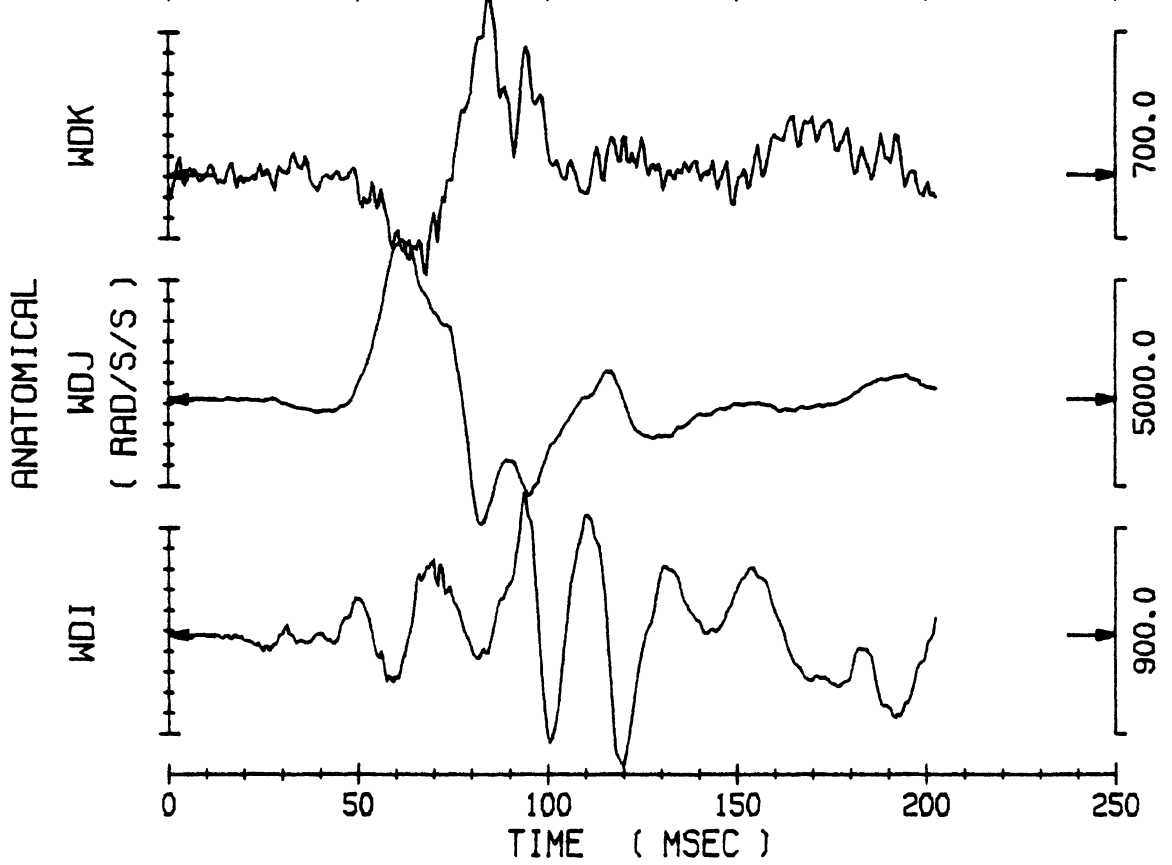


MEASURED FORCES

ANG VELOCITIES



ANG ACCELERATIONS



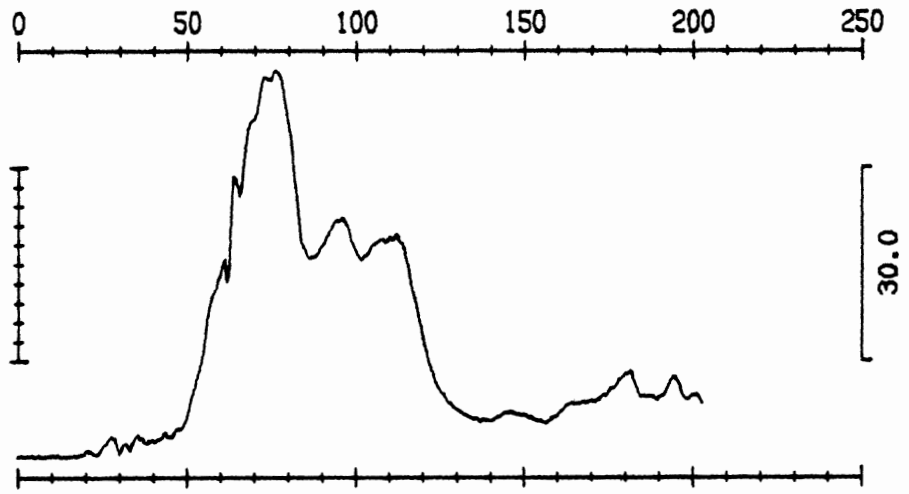
3-D ANGULAR MOTION

FILE: 144

77B109-3: HYB-3H

RESULTANT

GSI = 672
HIC = 562



INTERNAL HEAD TRIAX

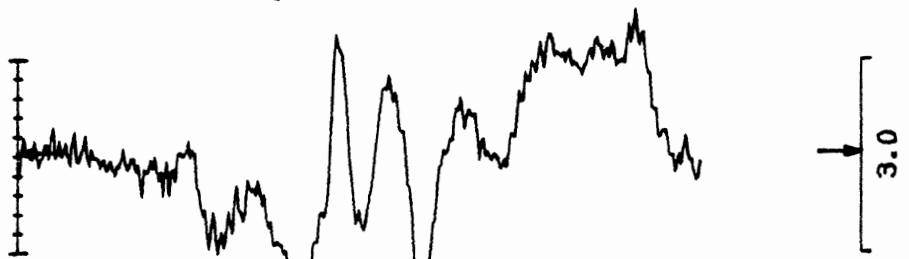
READINGS

L-R
(G'S)



S-I

A-P

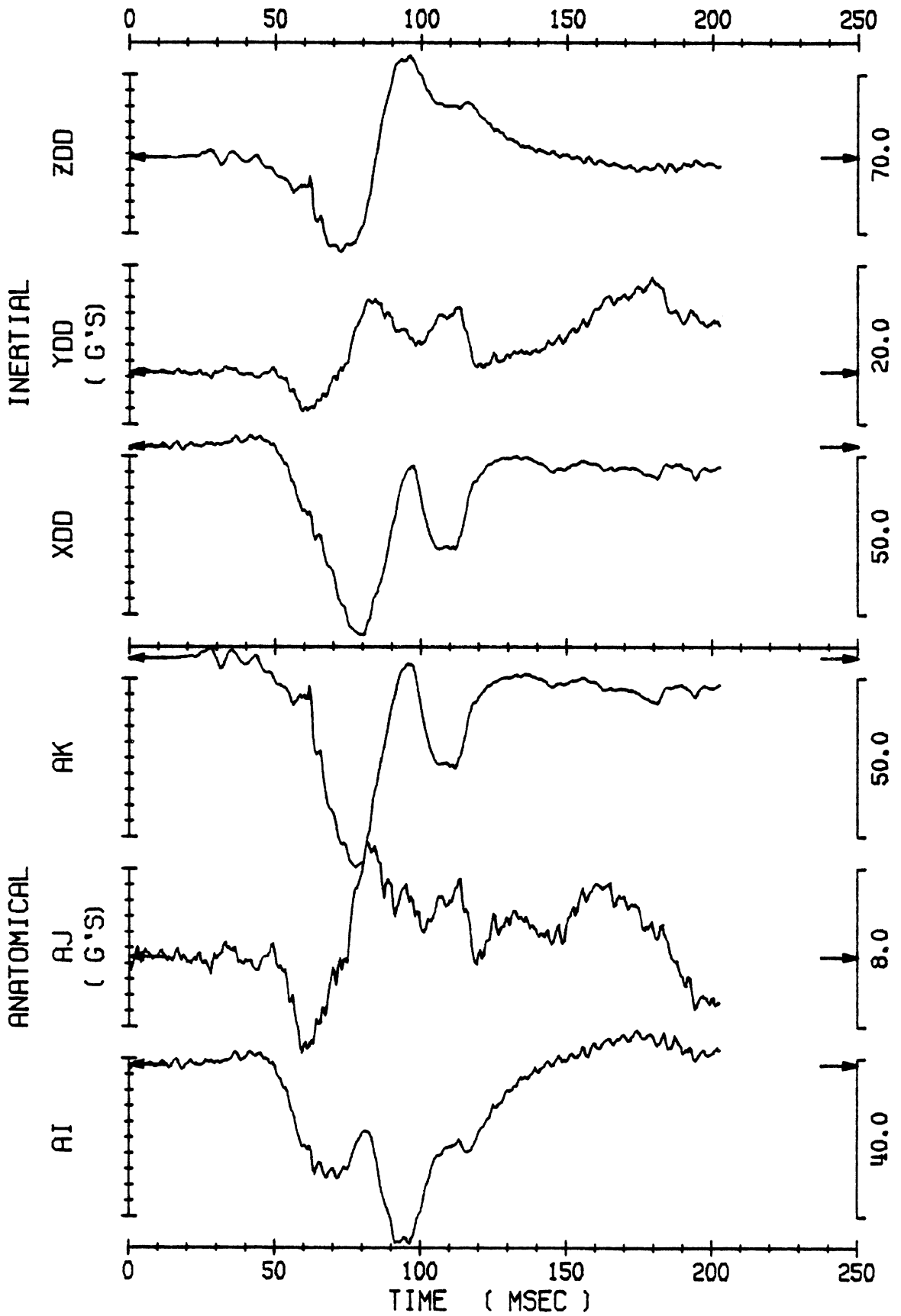


MEASURED ACCELERATIONS

ACC OF: HEAD C.G. GSI= 994, HIC= 844

FILE: 139

77B109-1: HYB-3H

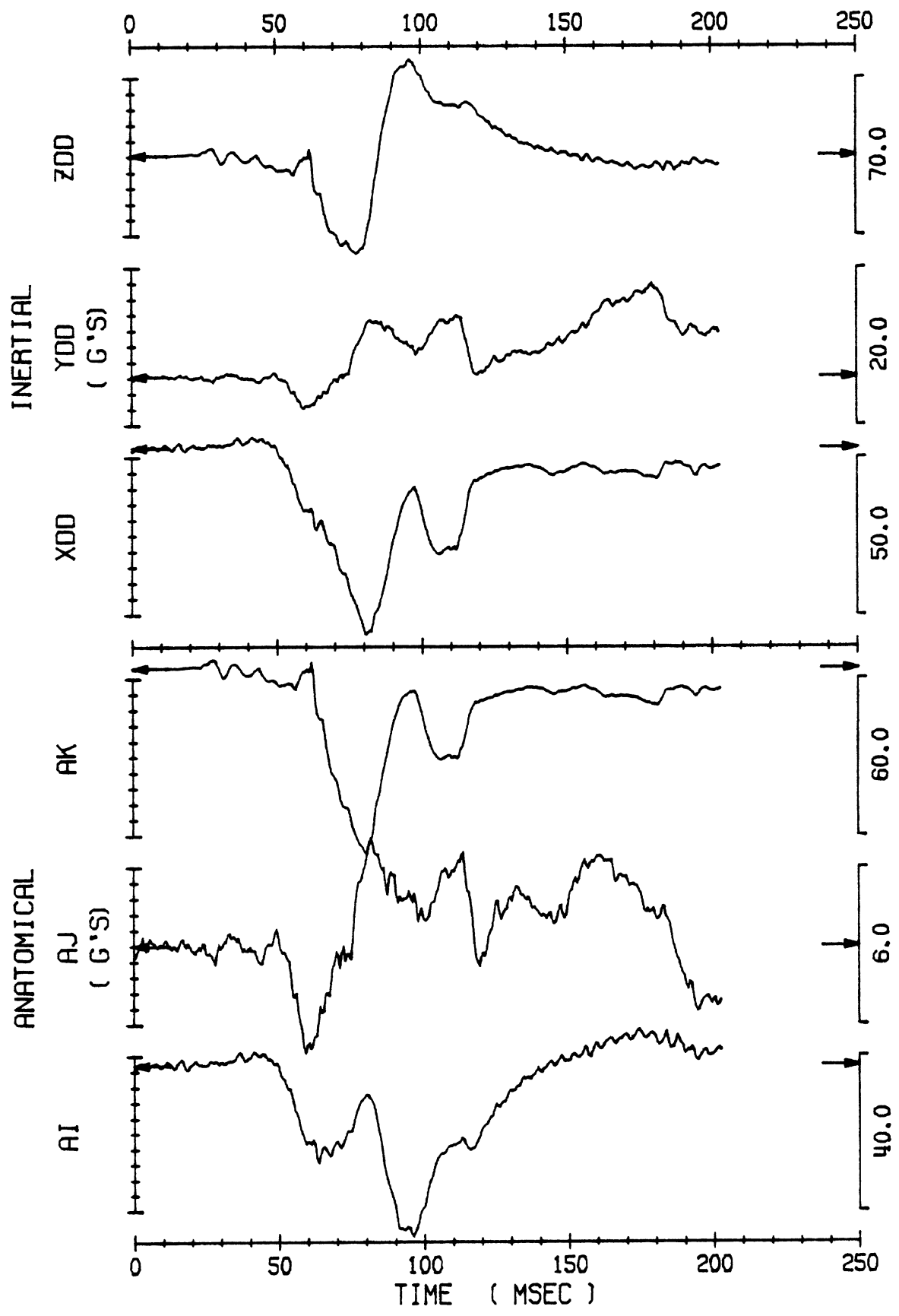


3-D ACCELERATIONS

FILE: 137

77B109-1: HYB-3H

ACC OF: A-P ACC CENTER GSI= 914, HIC= 770



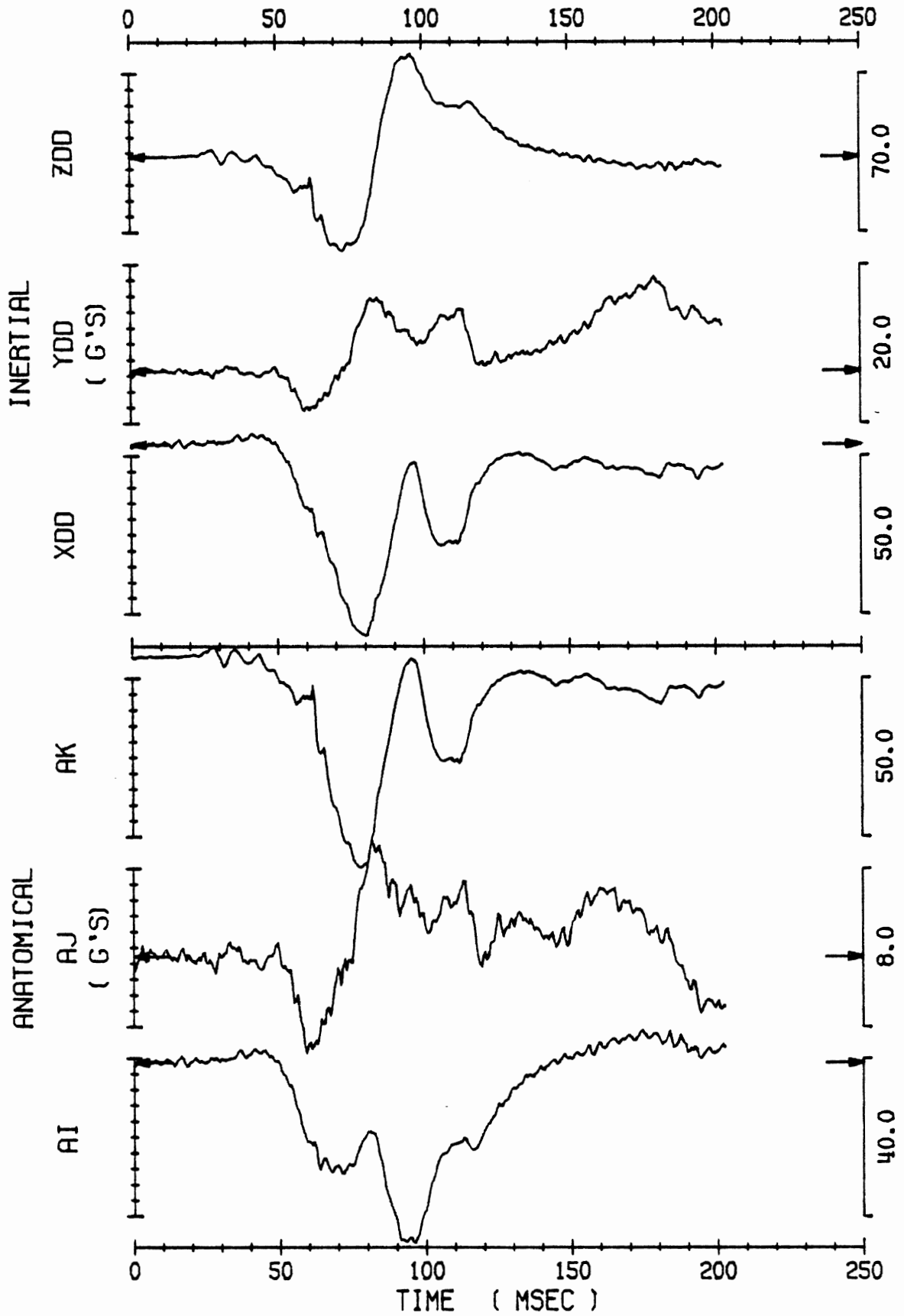
3-D ACCELERATIONS

FILE: 138

77B109-1: HYB-3H

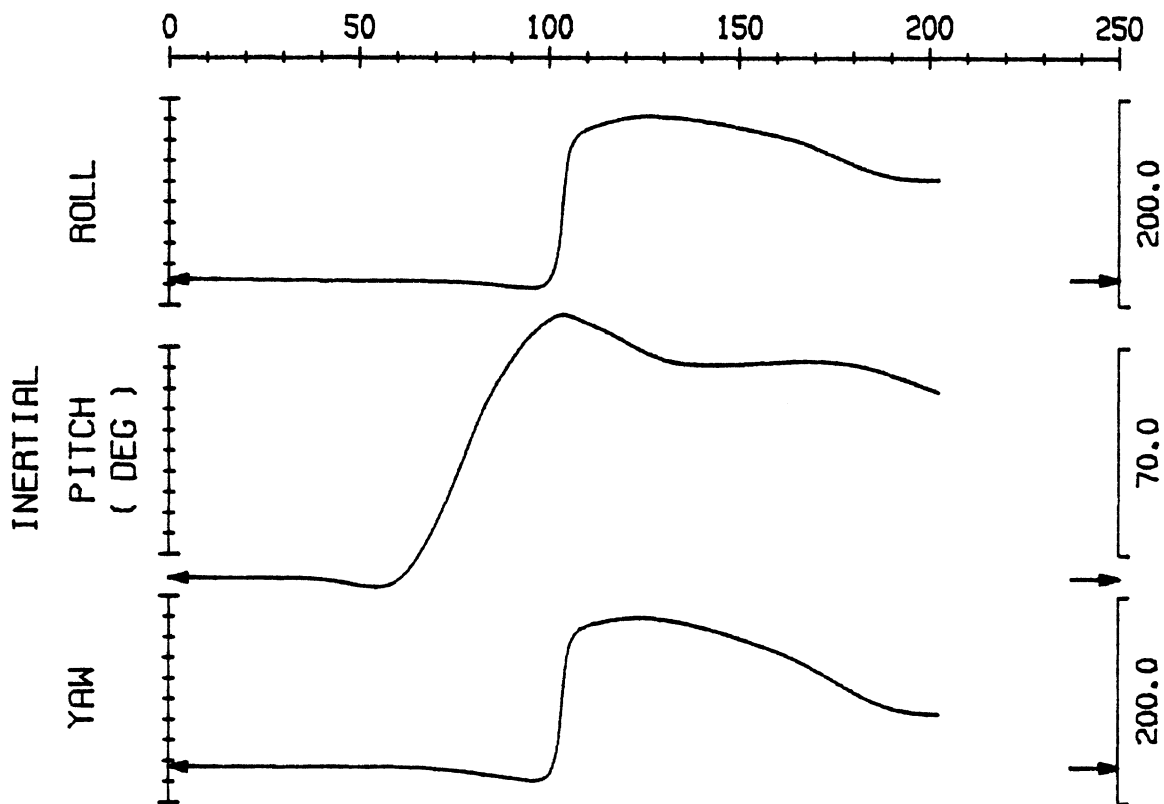
ACC OF: L-R ACC CENTER GSI= 997, HIC= 843

ACC OF: L-R ACC CENTER

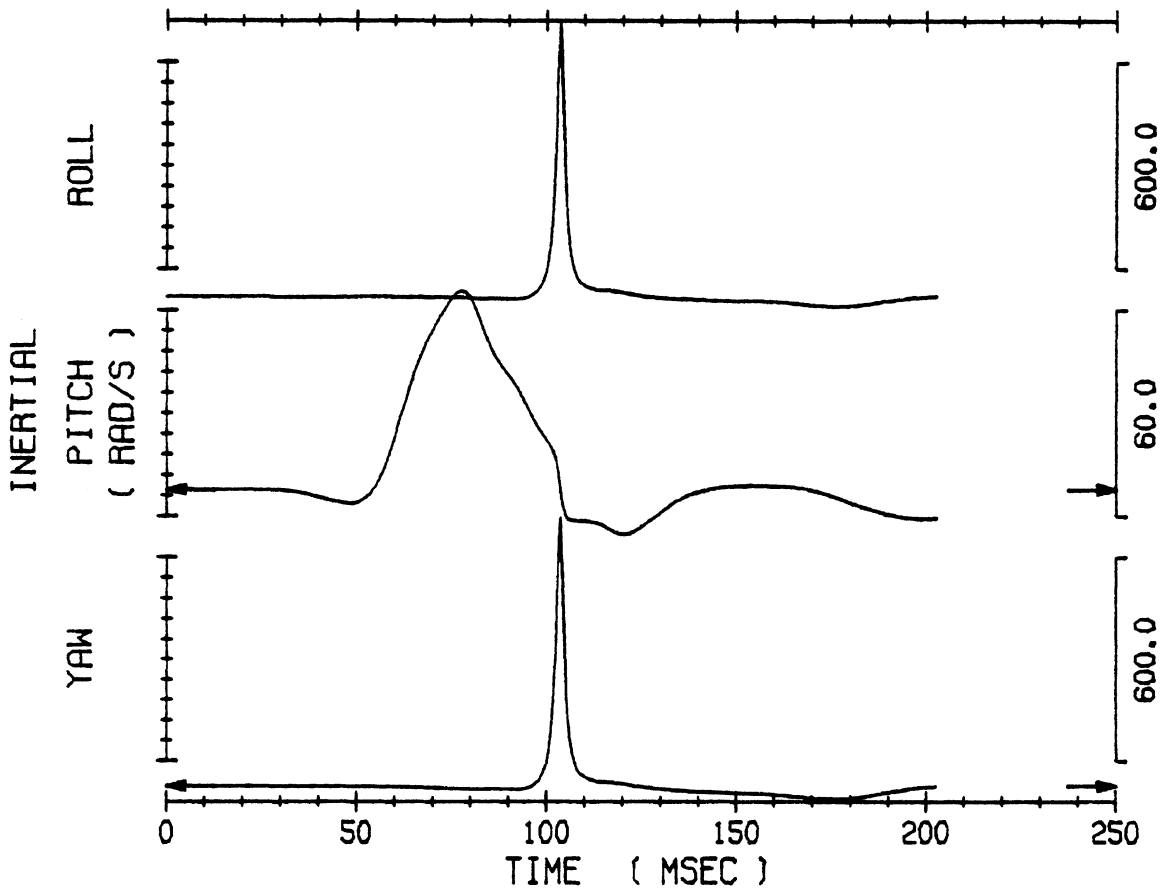


3-D ACCELERATIONS

EULER ANGLES



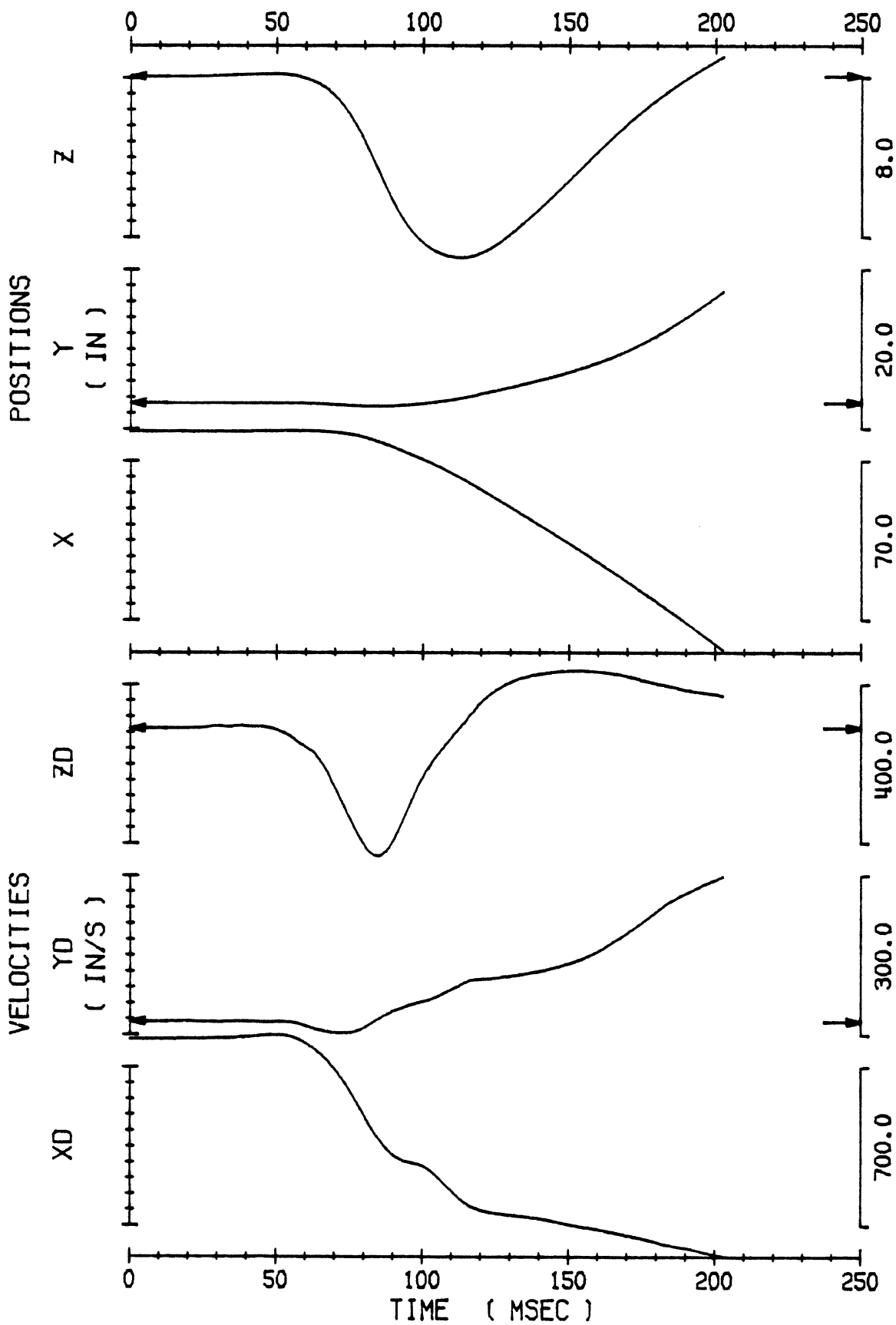
EULER RATES



3-D ROTATIONS

HEAD C.G.

INERTIAL MOTION OF:



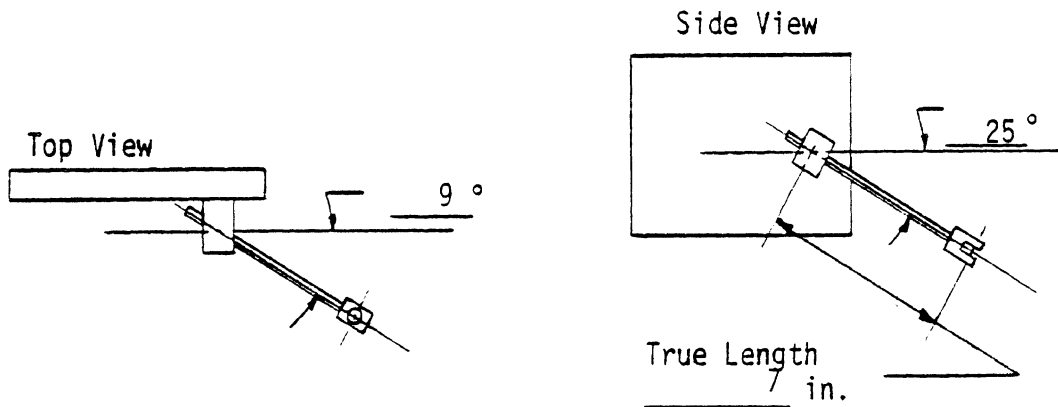
3-D TRANSLATIONS

Appendix B.

RAW DATA

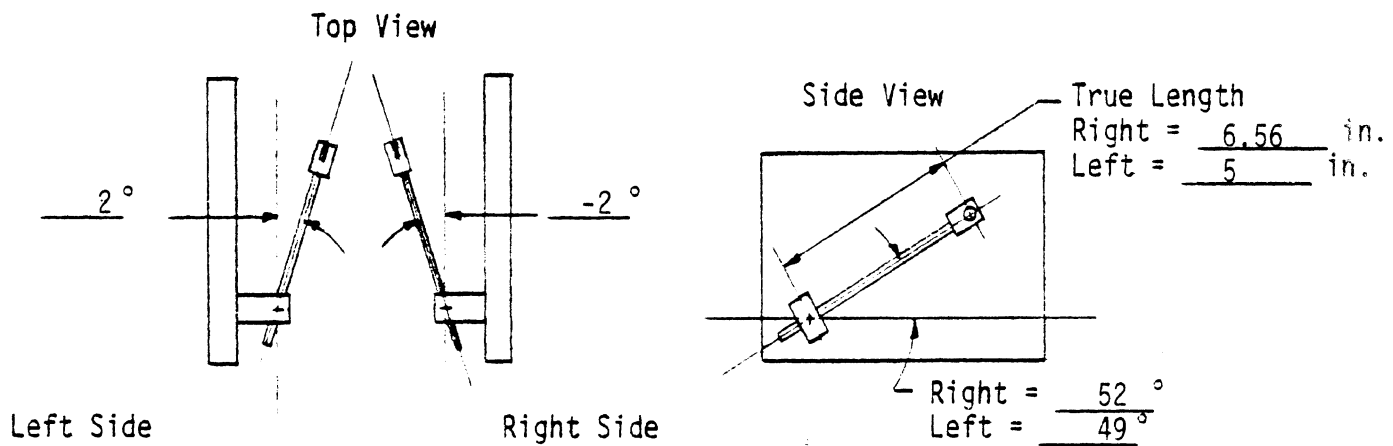
BELT ANCHOR ORIENTATIONS

A. SHOULDER BELT



B. LAP BELT

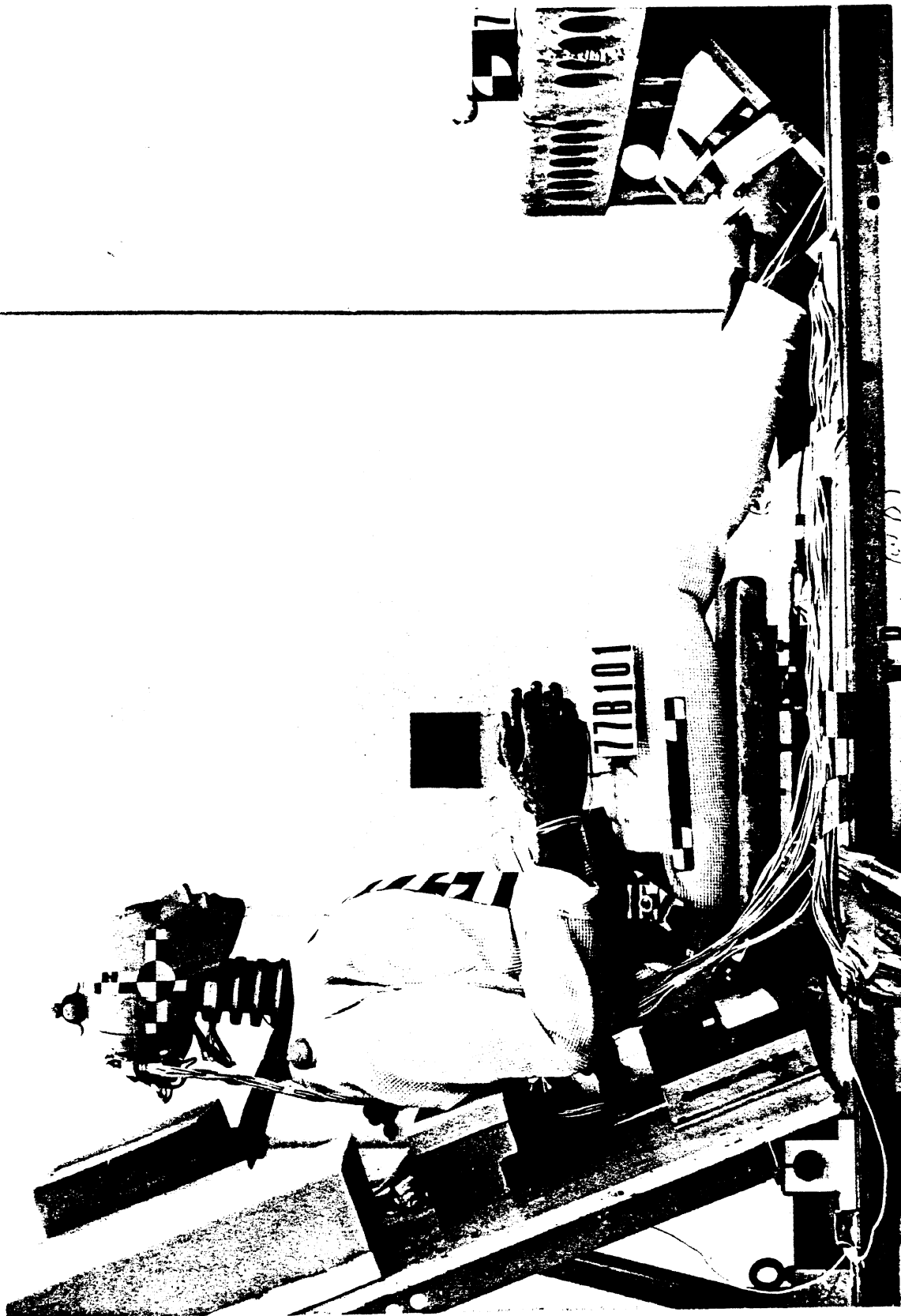
PELVIS ANGLE = 9°



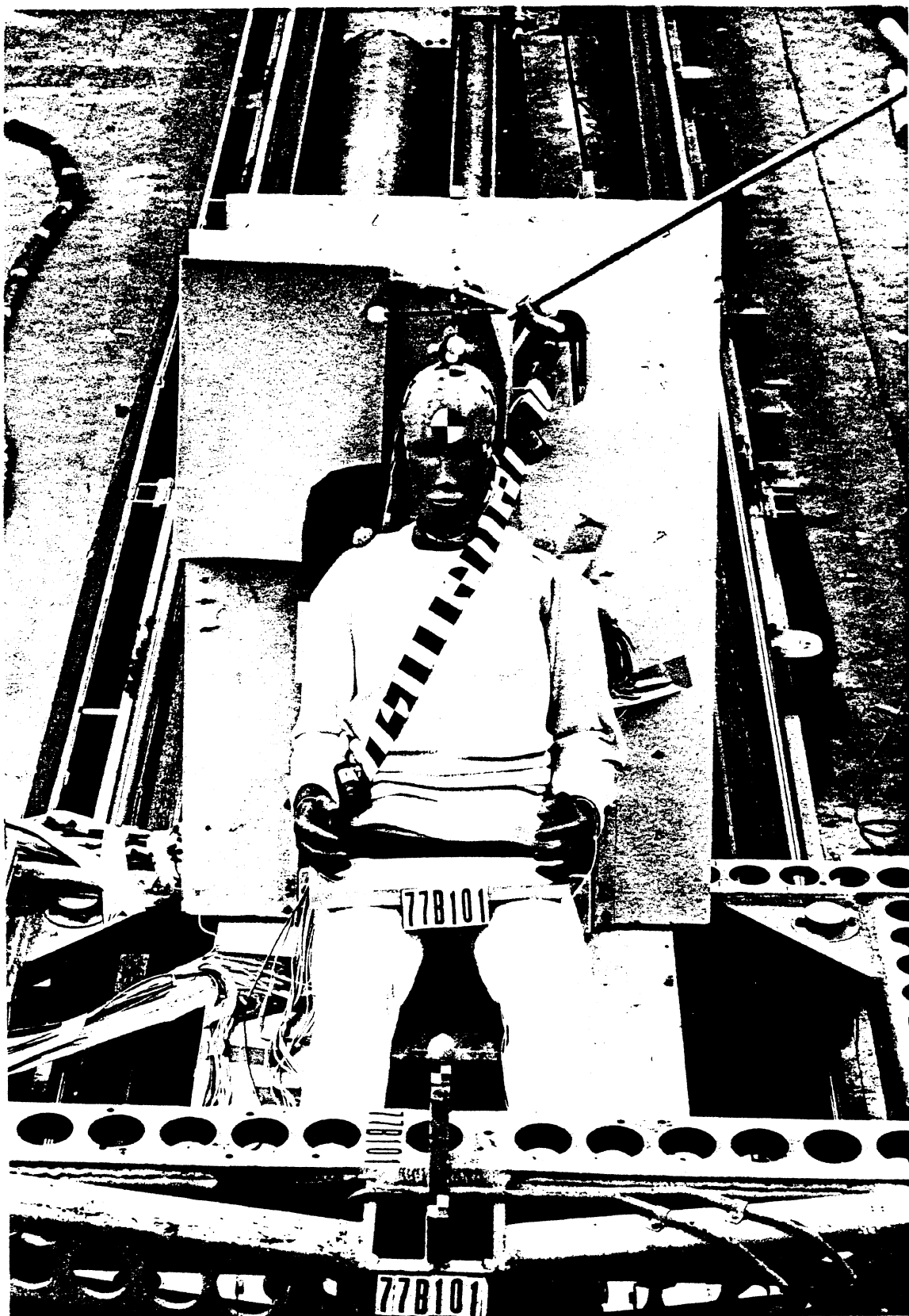
Sketch indicates positive angle directions

BELT LENGTH DATA

BELT POSITION	PRE-IMPACT LENGTH (in.)	POST-IMPACT LENGTH (in.)	BELT STRETCH (in.)	POST IMPACT LENGTH w/ LOAD CELLS (in.)
Rt. Lap	12.19	12.31	0.12	_____
Lt. Lap	32.5	32.56	0.06	_____
Shoulder	42.0	42.13	0.13	_____









77B101

=====
 RUN ID: 77B101-1: HYB-3L
 =====

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

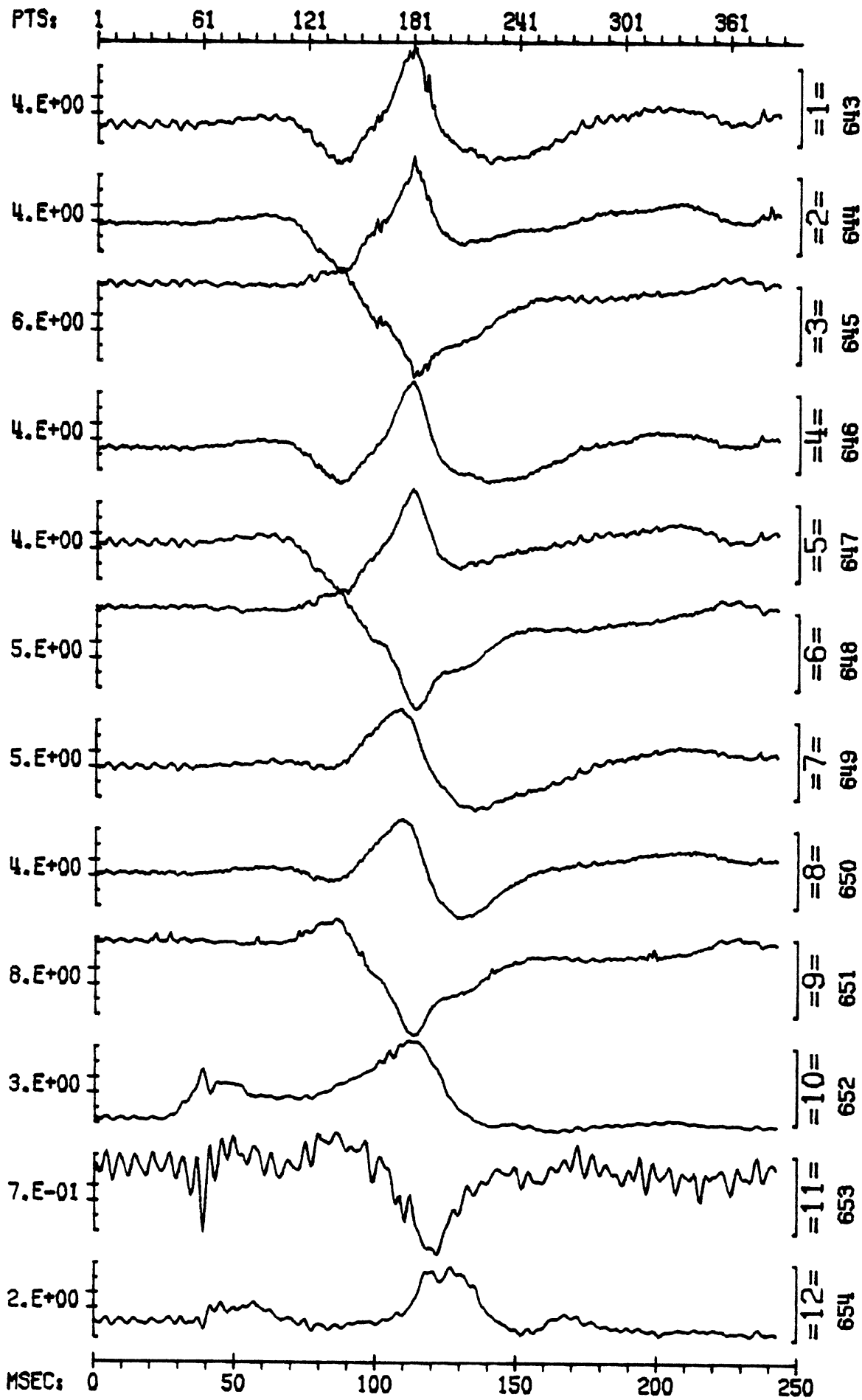
ANALOG TAPE: HSRI-138 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524, GMR= DATE: 09-FEB-77
 TEST SIGNALS: 1567 PTS/CH AT 6397.39 HZ. CAL SIGNALS: NOT DIGITIZED.

FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
643	- 1:	AX1 - HEAD ACC A @ Q1	-42.20	G'S	4+1+18	569.9	389 @	1599.35
644	- 2:	AY1 - HEAD ACC B @ Q1	-33.40	G'S	4+1+18	569.9	389 @	1599.35
645	- 3:	AZ1 - HEAD ACC C @ Q1	-42.50	G'S	4+1+18	569.9	389 @	1599.35
646	- 4:	AX2 - HEAD ACC C @ Q2	-38.30	G'S	4+1+18	569.9	389 @	1599.35
647	- 5:	AY2 - HEAD ACC A @ Q2	-37.10	G'S	4+1+18	569.9	389 @	1599.35
648	- 6:	AZ2 - HEAD ACC B @ Q2	-42.50	G'S	4+1+18	569.9	389 @	1599.35
649	- 7:	AX3 - HEAD ACC B @ Q3	-40.90	G'S	4+1+18	569.9	389 @	1599.35
650	- 8:	AY3 - HEAD ACC C @ Q3	-34.10	G'S	4+1+18	569.9	389 @	1599.35
651	- 9:	AZ3 - HEAD ACC A @ Q3	-40.20	G'S	4+1+18	569.9	389 @	1599.35
652	- 10:	A-P INTERNAL PELVIS ACC	-25.60	G'S	4+1+12	205.0	389 @	1599.35
653	- 11:	L-R INTERNAL PELVIS ACC	-25.70	G'S	4+1+12	205.0	389 @	1599.35
654	- 12:	S-I INTERNAL PELVIS ACC	-25.80	G'S	4+1+12	205.0	389 @	1599.35

13:

14:

 FILTERED FILES: 643 - 654 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 77B101-1: HYB-3L



ID: 77B101-1: HYB-3L

TAPE: GMR-DUM

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 RUN ID: 77B101-2: HYB-3L
 =====

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: HSRI-139 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524, GMR= DATE: 09-FEB-77
 TEST SIGNALS: 1566 PTS/CH AT 6393.30 HZ. CAL SIGNALS: NOT DIGITIZED.

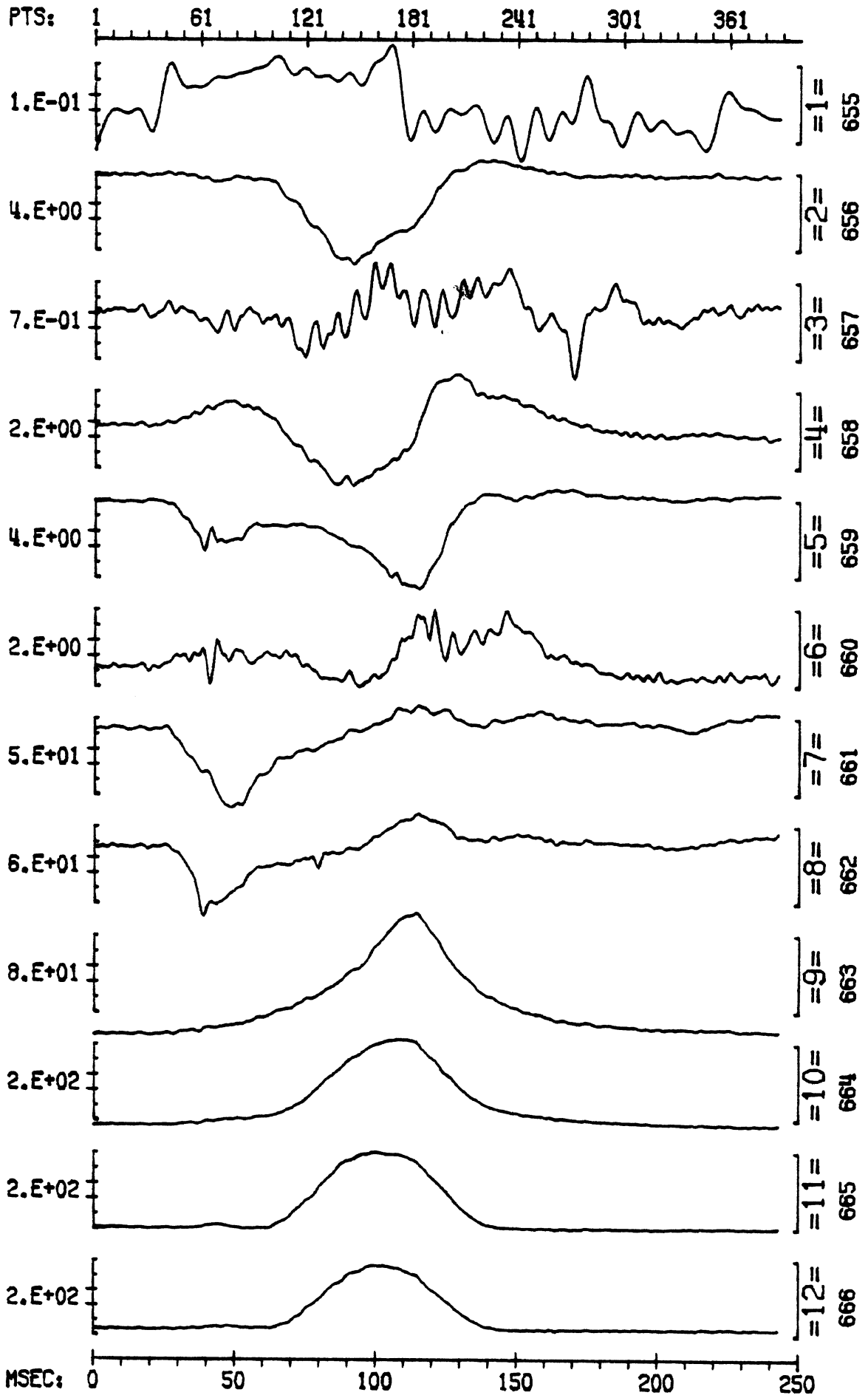
FILE CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
655	1: SLED DECELERATION	20.00	G'S	4+1+1	79.9	389	1598.33
656	2: A-P EXTERNAL CHEST ACC	42.40	G'S	4+1+12	284.8	389	1598.33
657	3: L-R EXTERNAL CHEST ACC	35.50	G'S	4+1+12	284.8	389	1598.33
658	4: S-I EXTERNAL CHEST ACC	37.30	G'S	4+1+12	284.8	389	1598.33
659	5: A-P EXTERNAL PELVIS ACC	53.70	G'S	4+1+12	284.8	389	1598.33
660	6: S-I EXTERNAL PELVIS ACC	51.90	G'S	4+1+12	284.8	389	1598.33
661	7: RIGHT FEMUR LOAD	925.00	LBS	4+1+12	284.8	389	1598.33
662	8: LEFT FEMUR LOAD	986.00	LBS	4+1+12	284.8	389	1598.33
663	9: RIGHT LAP BELT LOAD	1000.00	LBS	4+1+12	284.8	389	1598.33
664	10: LEFT LAP BELT LOAD	1000.00	LBS	4+1+12	284.8	389	1598.33
665	11: UPPER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	284.8	389	1598.33
666	12: LOWER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	284.8	389	1598.33

13:

14:

 FILTERED FILES: 655 - 666 DIGITAL TAPE: GMR=DUM DATE: 09-FEB-77

 RUN ID: 77B101-2: HYB-3L



ID: 77B101-2: HYB-3L

TAPE: GMR-DUM

 RUN ID: 77B101-3; HYB-3L

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

PROJECT: WHOLE BODY RESPONSE; HYBRID III SERIES

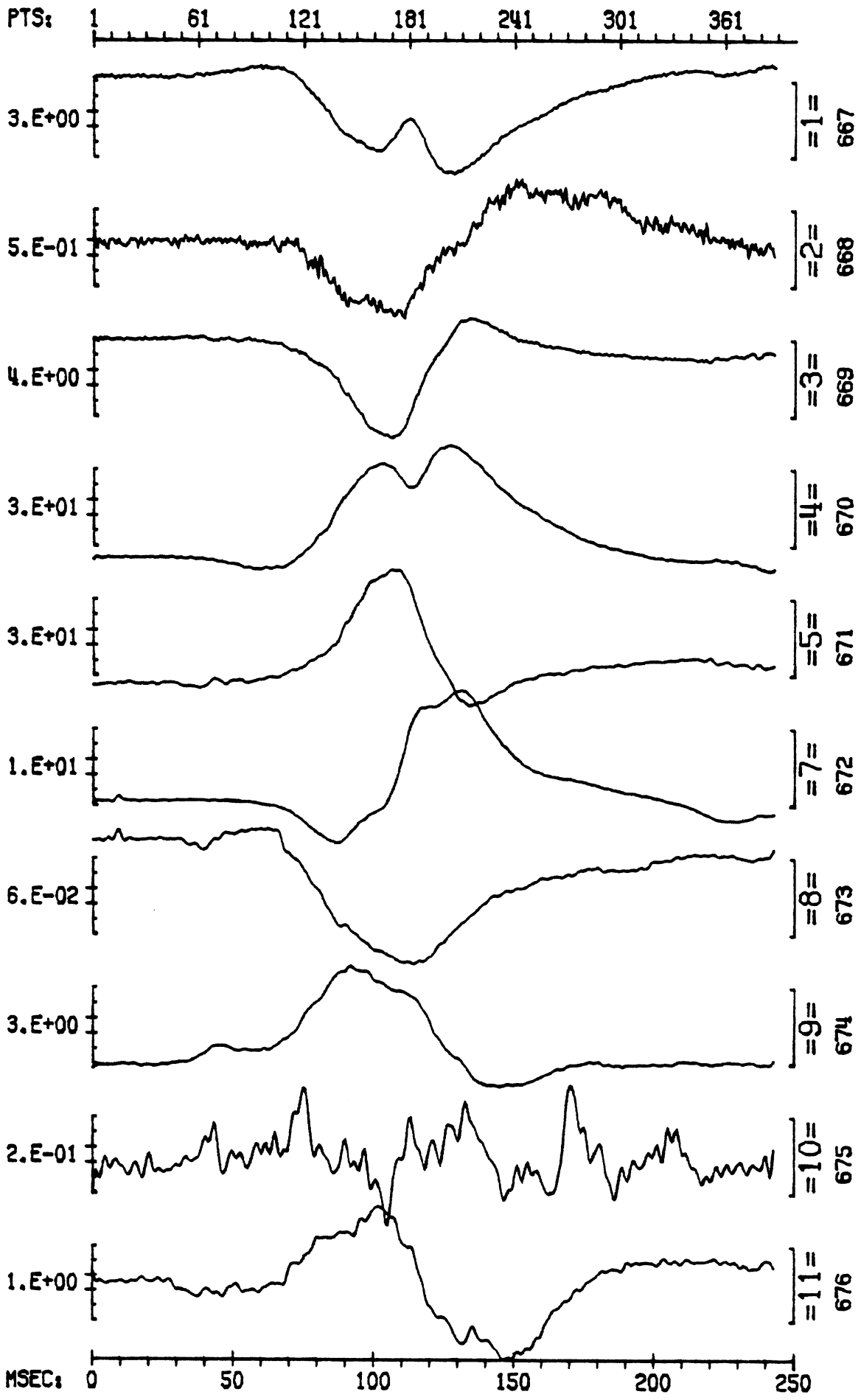
ANALOG TAPE: CR #118 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR- DATE: 09-FEB-77

TEST SIGNALS: 1567 PTS/CH AT 6394.45 HZ. CAL SIGNALS: NOT DIGITIZED.

FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
667	- 1:	A-P INTERNAL HEAD ACC	100.00	G'S	4+1+10	569.7	389	1598.61
668	- 2:	L-R INTERNAL HEAD ACC	-100.00	G'S	4+1+10	569.7	389	1598.61
669	- 3:	S-I INTERNAL HEAD ACC	-100.00	G'S	4+1+10	569.7	389	1598.61
670	- 4:	A-P NECK SHEAR FORCE	1000.00	LBS	4+1+12	284.8	389	1598.61
671	- 5:	S-I NECK AXIAL FORCE	1000.00	LBS	4+1+12	284.8	389	1598.61
6:								
672	- 7:	L-R NECK MOMENT (0.345 IN)	2400.00	IN-LBS	4+1+12	284.8	389	1598.61
673	- 8:	A-P CHEST DEFLECTION	3.00	INCHES	4+1+12	284.8	389	1598.61
674	- 9:	A-P INTERNAL CHEST ACC	100.00	G'S	4+1+12	284.8	389	1598.61
675	- 10:	L-R INTERNAL CHEST ACC	100.00	G'S	4+1+12	284.8	389	1598.61
676	- 11:	S-I INTERNAL CHEST ACC	-100.00	G'S	4+1+12	284.8	389	1598.61

12:
 13:
 14:

 FILTERED FILES: 667 - 676 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 77B101-3; HYB-3L

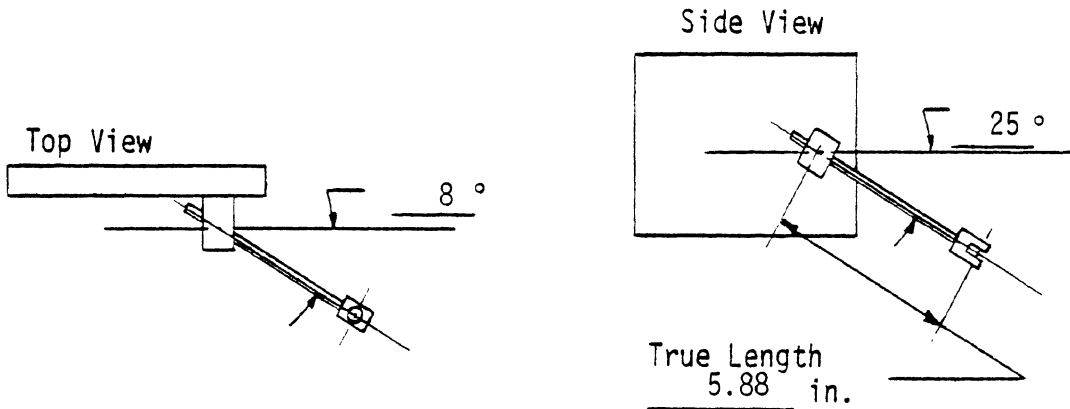


ID: 77B101-3: HYB-3L

TAPE: GMR-DUM

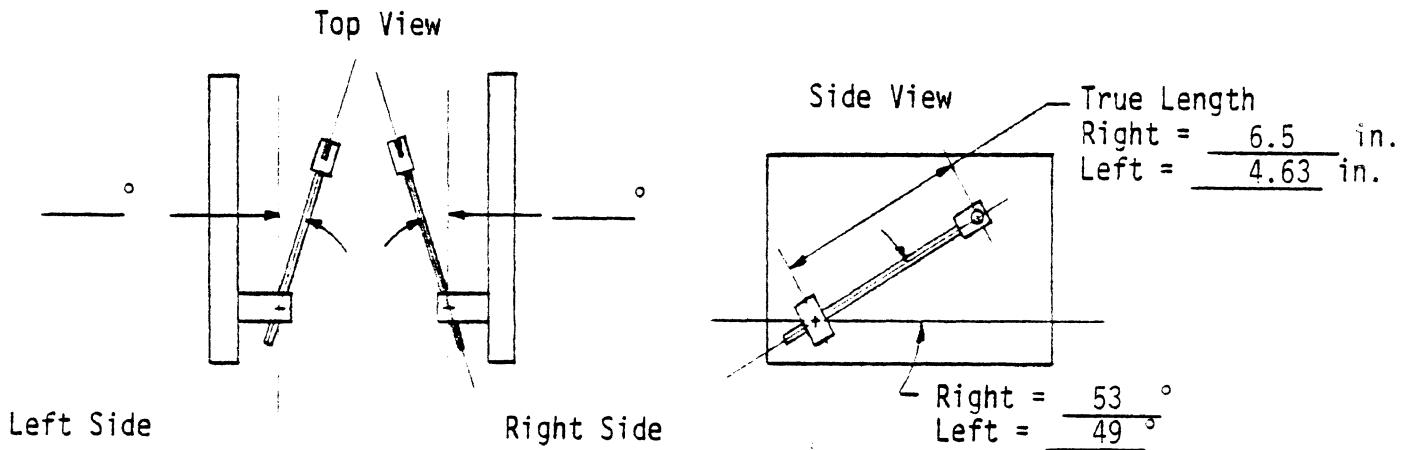
BELT ANCHOR ORIENTATIONS

A. SHOULDER BELT



B. LAP BELT

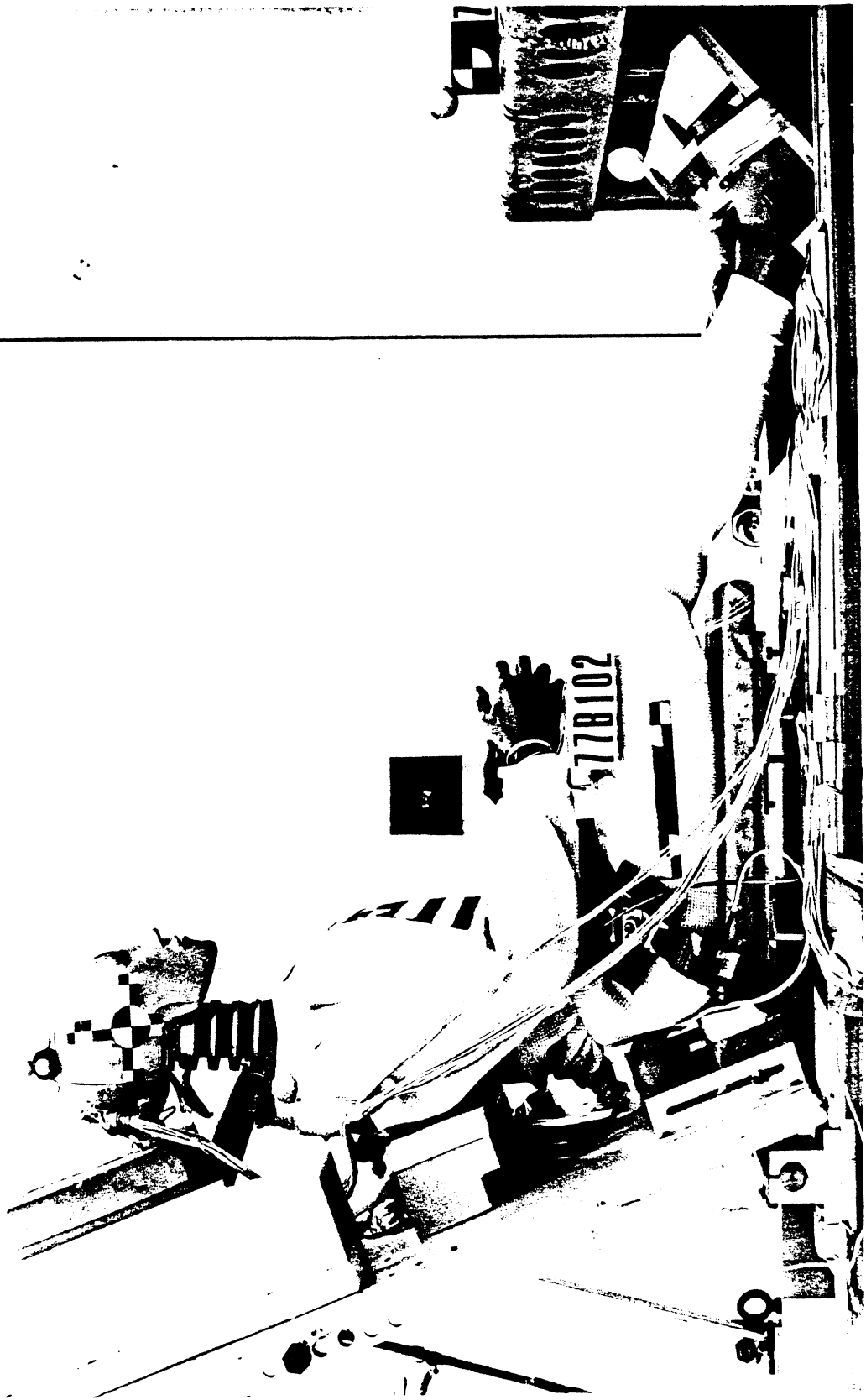
Pelvis Angle = 11.5°



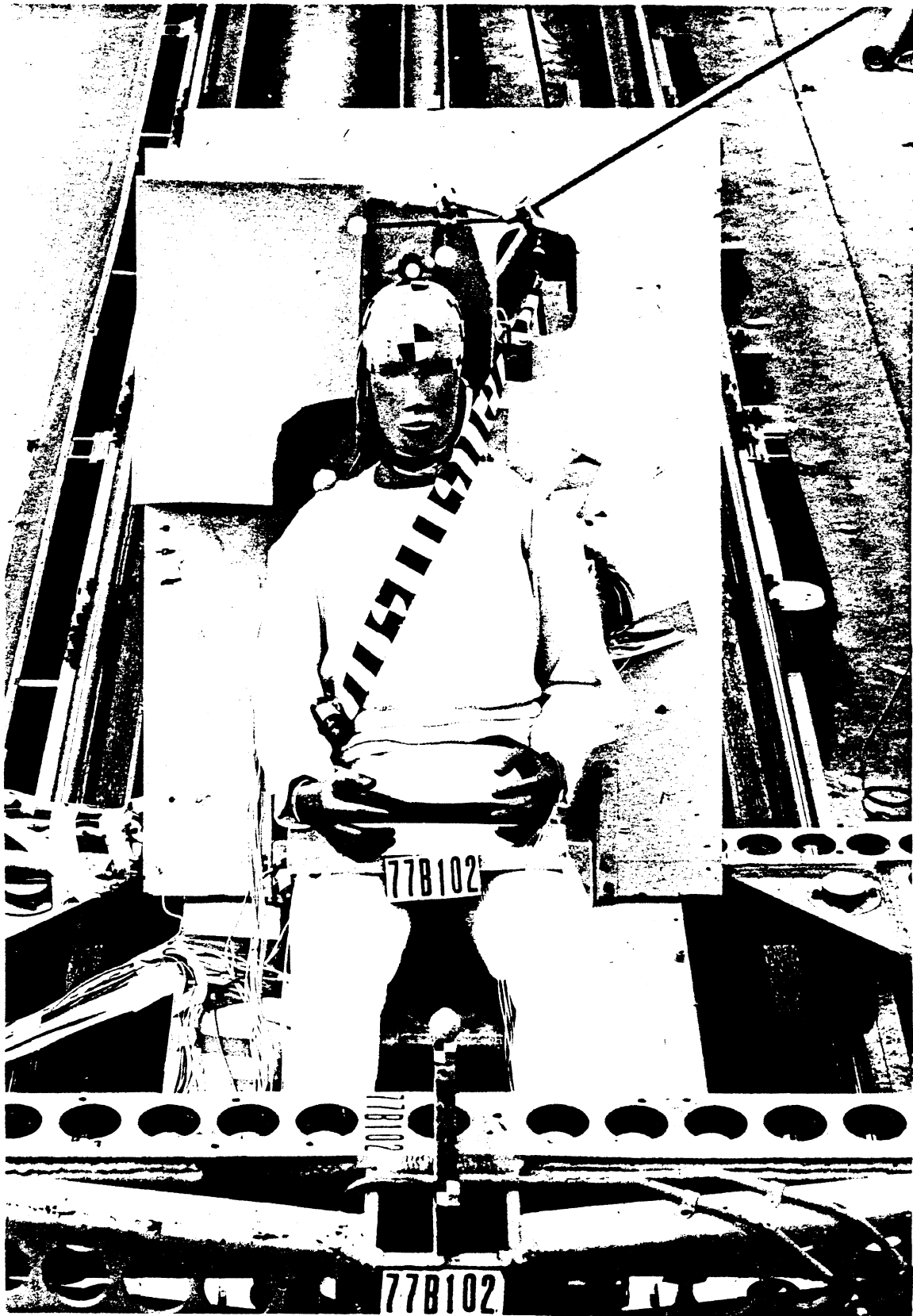
Sketch indicates positive angle directions

BELT LENGTH DATA

BELT POSITION	PRE-IMPACT LENGTH (in.)	POST-IMPACT LENGTH (in.)	BELT STRETCH (in.)	POST IMPACT LENGTH w/ LOAD CELLS (in.)
Rt. Lap	<u>12.25</u>	<u>12.38</u>	<u>0.13</u>	<u> </u>
Lt. Lap	<u>32.5</u>	<u>32.75</u>	<u>0.25</u>	<u> </u>
Shoulder	<u>42.0</u>	<u>42.13</u>	<u>0.13</u>	<u> </u>









77B102

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

RUN ID: 77B102-1: HYB-3L

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: HSRI-138 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR- DATE: 09-FEB-77

TEST SIGNALS: 1603 PTS/CH AT 6396.97 HZ. CAL SIGNALS: NOT DIGITIZED.

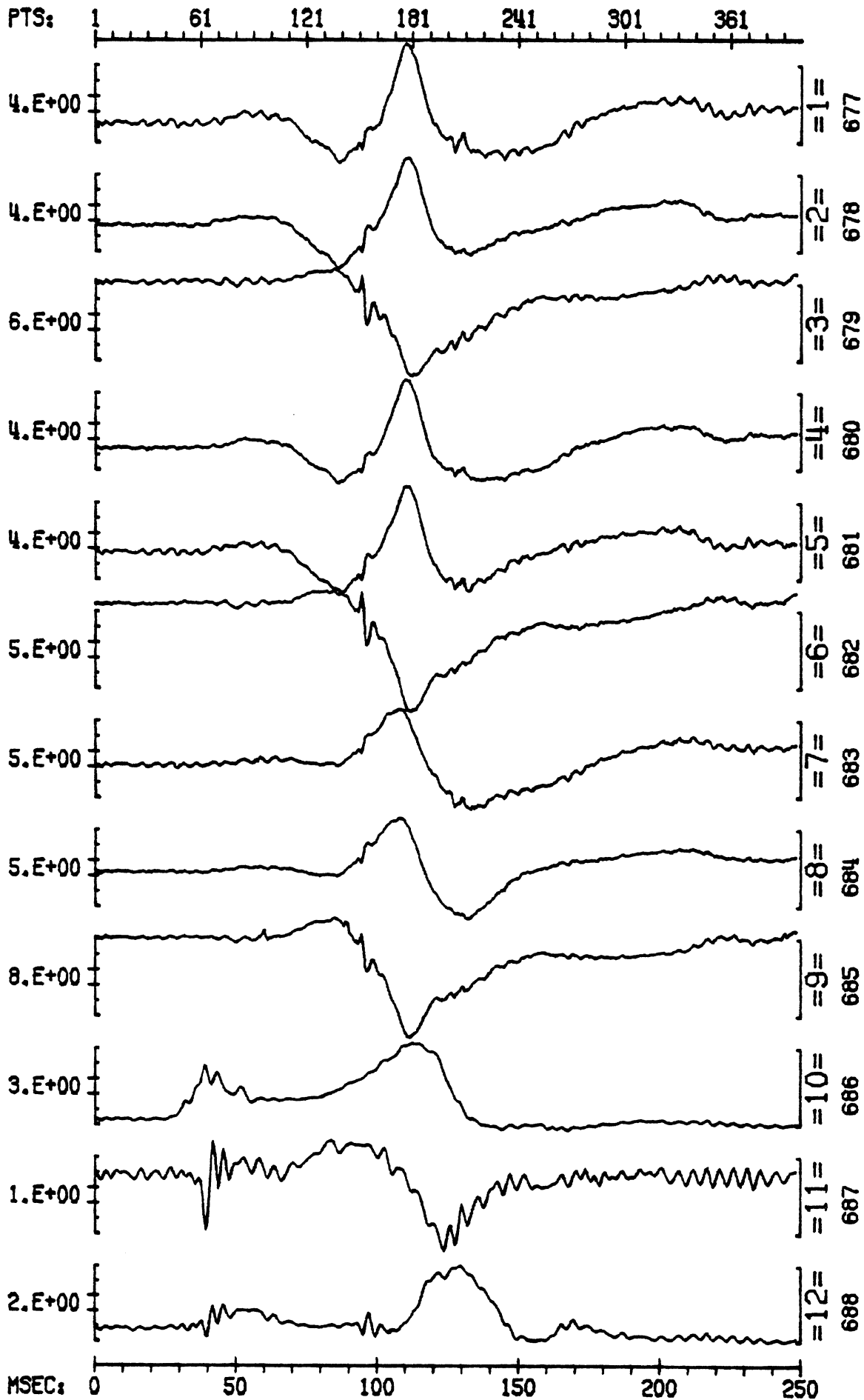
FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
677	- 1:	AX1 - HEAD ACC A @ Q1	-42.20	G'S	4+1+18	569.9	398 @	1599.24
678	- 2:	AY1 - HEAD ACC B @ Q1	-33.40	G'S	4+1+18	569.9	398 @	1599.24
679	- 3:	AZ1 - HEAD ACC C @ Q1	-42.50	G'S	4+1+18	569.9	398 @	1599.24
680	- 4:	AX2 - HEAD ACC C @ Q2	-38.30	G'S	4+1+18	569.9	398 @	1599.24
681	- 5:	AY2 - HEAD ACC A @ Q2	-37.10	G'S	4+1+18	569.9	398 @	1599.24
682	- 6:	AZ2 - HEAD ACC B @ Q2	-42.50	G'S	4+1+18	569.9	398 @	1599.24
683	- 7:	AX3 - HEAD ACC B @ Q3	-40.90	G'S	4+1+18	569.9	398 @	1599.24
684	- 8:	AY3 - HEAD ACC C @ Q3	-34.10	G'S	4+1+18	569.9	398 @	1599.24
685	- 9:	AZ3 - HEAD ACC A @ Q3	-40.20	G'S	4+1+18	569.9	398 @	1599.24
686	- 10:	A-P INTERNAL PELVIS ACC	-25.60	G'S	4+1+12	285.0	398 @	1599.24
687	- 11:	L-R INTERNAL PELVIS ACC	-25.70	G'S	4+1+12	285.0	398 @	1599.24
688	- 12:	S-I INTERNAL PELVIS ACC	-25.80	G'S	4+1+12	285.0	398 @	1599.24
		13:						
		14:						

FILTERED FILES: 677 - 688

DIGITAL TAPE: GMR-DUM

DATE: 09-FEB-77

RUN ID: 77B102-1: HYB-3L



ID: 77B102-1: HYB-3L

TAPE: GMR-DUM

=====
 RUN ID: 778102-2: HYB-3L
 =====

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

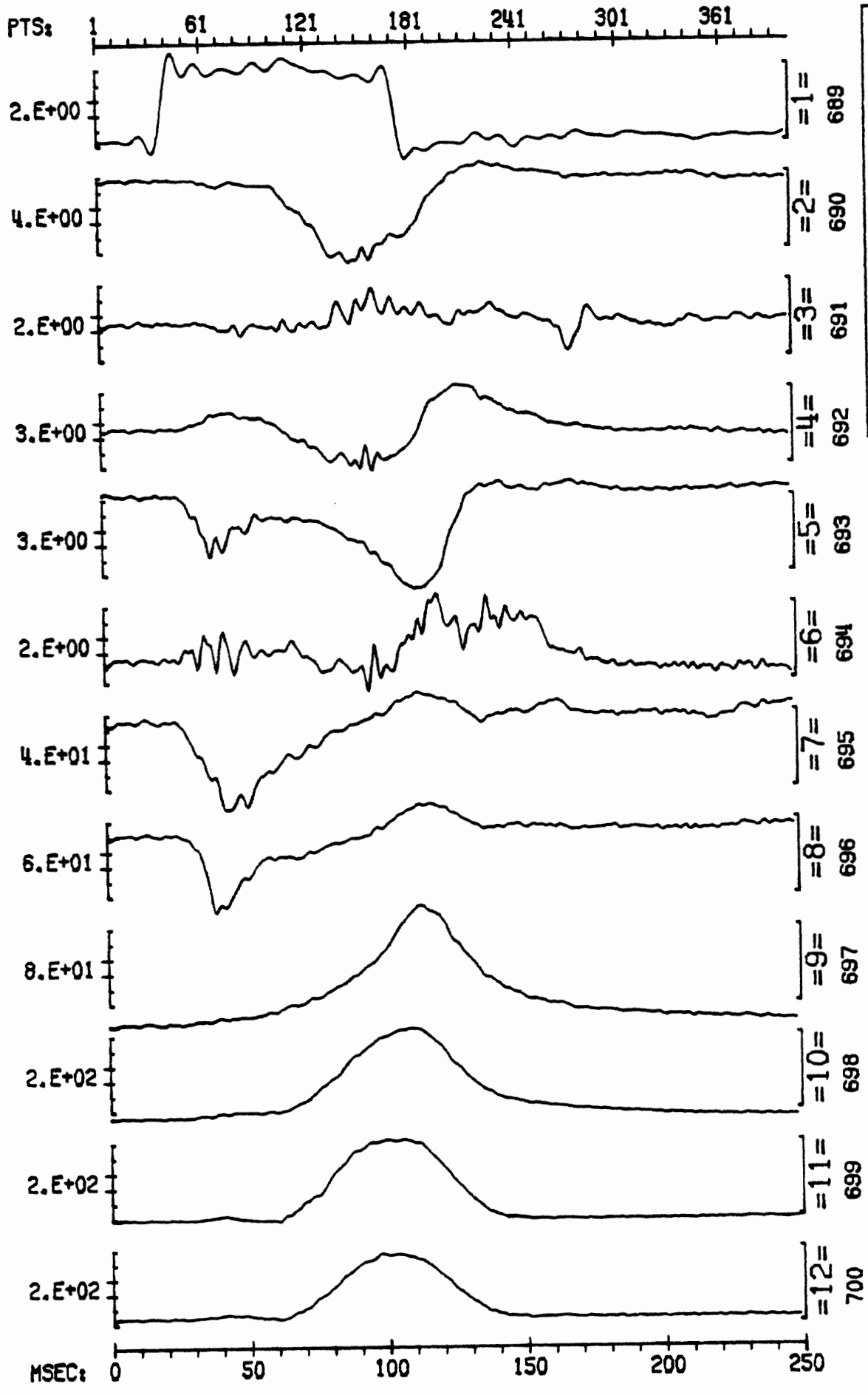
ANALOG TAPE: HSR1-139 EXPANDED 1600, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR- DATE: 09-FEB-77
 TEST SIGNALS: 1603 PTS/CH AT 6398.00 HZ. CAL SIGNALS: NOT DIGITIZED.

FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
689	1	SLED DECELERATION	20.00	G'S	4+1+1	80.0	398	1599.52
690	2	A-P EXTERNAL CHEST ACC	42.40	G'S	4+1+12	285.0	398	1599.52
691	3	L-R EXTERNAL CHEST ACC	35.50	G'S	4+1+12	285.0	398	1599.52
692	4	S-I EXTERNAL CHEST ACC	37.30	G'S	4+1+12	285.0	398	1599.52
693	5	A-P EXTERNAL PELVIS ACC	53.70	G'S	4+1+12	285.0	398	1599.52
694	6	S-I EXTERNAL PELVIS ACC	51.90	G'S	4+1+12	285.0	398	1599.52
695	7	RIGHT FEMUR LOAD	925.00	LBS	4+1+12	285.0	398	1599.52
696	8	LEFT FEMUR LOAD	986.00	LBS	4+1+12	285.0	398	1599.52
697	9	RIGHT LAP BELT LOAD	1000.00	LBS	4+1+12	285.0	398	1599.52
698	10	LEFT LAP BELT LOAD	1000.00	LBS	4+1+12	285.0	398	1599.52
699	11	UPPER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	285.0	398	1599.52
700	12	LOWER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	285.0	398	1599.52

13:

14:

 FILTERED FILES: 689 - 700 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 778102-2: HYB-3L



ID: 77B102-2: HYB-3L

TAPE: GMR-DUM

=====
 RUN ID: 77B102-3: HYB-3L
 =====

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: CR #118 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GHR- DATE: 09-FEB-77
 TEST SIGNALS: 1603 PTS/CH AT 6394.42 HZ. CAL SIGNALS: NOT DIGITIZED,

FILE CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
701	1: A-P INTERNAL HEAD ACC	100.00	G'S	4+1+10	569.7	390	1598.60
702	2: L-R INTERNAL HEAD ACC	-100.00	G'S	4+1+10	569.7	390	1598.60
703	3: S-I INTERNAL HEAD ACC	-100.00	G'S	4+1+10	569.7	390	1598.60
704	4: A-P NECK SHEAR FORCE	1000.00	LBS	4+1+12	284.8	390	1598.60
705	5: S-I NECK AXIAL FORCE	1000.00	LBS	4+1+12	284.8	390	1598.60
706	7: L-R NECK MOMENT (0.345 IN)	2400.00	IN-LBS	4+1+12	284.8	390	1598.60
707	8: A-P CHEST DEFLECTION	3.00	INCHES	4+1+12	284.8	390	1598.60
708	9: A-P INTERNAL CHEST ACC	100.00	G'S	4+1+12	284.8	390	1598.60
709	10: L-R INTERNAL CHEST ACC	100.00	G'S	4+1+12	284.8	390	1598.60
710	11: S-I INTERNAL CHEST ACC	-100.00	G'S	4+1+12	284.8	390	1598.60

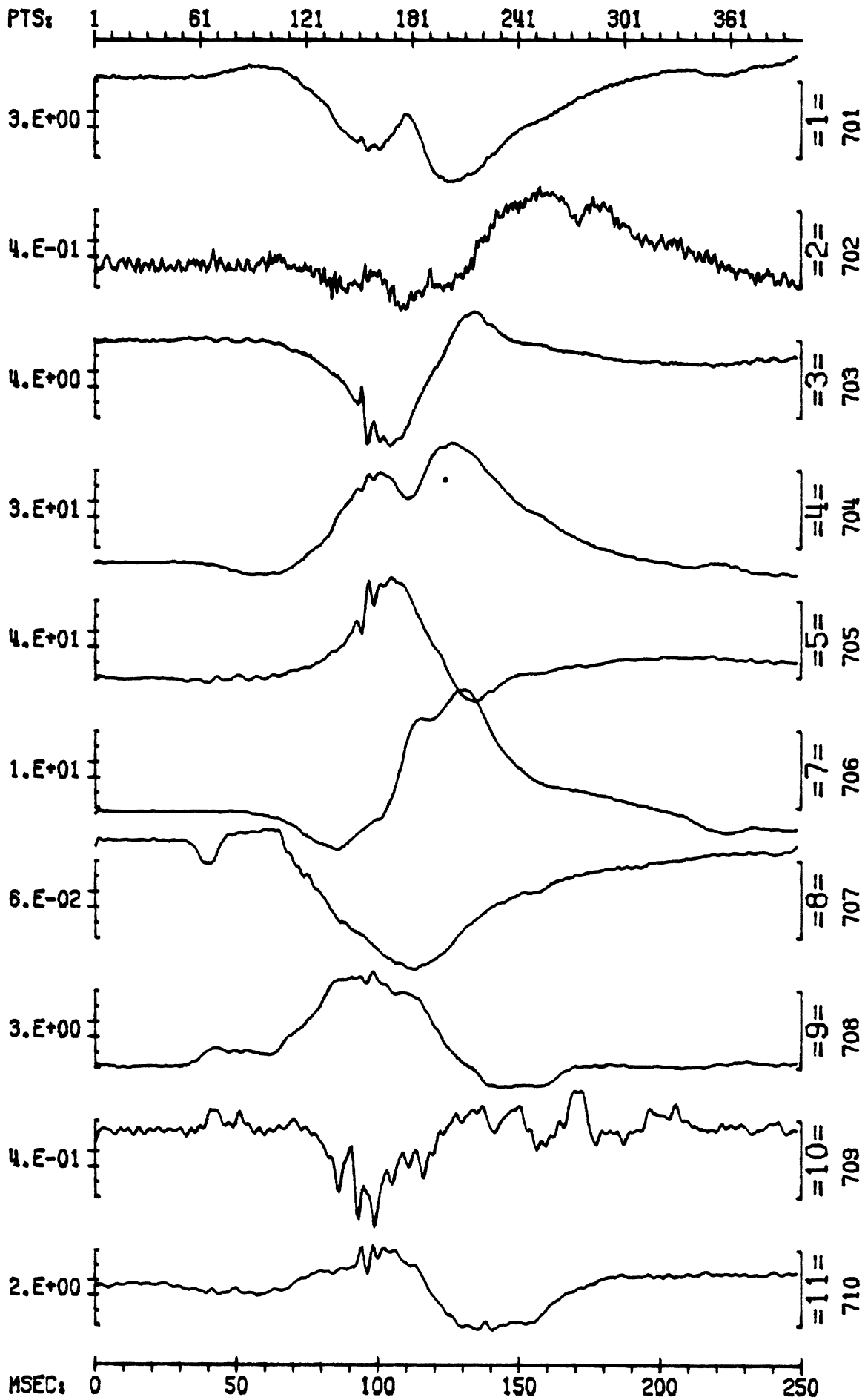
12:

13:

14:

 FILTERED FILES: 701 - 710 DIGITAL TAPE: GHR-DUM DATE: 09-FEB-77

 RUN ID: 77B102-3: HYB-3L



77B102-3: HYB-3L

ID:

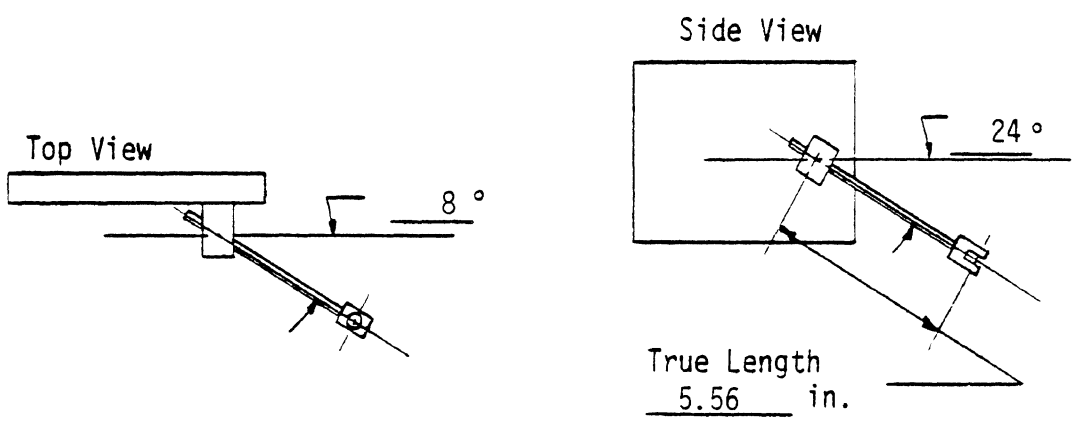
TAPE: GMR-DUM

TEST NO.: 77B103

SUBJECT: _____

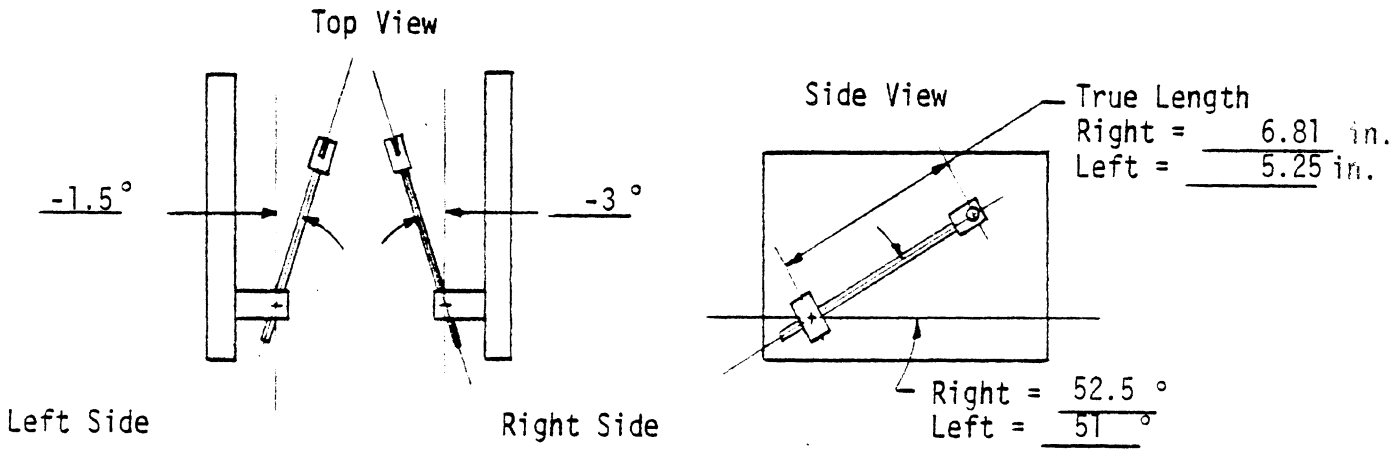
BELT ANCHOR ORIENTATIONS

A. SHOULDER BELT



B. LAP BELT

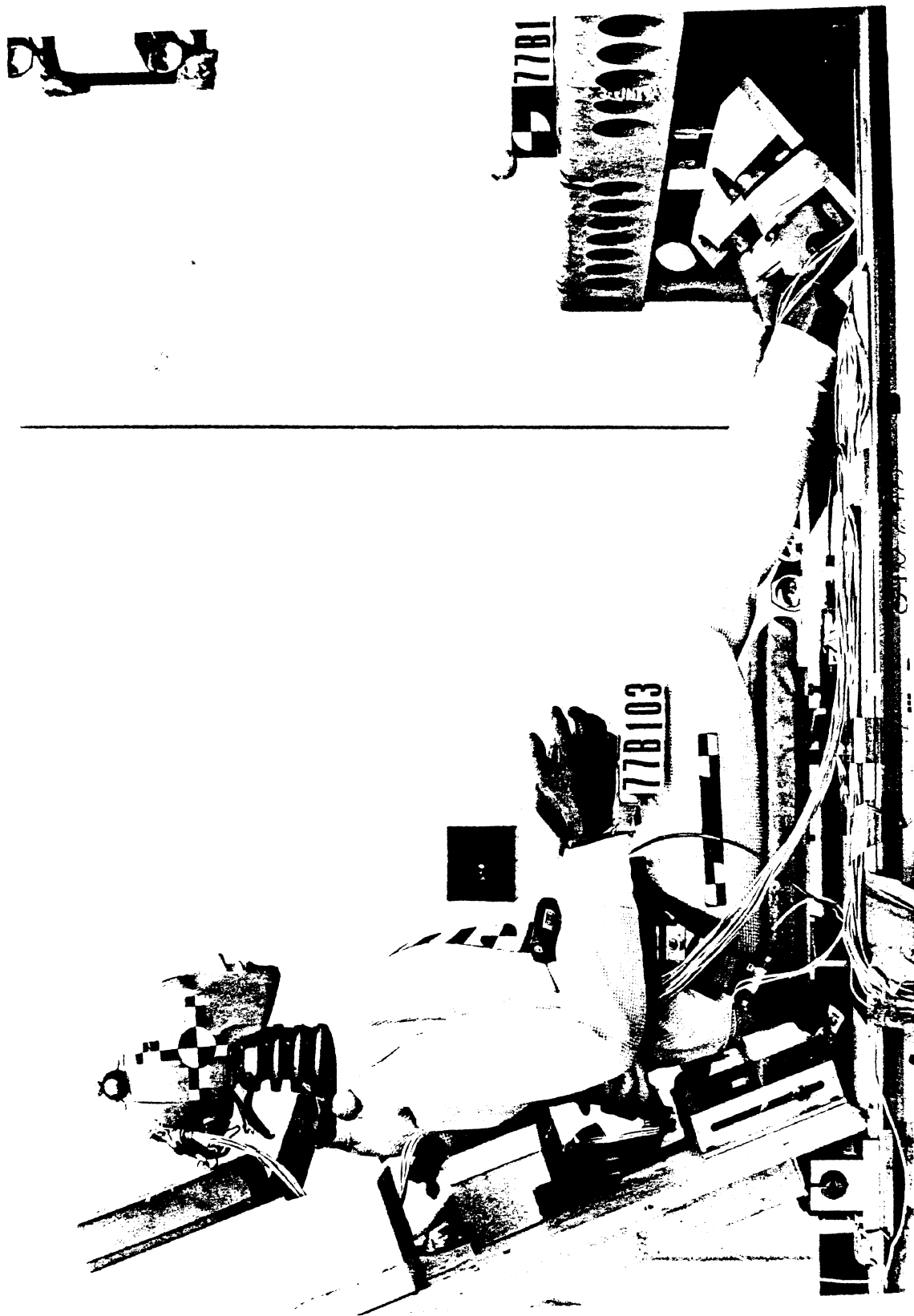
Pelvis Angle = 10.5°



Sketch indicates positive angle directions

BELT LENGTH DATA

BELT POSITION	PRE-IMPACT LENGTH (in.)	POST-IMPACT LENGTH (in.)	BELT STRETCH (in.)	POST IMPACT LENGTH w/ LOAD CELLS (in.)
Rt. Lap	<u>12.06</u>	<u>12.19</u>	<u>0.13</u>	<u> </u>
Lt. Lap	<u>32.5</u>	<u>32.56</u>	<u>0.06</u>	<u> </u>
Shoulder	<u>42</u>	<u>42.44</u>	<u>0.44</u>	<u> </u>









77B103

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 RUN ID: 77B103-1: HYB-3L
 =====

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: HSKI-138 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524, GMR- DATE: 09-FEB-77
 TEST SIGNALS: 1642 PTS/CH AT 6395.64 HZ. CAL SIGNALS: NOT DIGITIZED.

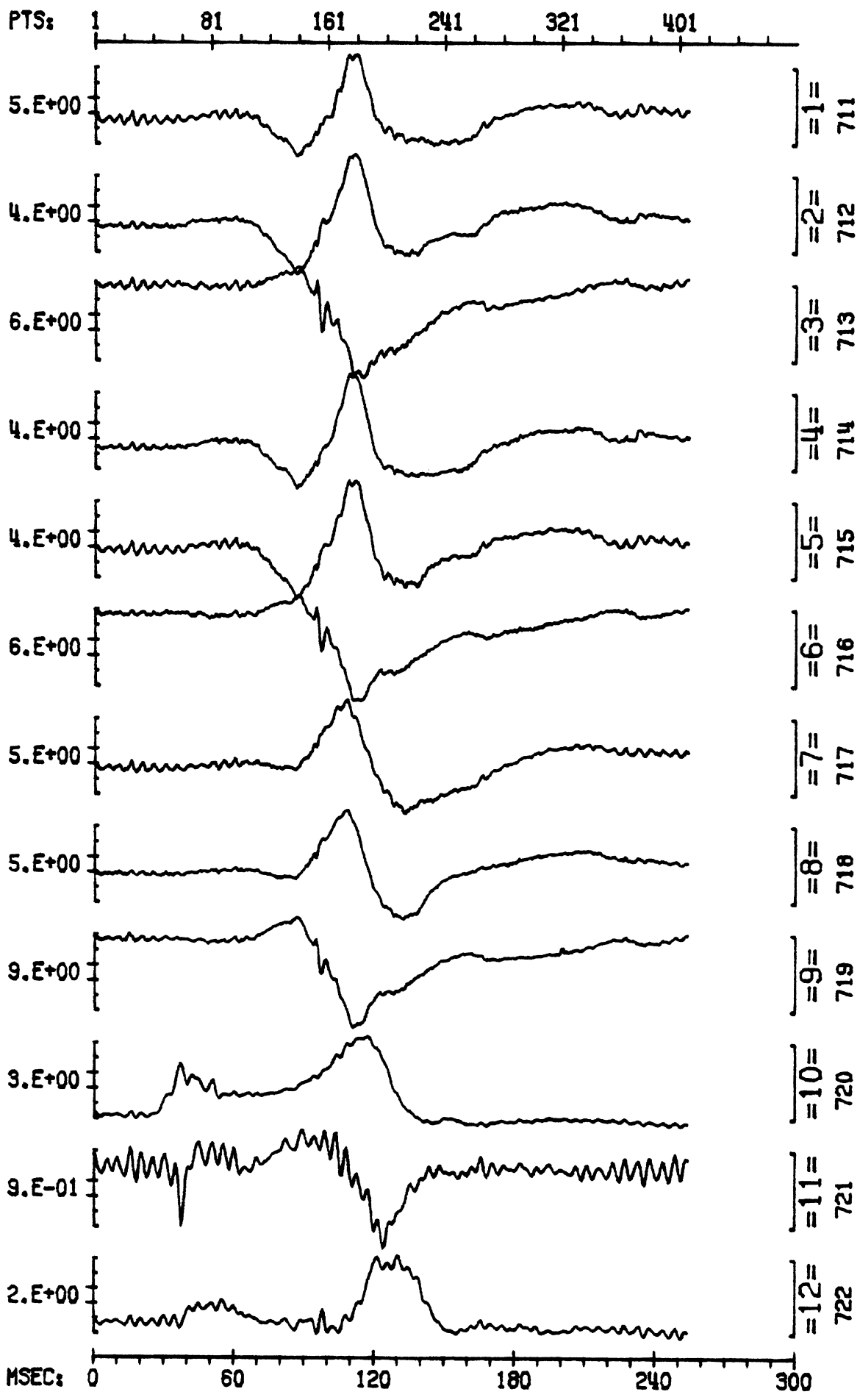
FILE CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
711 - 1:	AX1 - HEAD ACC A @ Q1	-42.20	G'S	4+1+18	569.8	407 @	1598.91
712 - 2:	AY1 - HEAD ACC B @ Q1	-33.40	G'S	4+1+18	569.8	407 @	1598.91
713 - 3:	AZ1 - HEAD ACC C @ Q1	-42.50	G'S	4+1+18	569.8	407 @	1598.91
714 - 4:	AX2 - HEAD ACC C @ Q2	-38.30	G'S	4+1+18	569.8	407 @	1598.91
715 - 5:	AY2 - HEAD ACC A @ Q2	-37.10	G'S	4+1+18	569.8	407 @	1598.91
716 - 6:	AZ2 - HEAD ACC B @ Q2	-42.50	G'S	4+1+18	569.8	407 @	1598.91
717 - 7:	AX3 - HEAD ACC B @ Q3	-40.90	G'S	4+1+18	569.8	407 @	1598.91
718 - 8:	AY3 - HEAD ACC C @ Q3	-34.10	G'S	4+1+18	569.8	407 @	1598.91
719 - 9:	AZ3 - HEAD ACC A @ Q3	-40.20	G'S	4+1+18	569.8	407 @	1598.91
720 - 10:	A-P INTERNAL PELVIS ACC	-25.60	G'S	4+1+12	284.9	407 @	1598.91
721 - 11:	L-R INTERNAL PELVIS ACC	-25.70	G'S	4+1+12	284.9	407 @	1598.91
722 - 12:	S-I INTERNAL PELVIS ACC	-25.80	G'S	4+1+12	284.9	407 @	1598.91

13:

14:

 FILED FILES: 711 - 722 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77

 RUN ID: 77B103-1: HYB-3L



IO: 77B103-1: HYB-3L

TAPE: GMR-DUM

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

RUN ID: 77B103-2: HYB-3L

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: HSKI-139 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR- DATE: 09-FEB-77

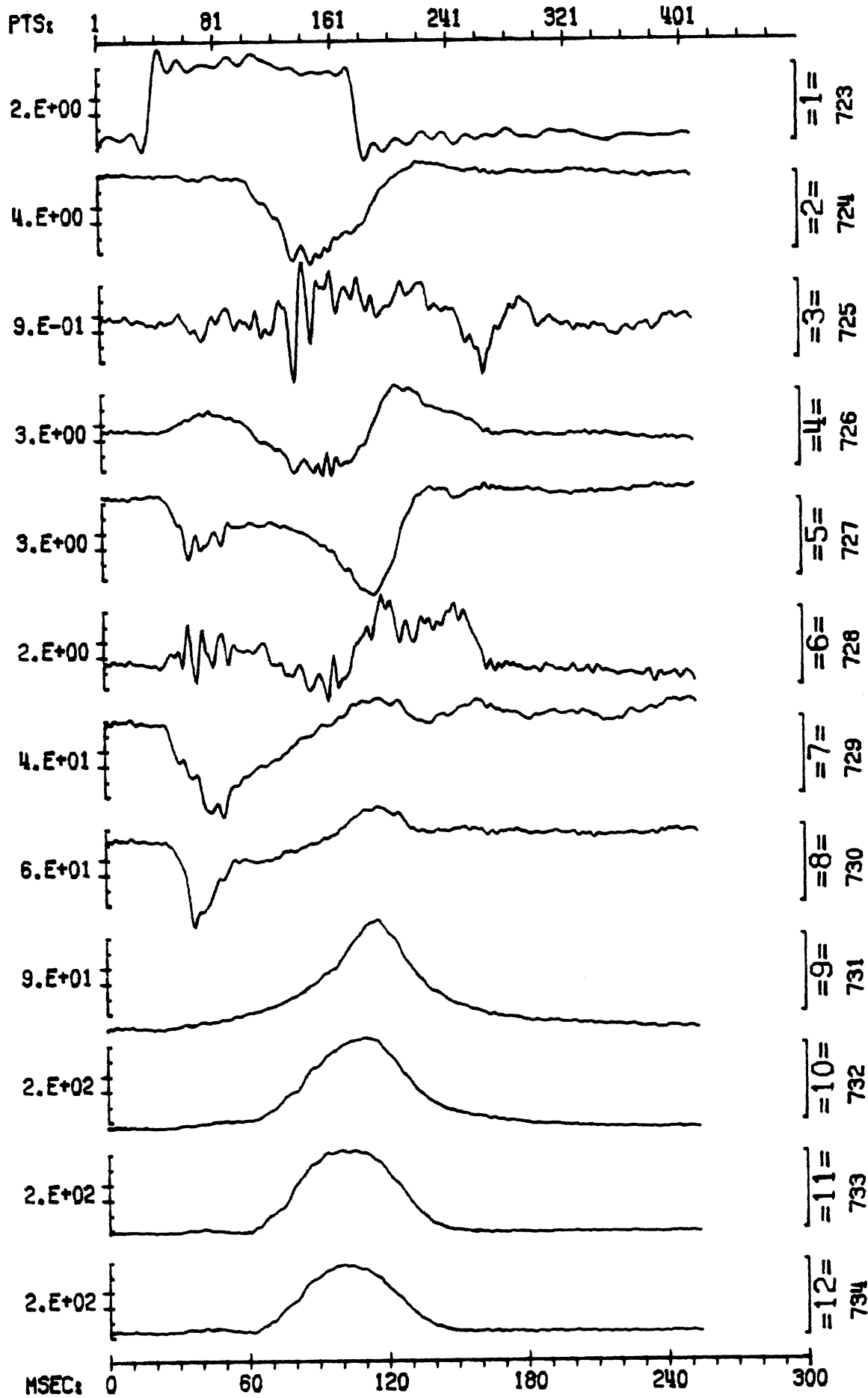
TEST SIGNALS: 1642 PTS/CH AT 6396.10 HZ. CAL SIGNALS: NOT DIGITIZED,

FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
723	1	SLED DECELERATION	20.00	G'S	4+1+1	80.0	407	1599.03
724	2	A-P EXTERNAL CHEST ACC	42.40	G'S	4+1+12	284.9	407	1599.03
725	3	L-R EXTERNAL CHEST ACC	35.50	G'S	4+1+12	284.9	407	1599.03
726	4	S-I EXTERNAL CHEST ACC	37.30	G'S	4+1+12	284.9	407	1599.03
727	5	A-P EXTERNAL PELVIS ACC	53.70	G'S	4+1+12	284.9	407	1599.03
728	6	S-I EXTERNAL PELVIS ACC	51.90	G'S	4+1+12	284.9	407	1599.03
729	7	RIGHT FEMUR LOAD	925.00	LBS	4+1+12	284.9	407	1599.03
730	8	LEFT FEMUR LOAD	986.00	LBS	4+1+12	284.9	407	1599.03
731	9	RIGHT LAP BELT LOAD	1000.00	LBS	4+1+12	284.9	407	1599.03
732	10	LEFT LAP BELT LOAD	1000.00	LBS	4+1+12	284.9	407	1599.03
733	11	UPPER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	284.9	407	1599.03
734	12	LOWER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	284.9	407	1599.03

13:

14:

FILTERED FILES: 723 - 734 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 77B103-2: HYB-3L



ID: 77B103-2: HYB-3L

TAPE: GMR-DUM

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 RUN ID: 77B103-3: HYB-3L
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ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: CR #118 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR- DATE: 09-FEB-77
 TEST SIGNALS: 16/2 PTS/CH AT 6393.93 HZ. CAL SIGNALS: NOT DIGITIZED.

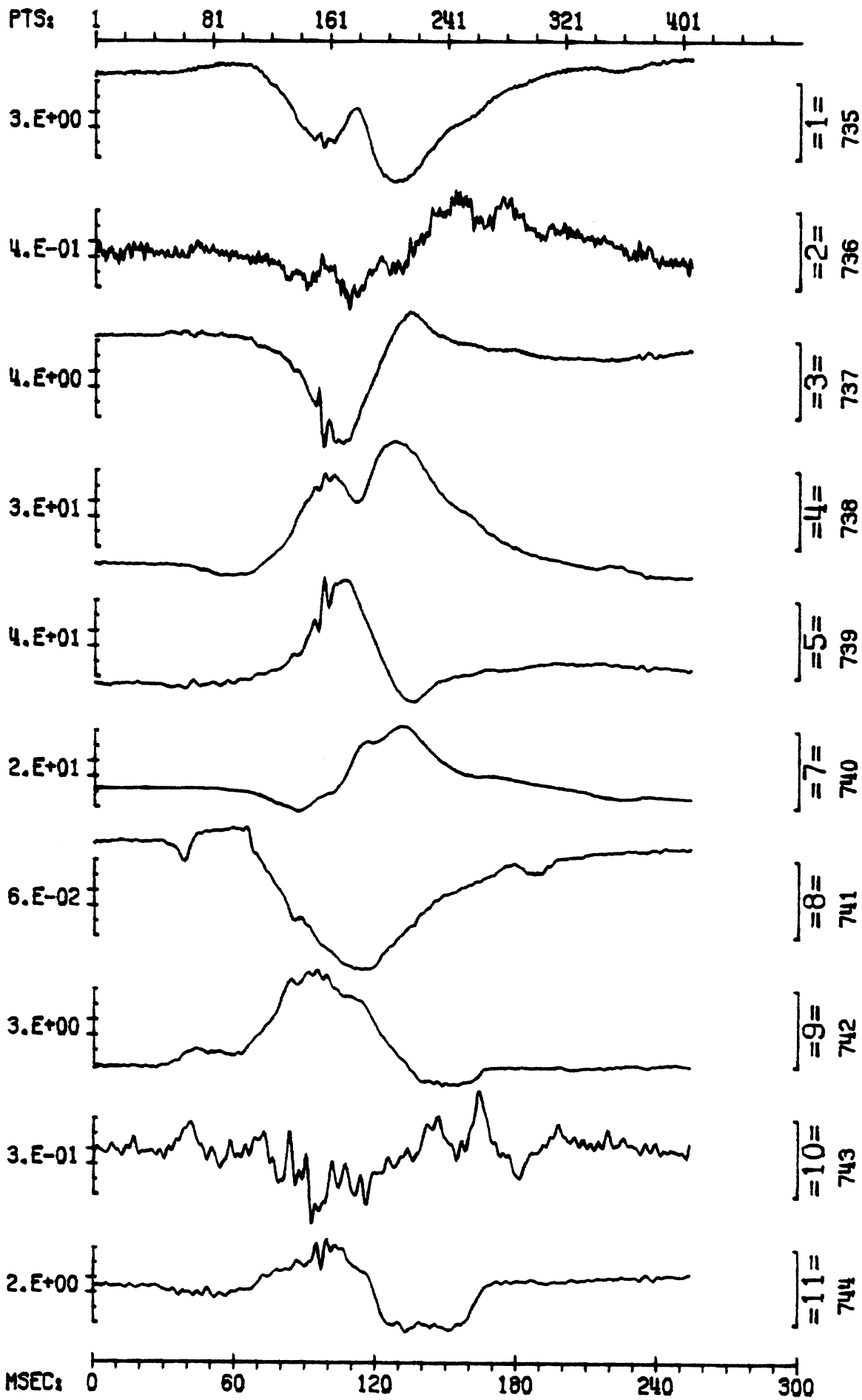
FILE CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
735 - 1:	A-P INTERNAL HEAD ACC	100.00	G'S	4+1+18	569.6	407 0	1598.48
736 - 2:	L-R INTERNAL HEAD ACC	-100.00	G'S	4+1+18	569.6	407 0	1598.48
737 - 3:	S-I INTERNAL HEAD ACC	-100.00	G'S	4+1+18	569.6	407 0	1598.48
738 - 4:	A-P NECK SHEAR FORCE	1000.00	LBS	4+1+12	284.8	407 0	1598.48
739 - 5:	S-I NECK AXIAL FORCE	1000.00	LBS	4+1+12	284.8	407 0	1598.48
6:							
740 - 7:	L-R NECK MOMENT (0.345 IN)	2400.00	IN-LBS	4+1+12	284.8	407 0	1598.48
741 - 8:	A-P CHEST DEFLECTION	3.00	INCHES	4+1+12	284.8	407 0	1598.48
742 - 9:	A-P INTERNAL CHEST ACC	100.00	G'S	4+1+12	284.8	407 0	1598.48
743 - 10:	L-R INTERNAL CHEST ACC	100.00	G'S	4+1+12	284.8	407 0	1598.48
744 - 11:	S-I INTERNAL CHEST ACC	-100.00	G'S	4+1+12	284.8	407 0	1598.48

12:

13:

14:

 FILTERED FILES: 735 - 744 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 77B103-3: HYB-3L



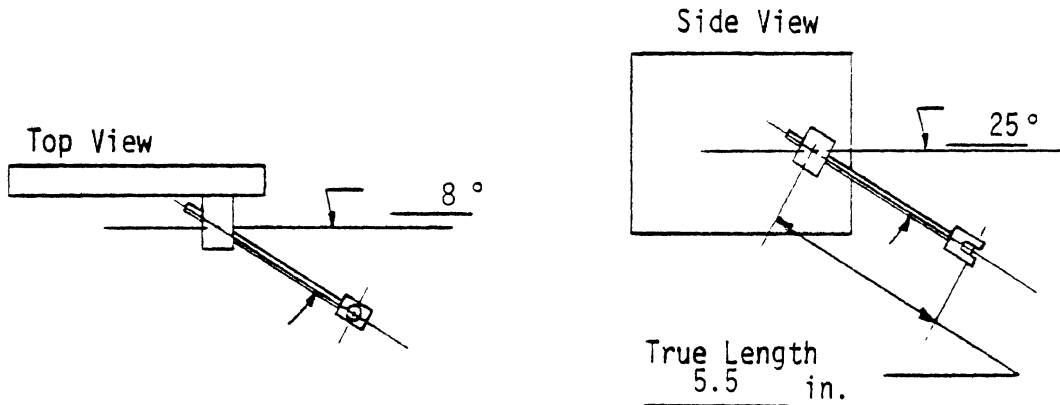
77B103-3: HYB-3L

ID:

TAPE: GMR-DUM

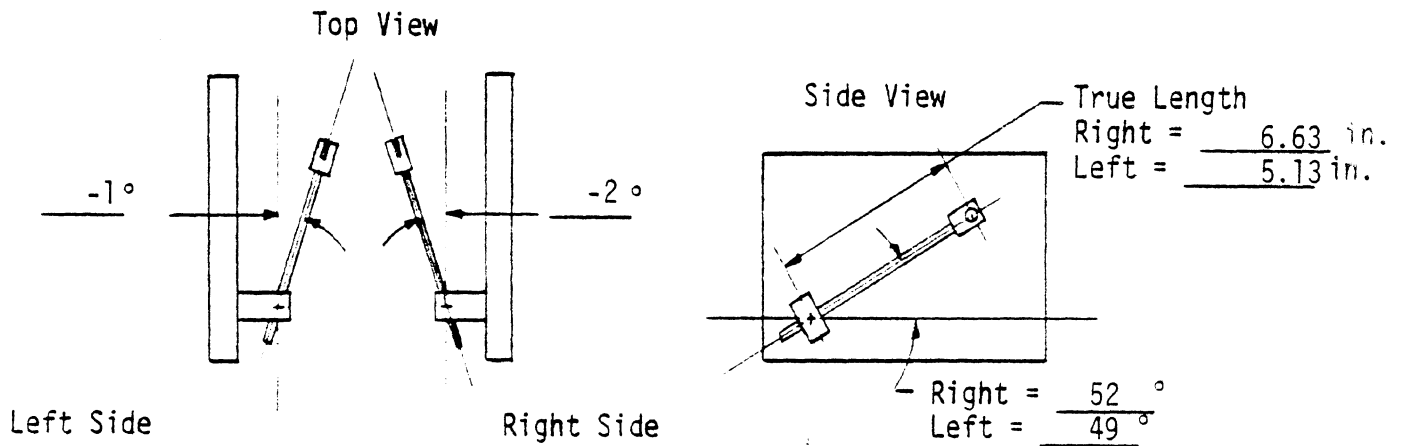
BELT ANCHOR ORIENTATIONS

A. SHOULDER BELT



B. LAP BELT

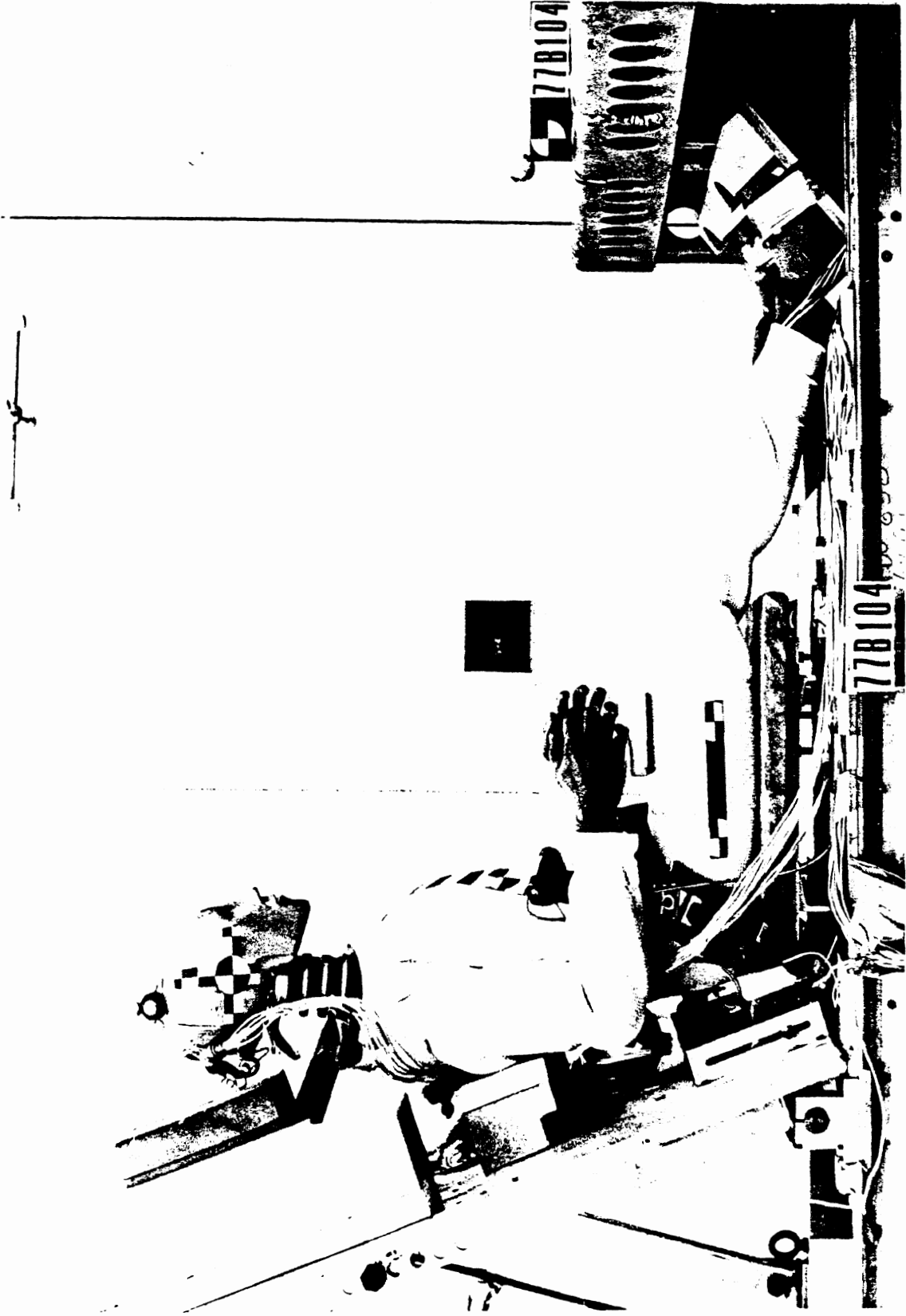
Pelvis Angle = 12°



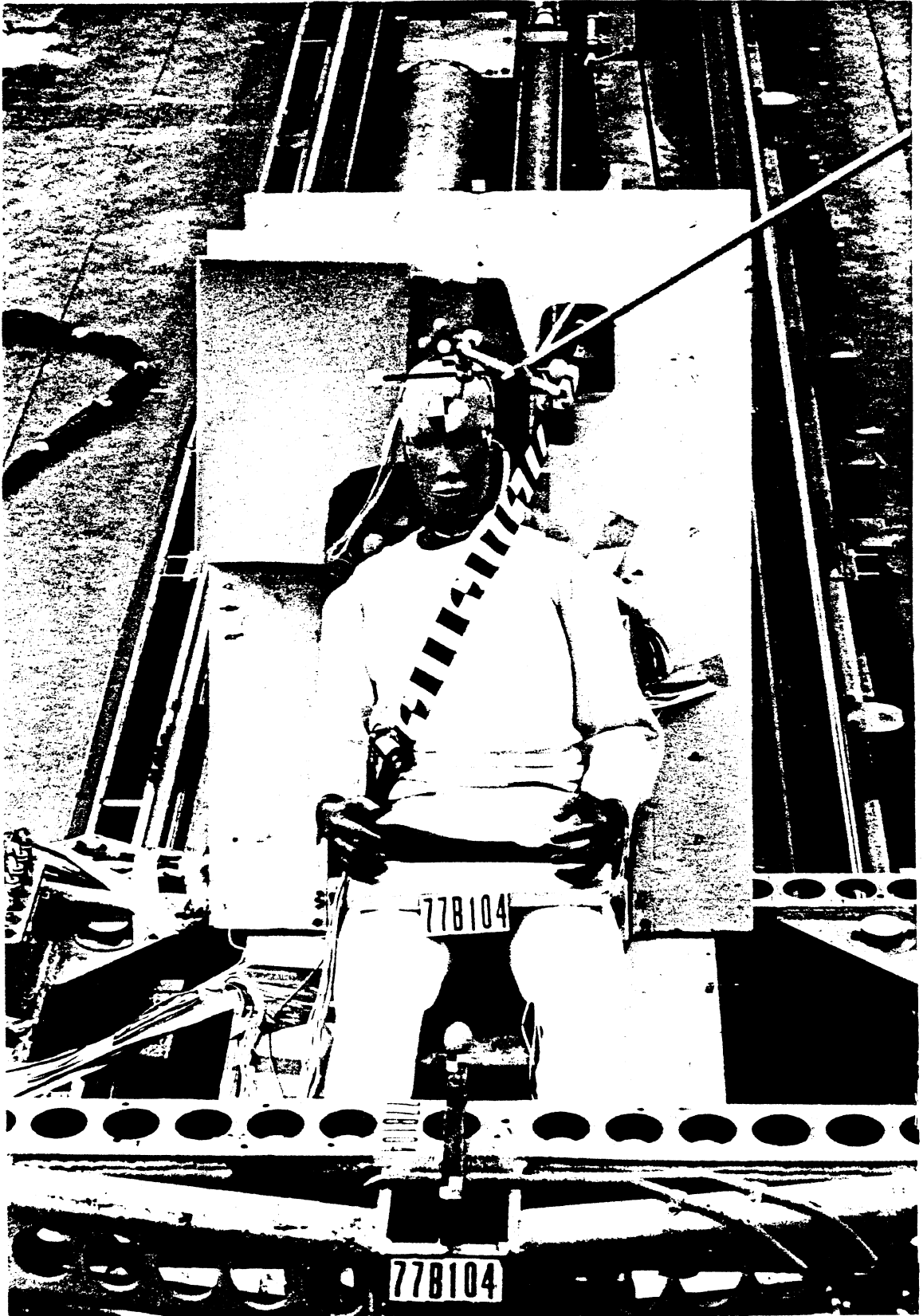
Sketch indicates positive angle directions

BELT LENGTH DATA

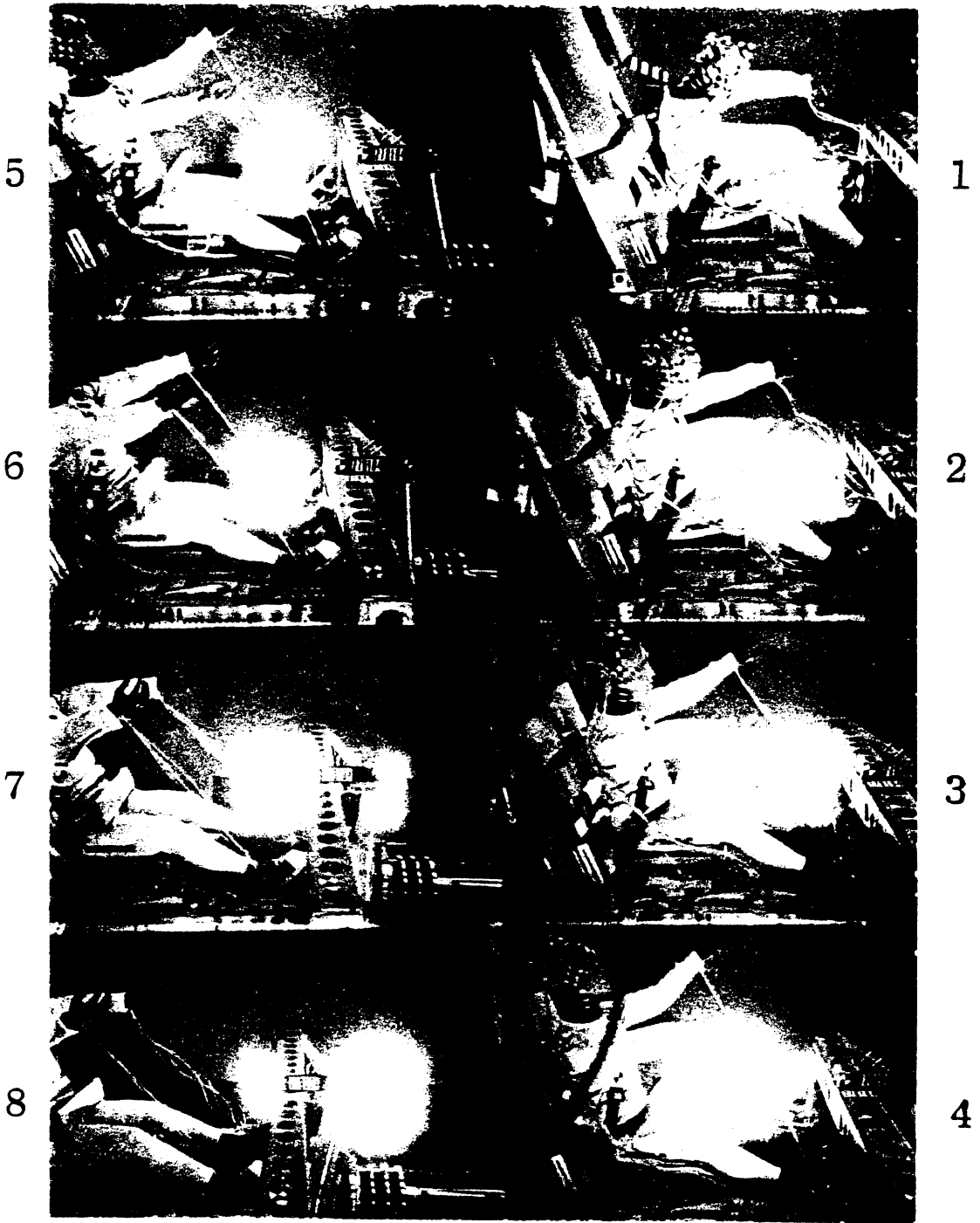
BELT POSITION	PRE-IMPACT LENGTH (in.)	POST-IMPACT LENGTH (in.)	BELT STRETCH (in.)	POST IMPACT LENGTH w/ LOAD CELLS (in.)
Rt. Lap	12.13	12.25	0.13	_____
Lt. Lap	32.5	32.88	0.38	_____
Shoulder	42.0	42.25	0.25	_____







B-42



77B104

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RUN ID: 77B100-1: HYB-3M

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ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: HSRI-138 EXPANDED 16BIT, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR- DATE: 09-FEB-77

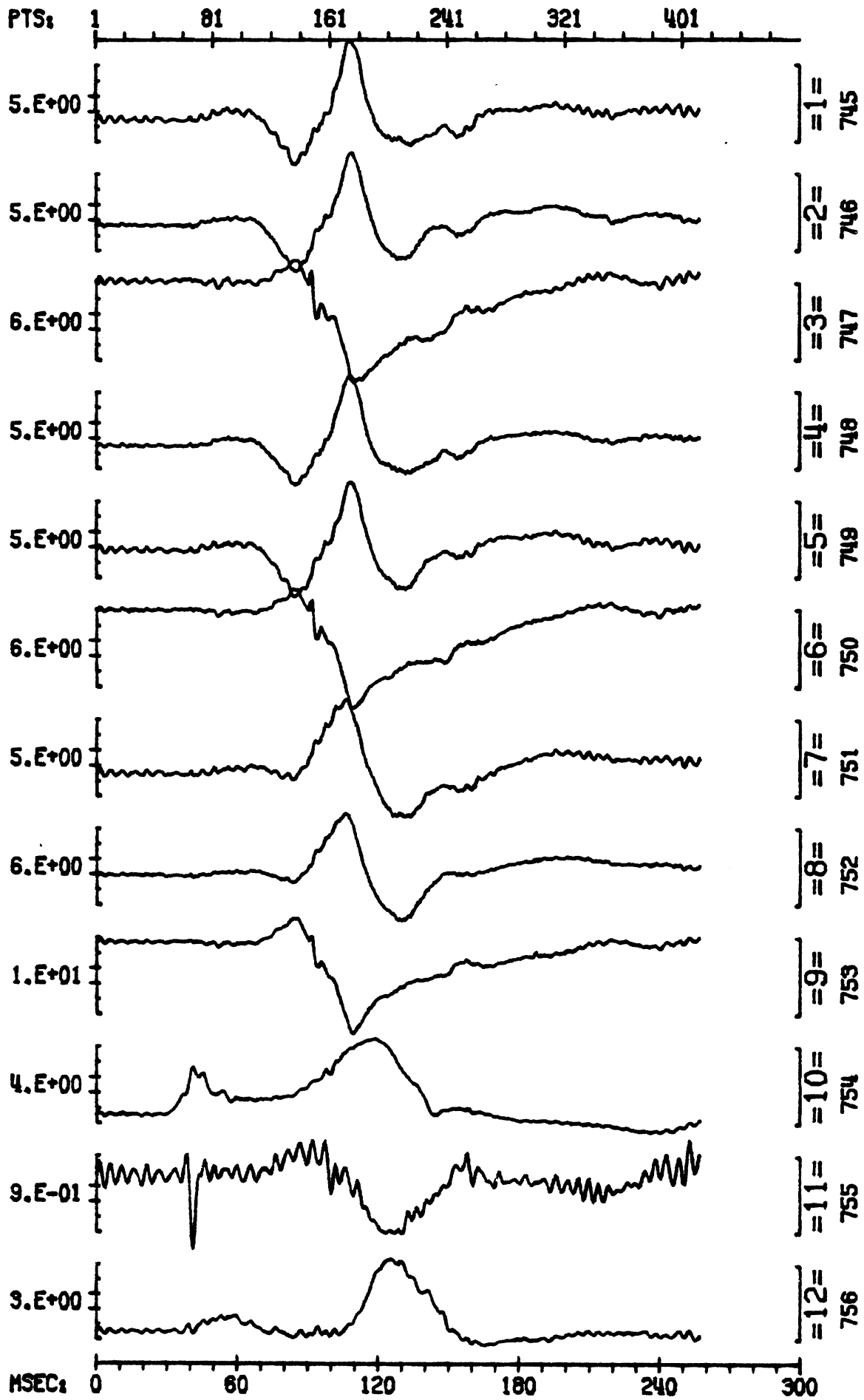
TEST SIGNALS: 1663 PTS/CH AT 6395.39 HZ. CAL SIGNALS: NOT DIGITIZED.

FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
745	- 1:	AX1 - HEAD ACC A @ Q1	-42.20	G'S	4+1+18	569.8	412 @	1598.85
746	- 2:	AY1 - HEAD ACC R @ Q1	-33.40	G'S	4+1+18	569.8	412 @	1598.85
747	- 3:	AZ1 - HEAD ACC C @ Q1	-42.50	G'S	4+1+18	569.8	412 @	1598.85
748	- 4:	AX2 - HEAD ACC C @ Q2	-38.30	G'S	4+1+18	569.8	412 @	1598.85
749	- 5:	AY2 - HEAD ACC A @ Q2	-37.10	G'S	4+1+18	569.8	412 @	1598.85
750	- 6:	AZ2 - HEAD ACC R @ Q2	-42.50	G'S	4+1+18	569.8	412 @	1598.85
751	- 7:	AX3 - HEAD ACC B @ Q3	-40.90	G'S	4+1+18	569.8	412 @	1598.85
752	- 8:	AY3 - HEAD ACC C @ Q3	-34.10	G'S	4+1+18	569.8	412 @	1598.85
753	- 9:	AZ3 - HEAD ACC A @ Q3	-40.20	G'S	4+1+18	569.8	412 @	1598.85
754	- 10:	A-P INTERNAL PELVIS ACC	-25.60	G'S	4+1+12	284.9	412 @	1598.85
755	- 11:	L-R INTERNAL PELVIS ACC	-25.70	G'S	4+1+12	284.9	412 @	1598.85
756	- 12:	S-I INTERNAL PELVIS ACC	-25.80	G'S	4+1+12	284.9	412 @	1598.85

13:

14:

----- FILTERED FILFS: 745 - 756 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 77B100-1: HYB-3M -----



ID: 77B104-1: HYB-3M

TAPE: GMR-DUM

 RUN ID: 77B104-2: HYB-3M

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

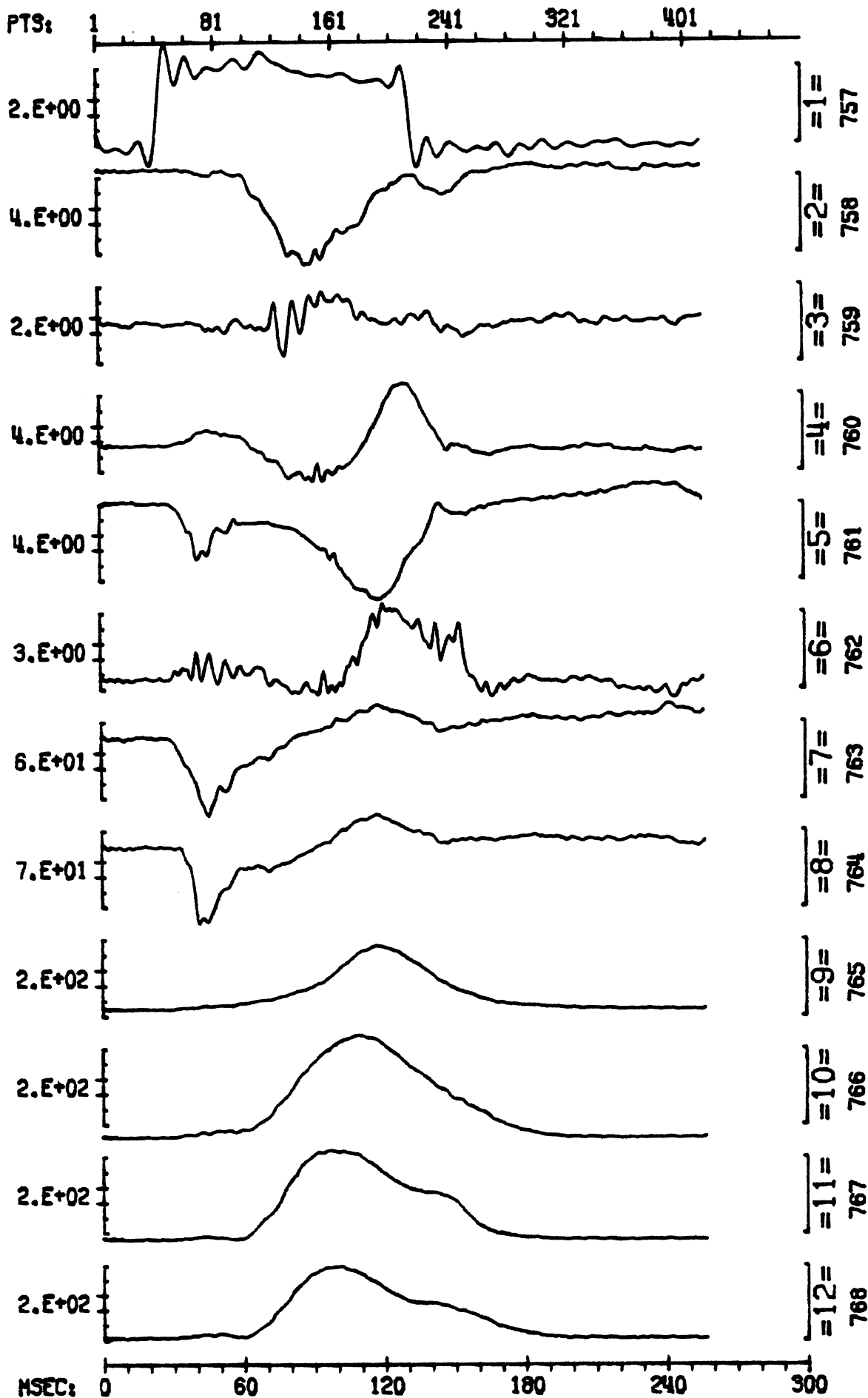
 PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: HSRI-139 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR- DATE: 09-FEB-77
 TEST SIGNALS: 1663 PTS/CH AT 6399.38 HZ. CAL SIGNALS: NOT DIGITIZED.

FILE CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
757 - 1	SLED DECELERATION	20.00	G'S	4+1+1	80.0	412	1599.85
758 - 2	A-P EXTERNAL CHEST ACC	42.40	G'S	4+1+12	285.1	412	1599.85
759 - 3	L-R EXTERNAL CHEST ACC	35.50	G'S	4+1+12	285.1	412	1599.85
760 - 4	S-I EXTERNAL CHEST ACC	37.30	G'S	4+1+12	285.1	412	1599.85
761 - 5	A-P EXTERNAL PELVIS ACC	53.70	G'S	4+1+12	285.1	412	1599.85
762 - 6	S-I EXTERNAL PELVIS ACC	51.90	G'S	4+1+12	285.1	412	1599.85
763 - 7	RIGHT FEMUR LOAD	925.00	LBS	4+1+12	285.1	412	1599.85
764 - 8	LEFT FEMUR LOAD	986.00	LBS	4+1+12	285.1	412	1599.85
765 - 9	RIGHT LAP BELT LOAD	1000.00	LBS	4+1+12	285.1	412	1599.85
766 - 10	LEFT LAP BELT LOAD	1000.00	LBS	4+1+12	285.1	412	1599.85
767 - 11	UPPER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	285.1	412	1599.85
768 - 12	LOWER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	285.1	412	1599.85

13:
14:

 FILTERED FILES: 757 - 768 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 77B104-2: HYB-3M



ID: 77B104-2: HYB-3M

TAPE: GMF-DUM

 RUN ID: 778104-3: HYB-3M

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: CR #116 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524, GMR= DATE: 09-FEB-77

TEST SIGNALS: 1664 PTS/CH AT 6398.31 HZ. CAL SIGNALS: NOT DIGITIZED.

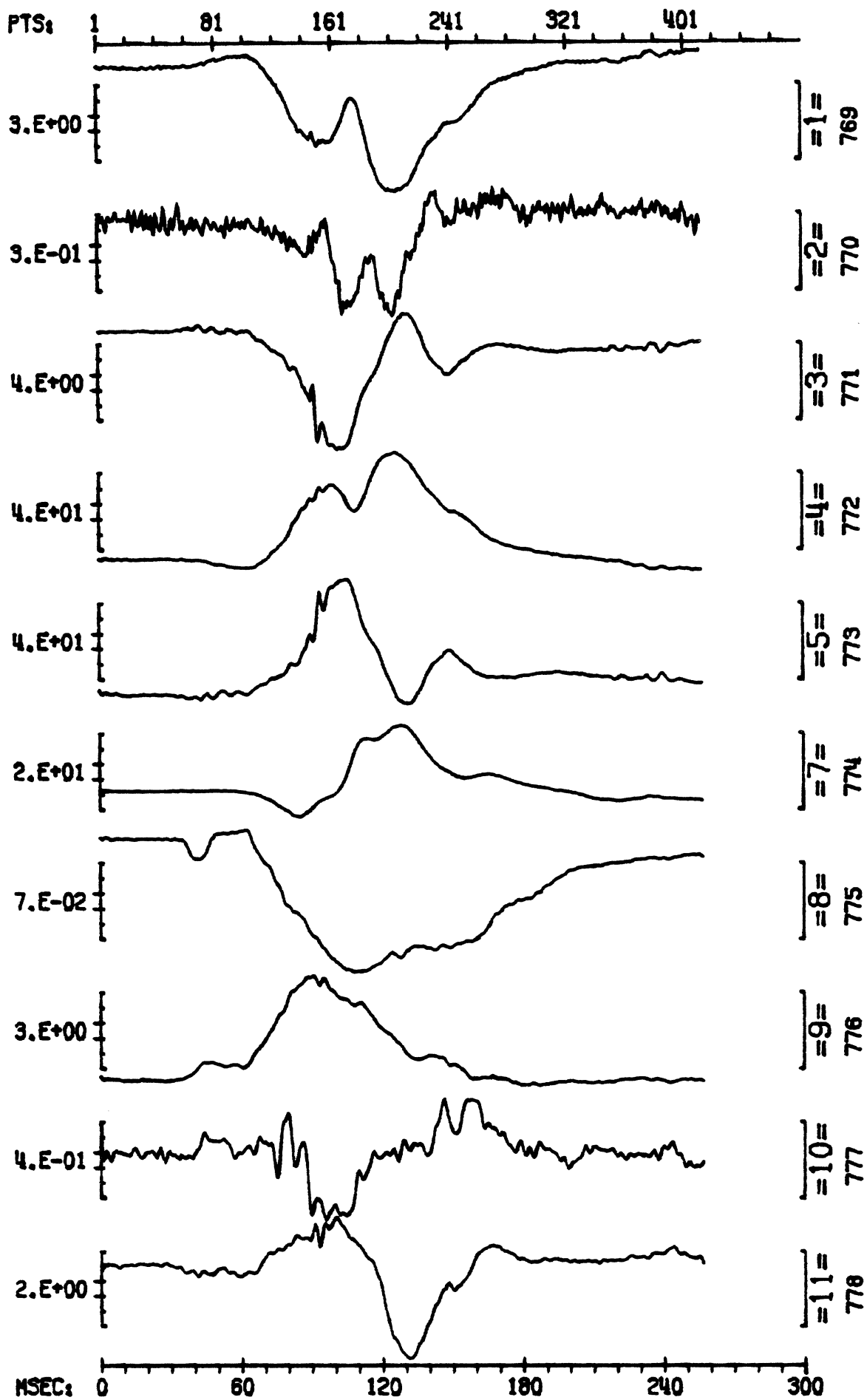
FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
769	1	A-P INTERNAL HEAD ACC	100.00	G'S	4+1+10	570.0	412	1599.50
770	2	L-R INTERNAL HEAD ACC	-100.00	G'S	4+1+10	570.0	412	1599.50
771	3	S-I INTERNAL HEAD ACC	-100.00	G'S	4+1+10	570.0	412	1599.50
772	4	A-P NECK SHEAR FORCE	1000.00	LBS	4+1+12	285.0	412	1599.50
773	5	S-I NECK AXIAL FORCE	1000.00	LBS	4+1+12	285.0	412	1599.50
6:								
774	7	L-R NECK MOMENT (0.345 IN)	2400.00	IN-LBS	4+1+12	285.0	412	1599.50
775	8	A-P CHEST DEFLECTION	3.00	INCHES	4+1+12	285.0	412	1599.50
776	9	A-P INTERNAL CHEST ACC	100.00	G'S	4+1+12	285.0	412	1599.50
777	10	L-R INTERNAL CHEST ACC	100.00	G'S	4+1+12	285.0	412	1599.50
778	11	S-I INTERNAL CHEST ACC	-100.00	G'S	4+1+12	285.0	412	1599.50

12:

13:

14:

 FILTERED FILES: 769 - 778 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 778104-3: HYB-3M



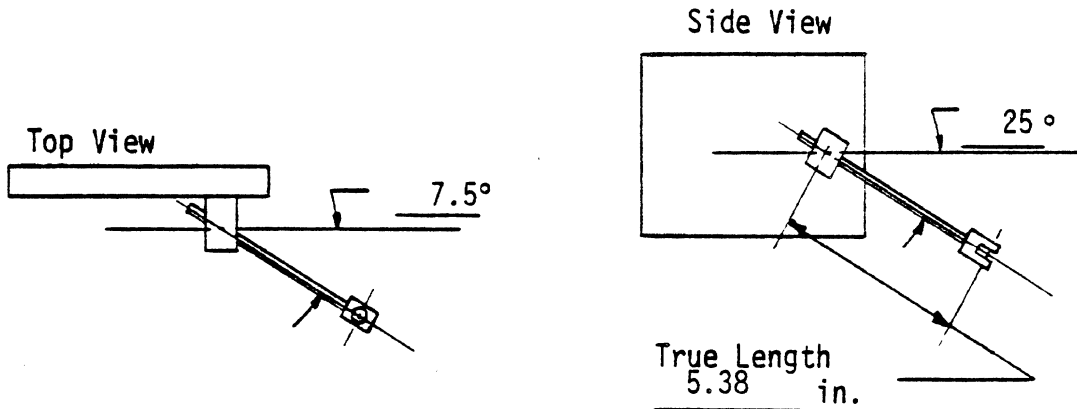
77B104-3: HYB-3M

ID:

TAPE: GMR-DUM

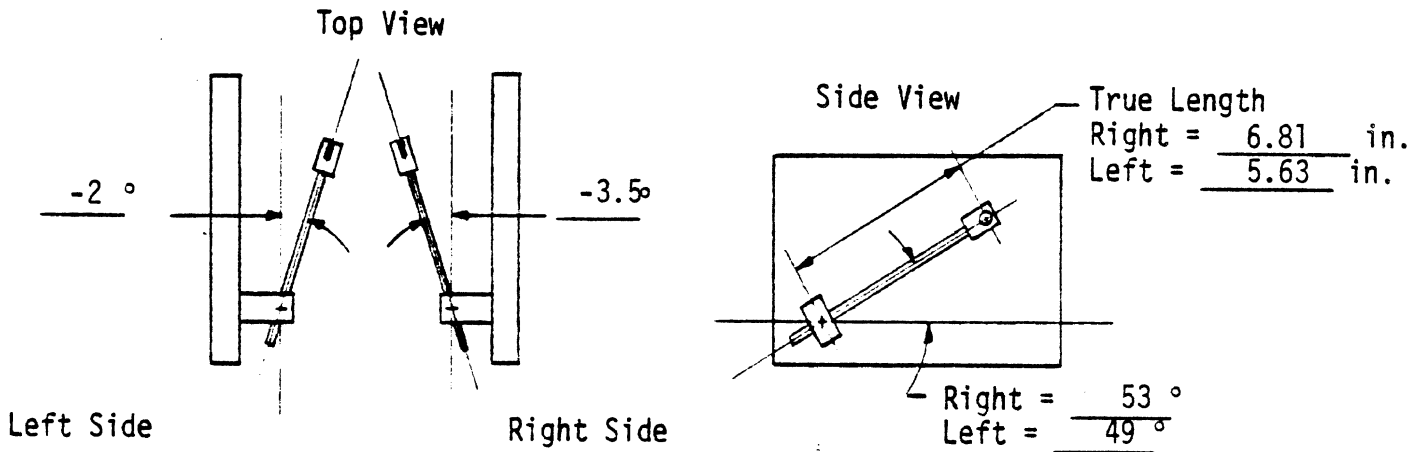
BELT ANCHOR ORIENTATIONS

A. SHOULDER BELT



B. LAP BELT

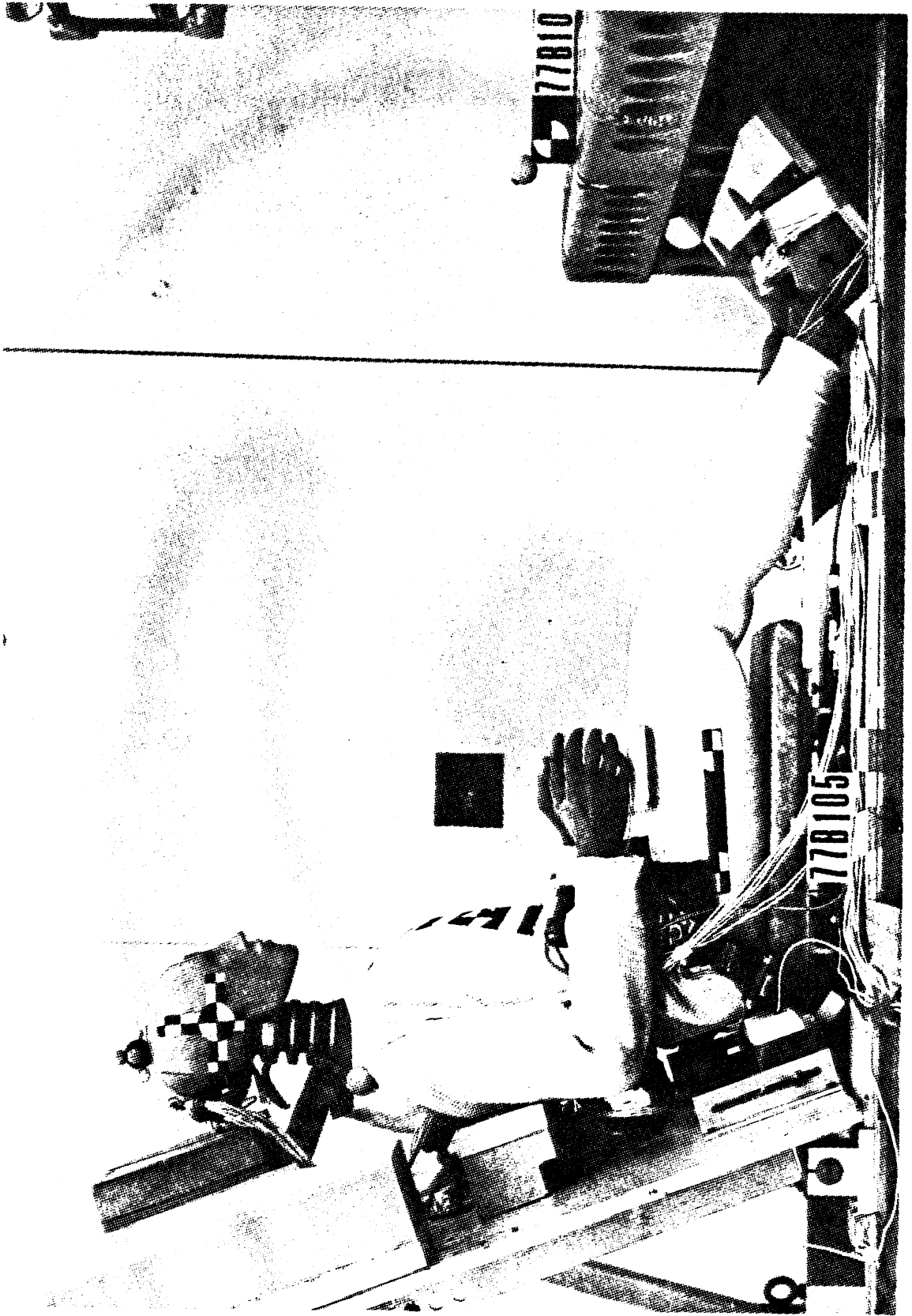
Pelvis Angle = 13°



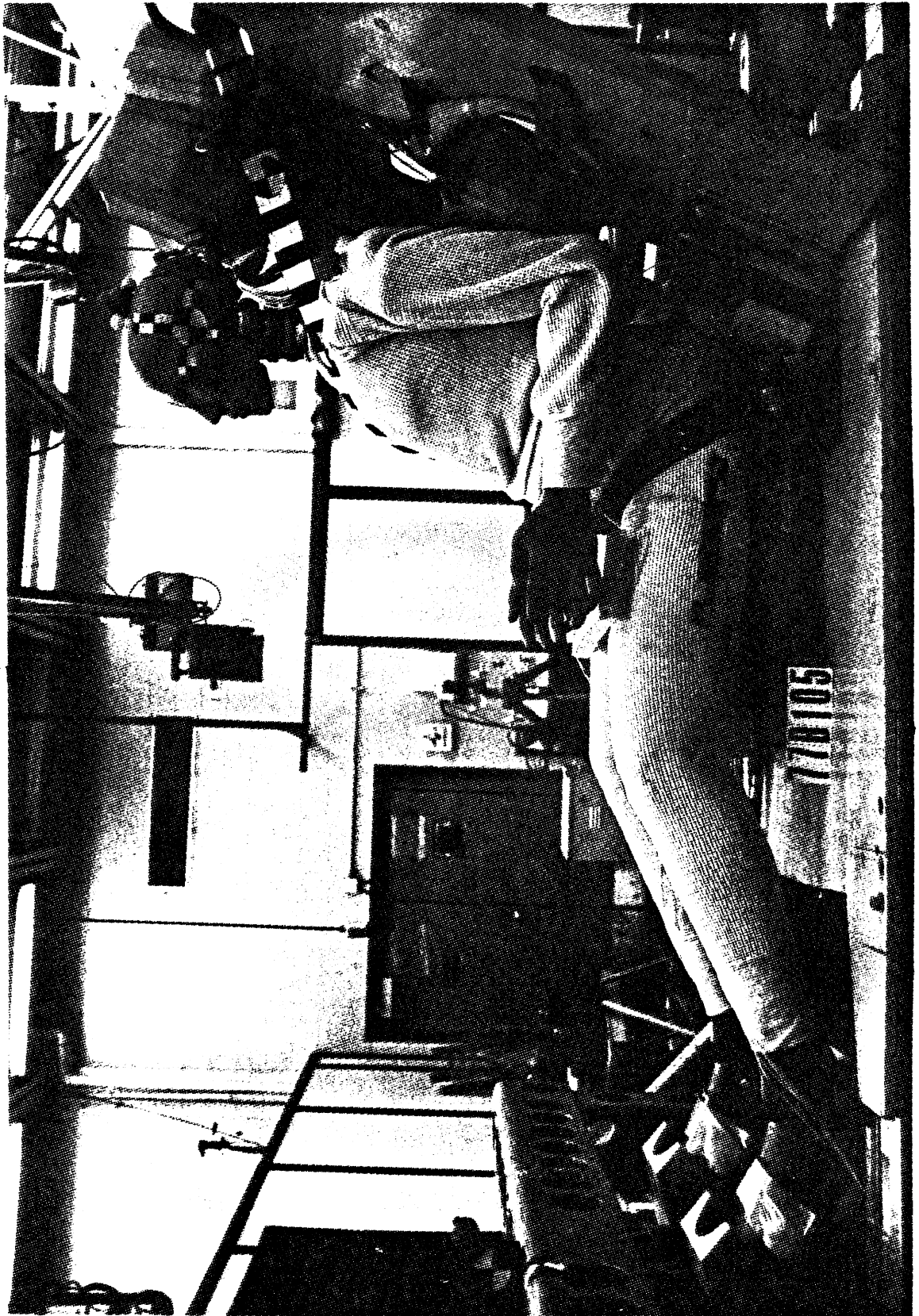
Sketch indicates positive angle directions

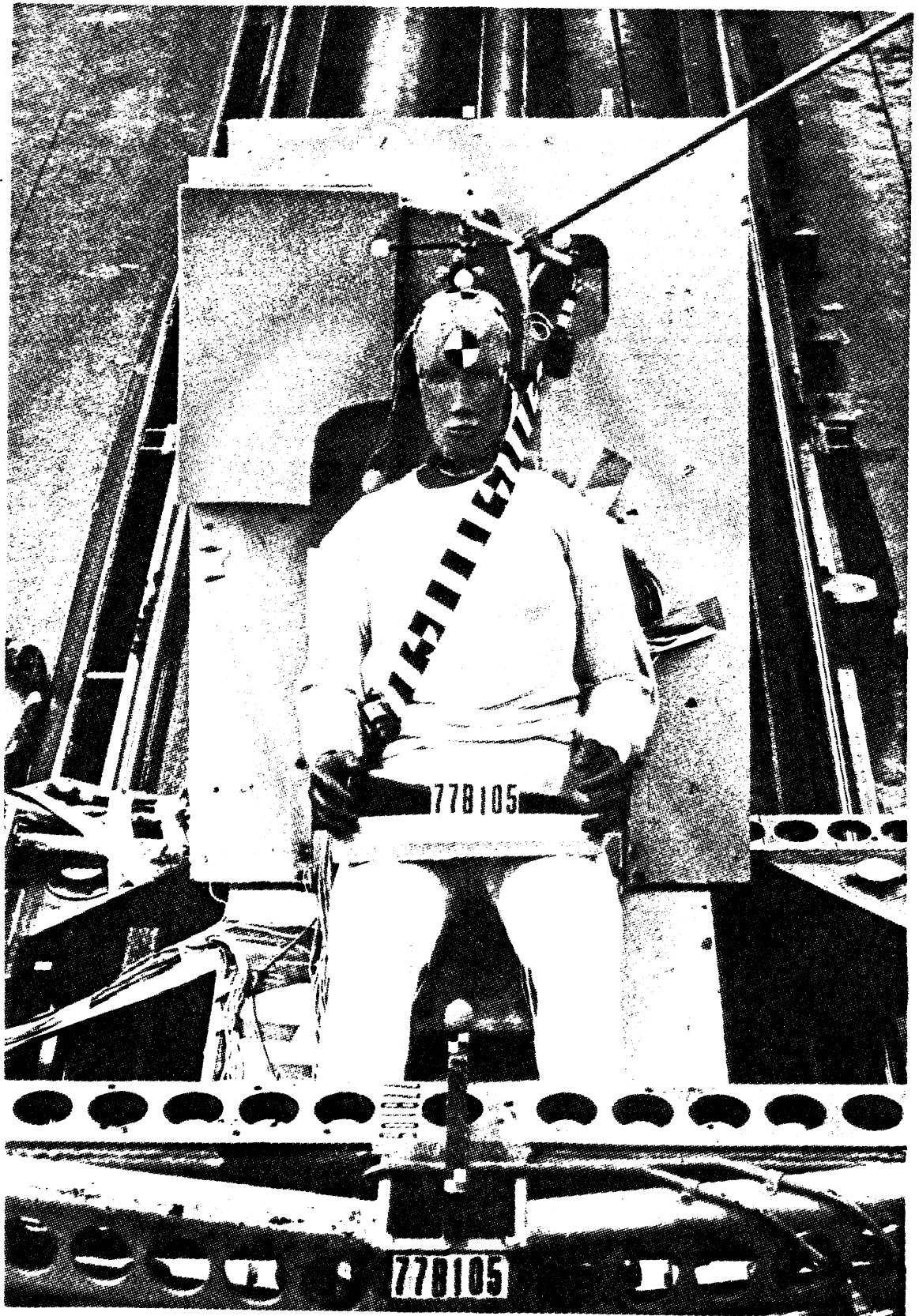
BELT LENGTH DATA

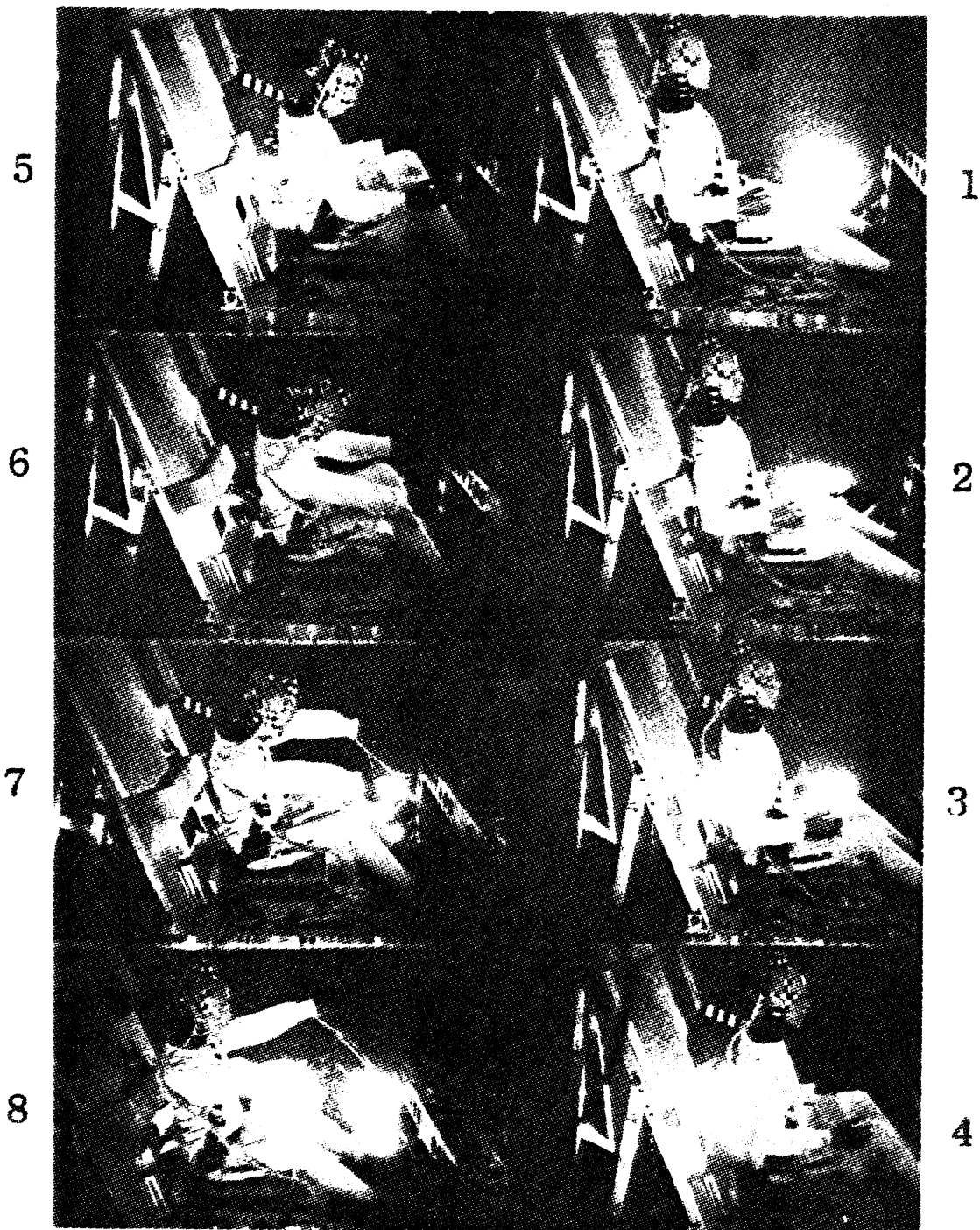
BELT POSITION	PRE-IMPACT LENGTH (in.)	POST-IMPACT LENGTH (in.)	BELT STRETCH (in.)	POST IMPACT LENGTH w/ LOAD CELLS (in.)
Rt. Lap	12.13	12.38	0.25	
Lt. Lap	32.5	32.69	0.19	
Shoulder	42.0	42.25	0.25	



B-52







77B105

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

RUN ID: 778105-11 HYB-3M

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: HSRI-138 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR- DATE: 09-FEB-77

TEST SIGNALS: 1562 PTS/CH AT 6395.41 HZ. CAL SIGNALS: NOT DIGITIZED.

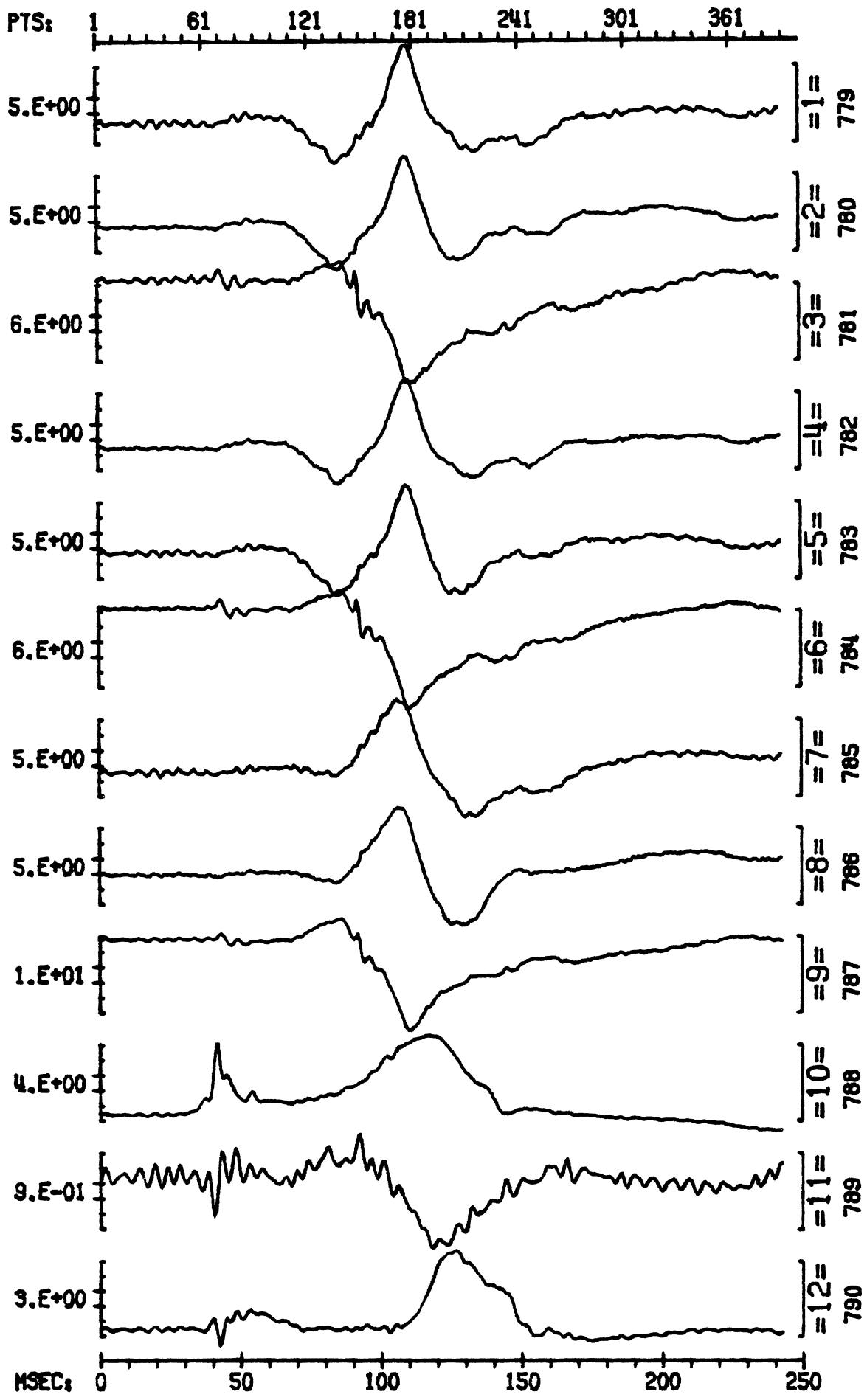
FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
779	- 11	AX1 - HEAD ACC A @ Q1	-42.20	G'S	4+1+18	569.8	389 @	1598.85
780	- 21	AY1 - HEAD ACC B @ Q1	-33.40	G'S	4+1+18	569.8	389 @	1598.85
781	- 31	AZ1 - HEAD ACC C @ Q1	-42.50	G'S	4+1+18	569.8	389 @	1598.85
782	- 41	AX2 - HEAD ACC C @ Q2	-38.30	G'S	4+1+18	569.8	389 @	1598.85
783	- 51	AY2 - HEAD ACC A @ Q2	-37.10	G'S	4+1+18	569.8	389 @	1598.85
784	- 61	AZ2 - HEAD ACC B @ Q2	-42.50	G'S	4+1+18	569.8	389 @	1598.85
785	- 71	AX3 - HEAD ACC B @ Q3	-40.90	G'S	4+1+18	569.8	389 @	1598.85
786	- 81	AY3 - HEAD ACC C @ Q3	-34.10	G'S	4+1+18	569.8	389 @	1598.85
787	- 91	AZ3 - HEAD ACC A @ Q3	-40.20	G'S	4+1+18	569.8	389 @	1598.85
788	- 101	A-P INTERNAL PELVIS ACC	-25.60	G'S	4+1+12	284.9	389 @	1598.85
789	- 111	L-R INTERNAL PELVIS ACC	-25.70	G'S	4+1+12	284.9	389 @	1598.85
790	- 121	S-I INTERNAL PELVIS ACC	-25.80	G'S	4+1+12	284.9	389 @	1598.85

131

141

FILTERED FILES: 779 - 790 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 778105-11 HYB-3M

B-56



IO: 77B105-1: HYB-3M

TAPE: GMR-DUM

 RUN ID: 77B105-2; HYB-3M

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: HSRI-139 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR- DATE: 09-FEB-77
 TEST SIGNALS: 1561 PTS/CH AT 6394.92 HZ. CAL SIGNALS: NOT DIGITIZED.

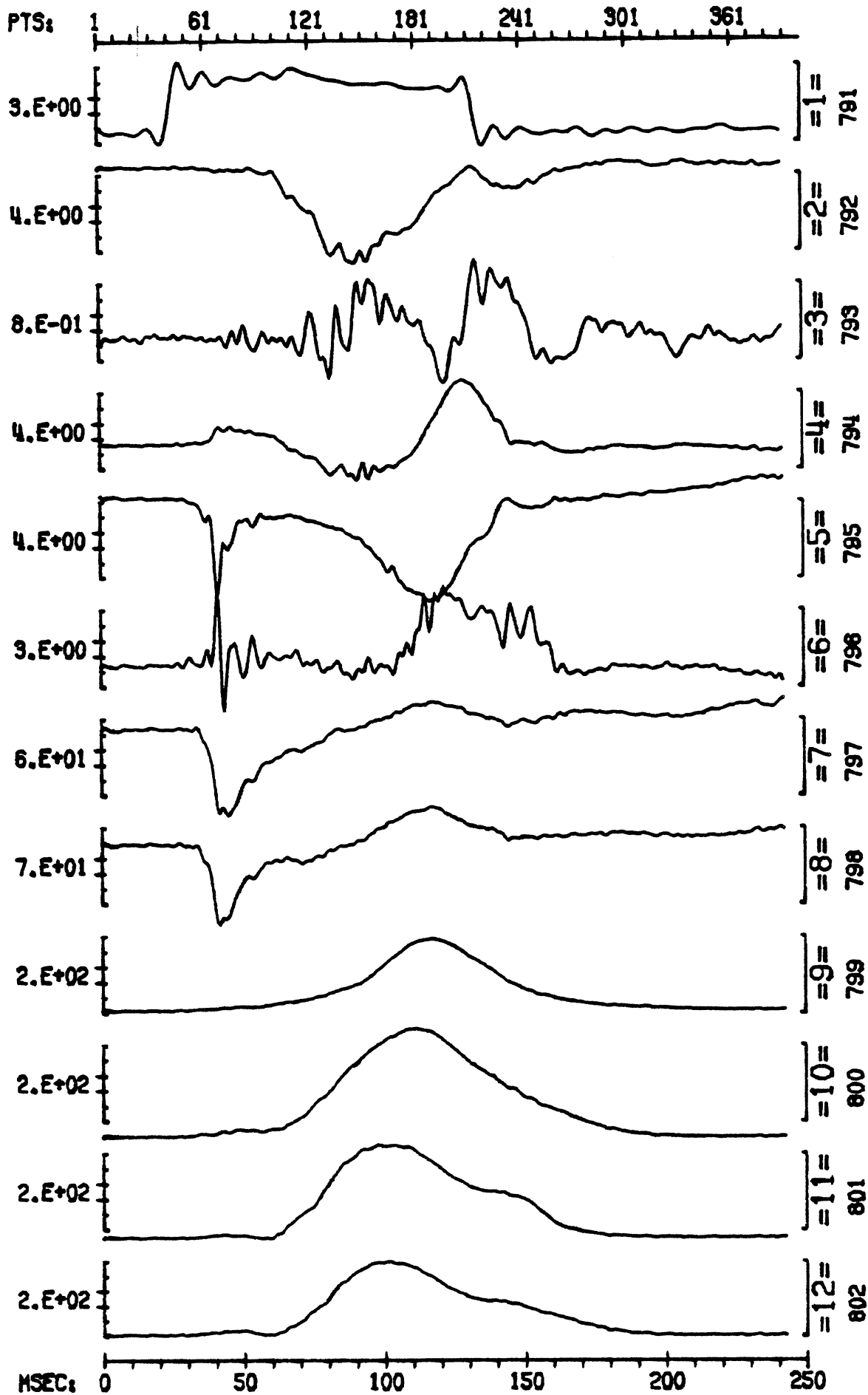
FILE CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
791 -	1: SLED DECELERATION	20.00	G'S	4+1+1	79.9	389	1598.73
792 -	2: A-P EXTERNAL CHEST ACC	42.40	G'S	4+1+12	284.9	389	1598.73
793 -	3: L-R EXTERNAL CHEST ACC	35.50	G'S	4+1+12	284.9	389	1598.73
794 -	4: S-I EXTERNAL CHEST ACC	37.30	G'S	4+1+12	284.9	389	1598.73
795 -	5: A-P EXTERNAL PELVIS ACC	53.70	G'S	4+1+12	284.9	389	1598.73
796 -	6: S-I EXTERNAL PELVIS ACC	51.90	G'S	4+1+12	284.9	389	1598.73
797 -	7: RIGHT FEMUR LOAD	925.00	LBS	4+1+12	284.9	389	1598.73
798 -	8: LEFT FEMUR LOAD	986.00	LBS	4+1+12	284.9	389	1598.73
799 -	9: RIGHT LAP BELT LOAD	1000.00	LBS	4+1+12	284.9	389	1598.73
800 -	10: LEFT LAP BELT LOAD	1000.00	LBS	4+1+12	284.9	389	1598.73
801 -	11: UPPER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	284.9	389	1598.73
802 -	12: LOWER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	284.9	389	1598.73

13:

14:

 FILTERED FILES: 791 - 802 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77

 RUN ID: 77B105-2; HYB-3M



IO: 77B105-2: HYB-3M

TAPE: GMR-DUM

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

RUN ID: 77B105-3; HYB-3M

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

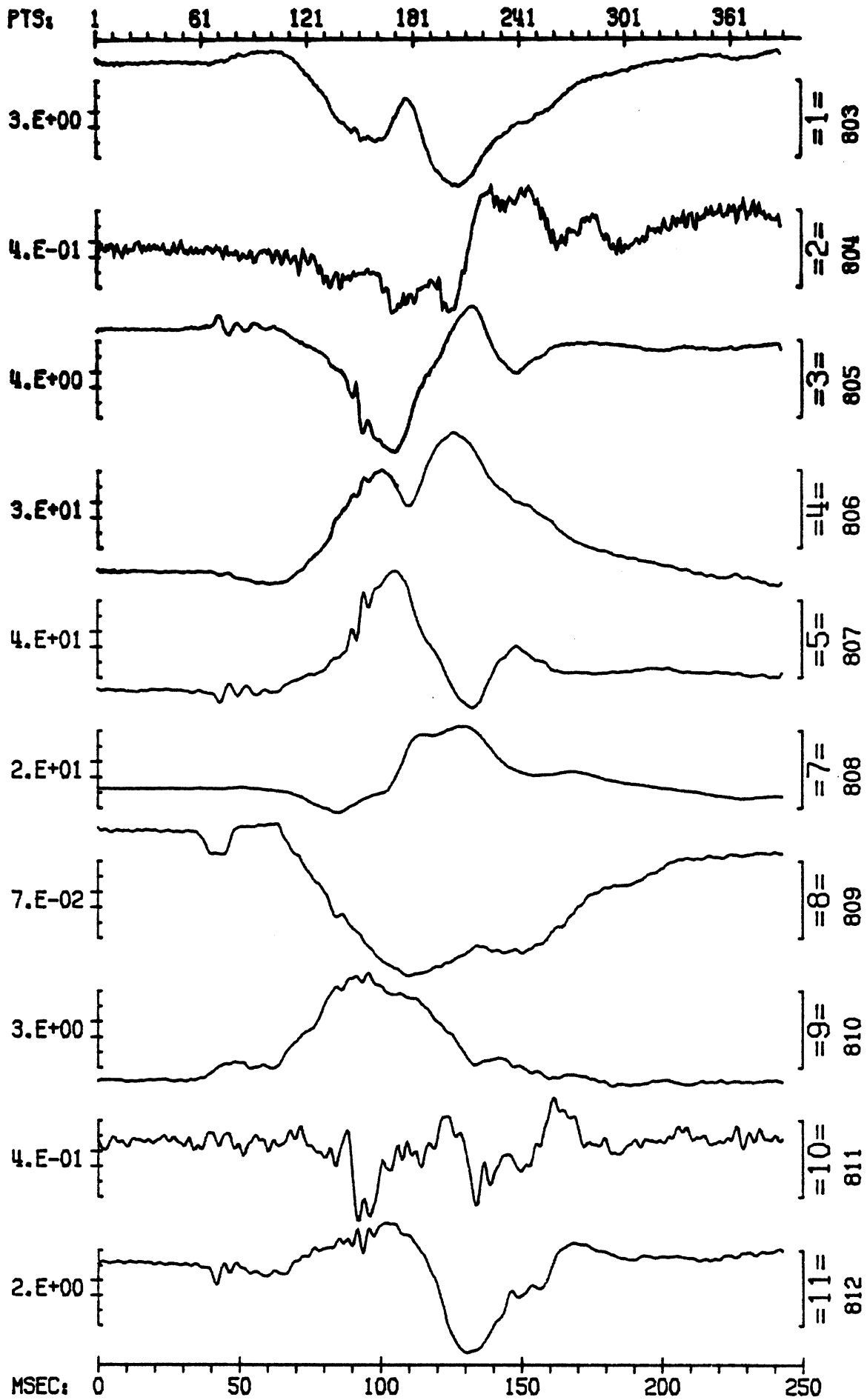
ANALOG TAPE: CR #118 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524, GMR- DATE: 09-FEB-77

TEST SIGNALS: 1562 PTS/CH AT 6393.29 HZ. CAL SIGNALS: NOT DIGITIZED.

FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
803	1	A-P INTERNAL HEAD ACC	100.00	G'S	4+1+18	569.6	389	1598.32
804	2	L-R INTERNAL HEAD ACC	-100.00	G'S	4+1+18	569.6	389	1598.32
805	3	S-I INTERNAL HEAD ACC	-100.00	G'S	4+1+18	569.6	389	1598.32
806	4	A-P NECK SHEAR FORCE	1000.00	LBS	4+1+12	284.8	389	1598.32
807	5	S-I NECK AXIAL FORCE	1000.00	LBS	4+1+12	284.8	389	1598.32
	6							
808	7	L-R NECK MOMENT (0.345 IN)	2400.00	IN-LBS	4+1+12	284.8	389	1598.32
809	8	A-P CHEST DEFLECTION	3.00	INCHES	4+1+12	284.8	389	1598.32
810	9	A-P INTERNAL CHEST ACC	100.00	G'S	4+1+12	284.8	389	1598.32
811	10	L-R INTERNAL CHEST ACC	100.00	G'S	4+1+12	284.8	389	1598.32
812	11	S-I INTERNAL CHEST ACC	-100.00	G'S	4+1+12	284.8	389	1598.32
	12							
	13							
	14							

FILTERED FILES: 803 - 812 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 77B105-3; HYB-3M

B-60



ID: 77B105-3: HYB-3M

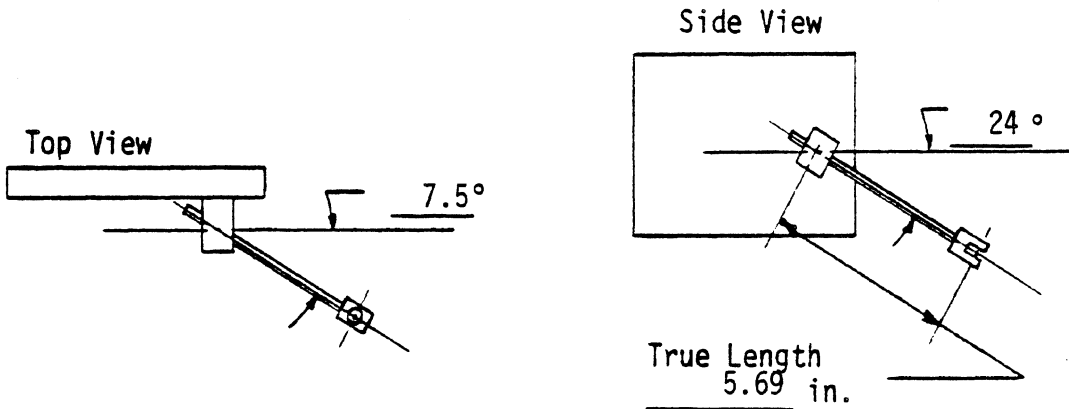
TAPE: GMR-DUM

TEST NO.: 77B106

SUBJECT: _____

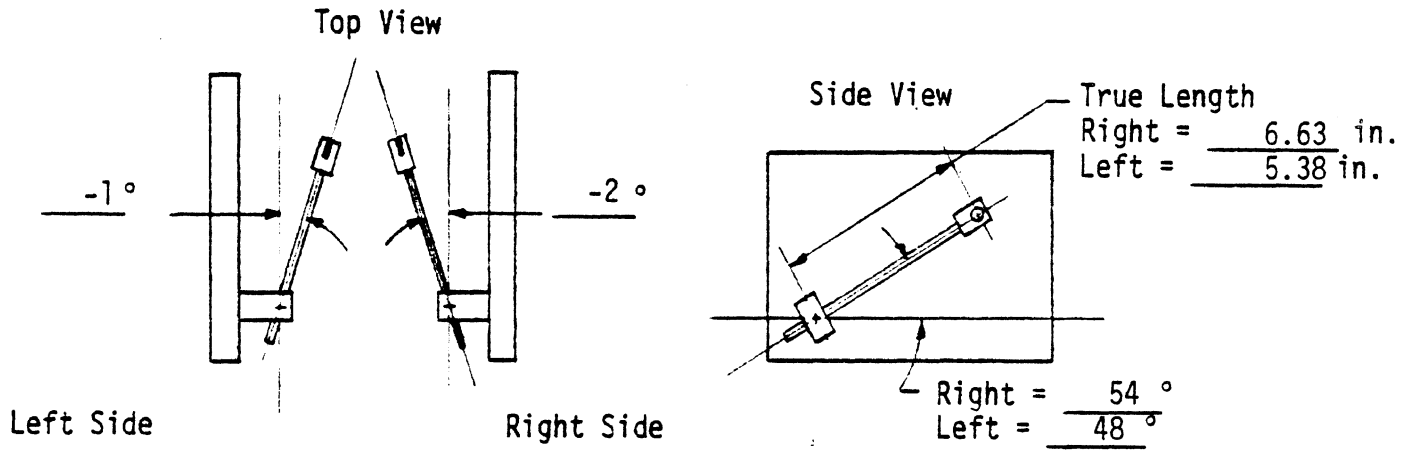
BELT ANCHOR ORIENTATIONS

A. SHOULDER BELT



B. LAP BELT

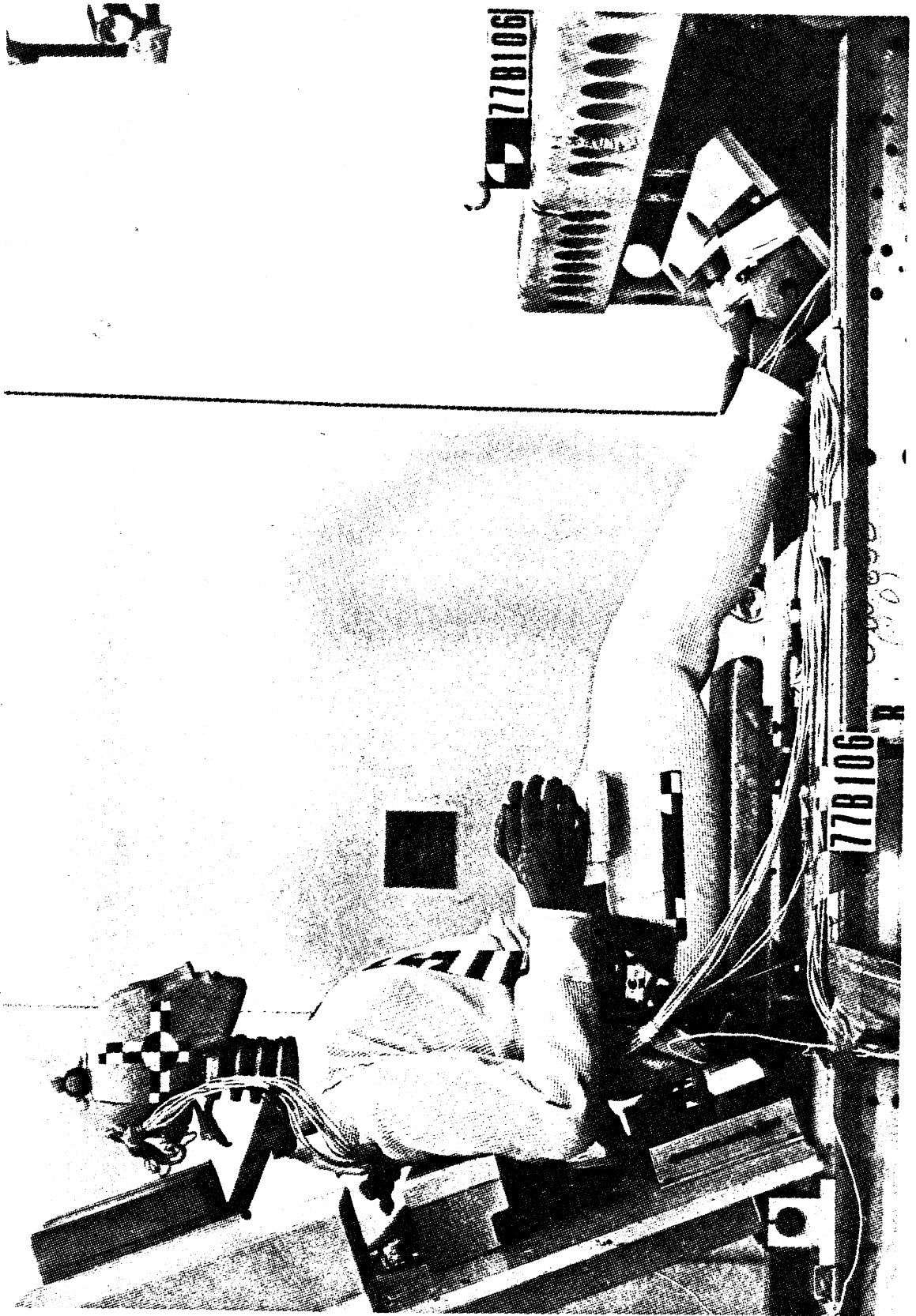
Pelvis Angle = 12°

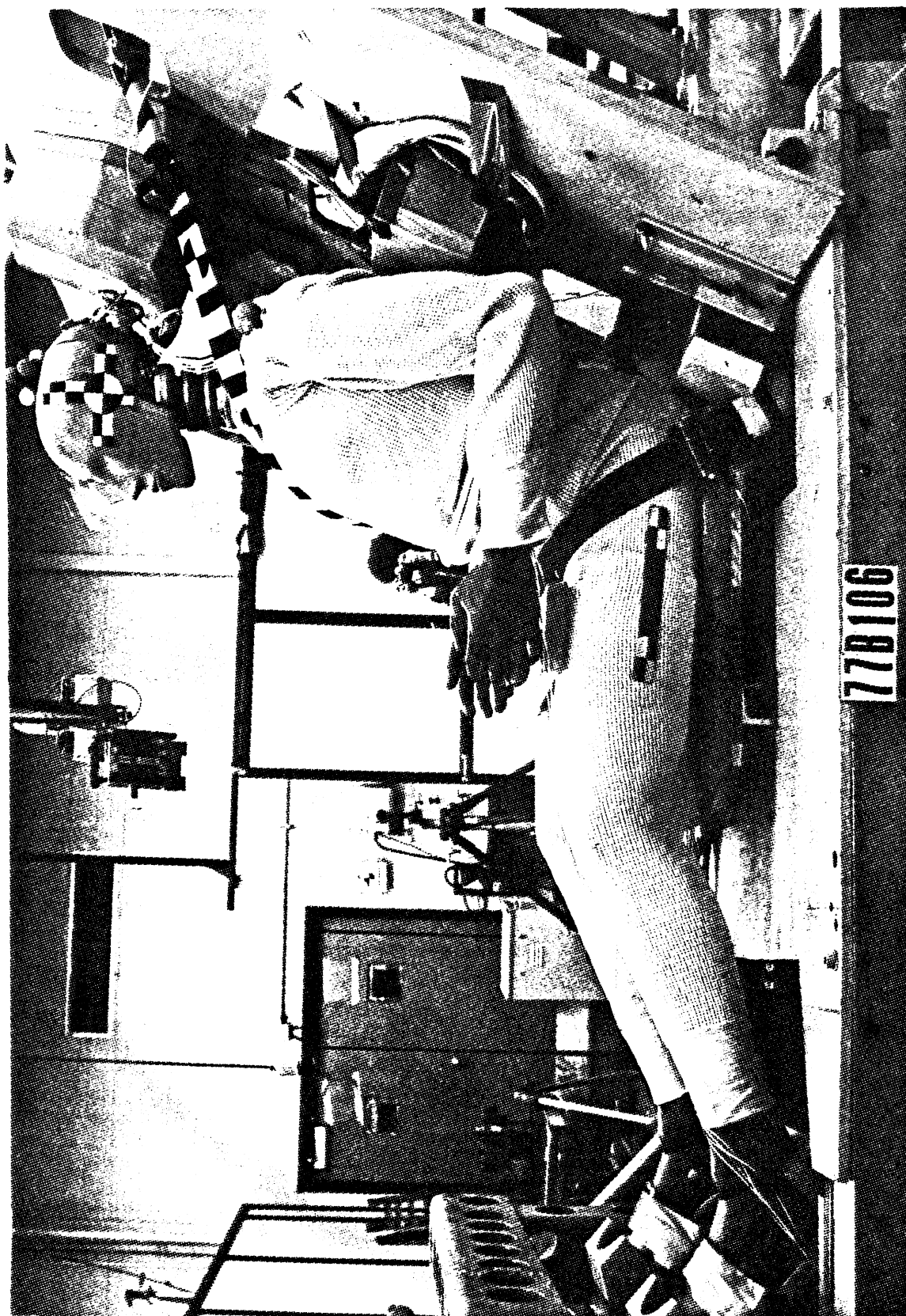


Sketch indicates positive angle directions

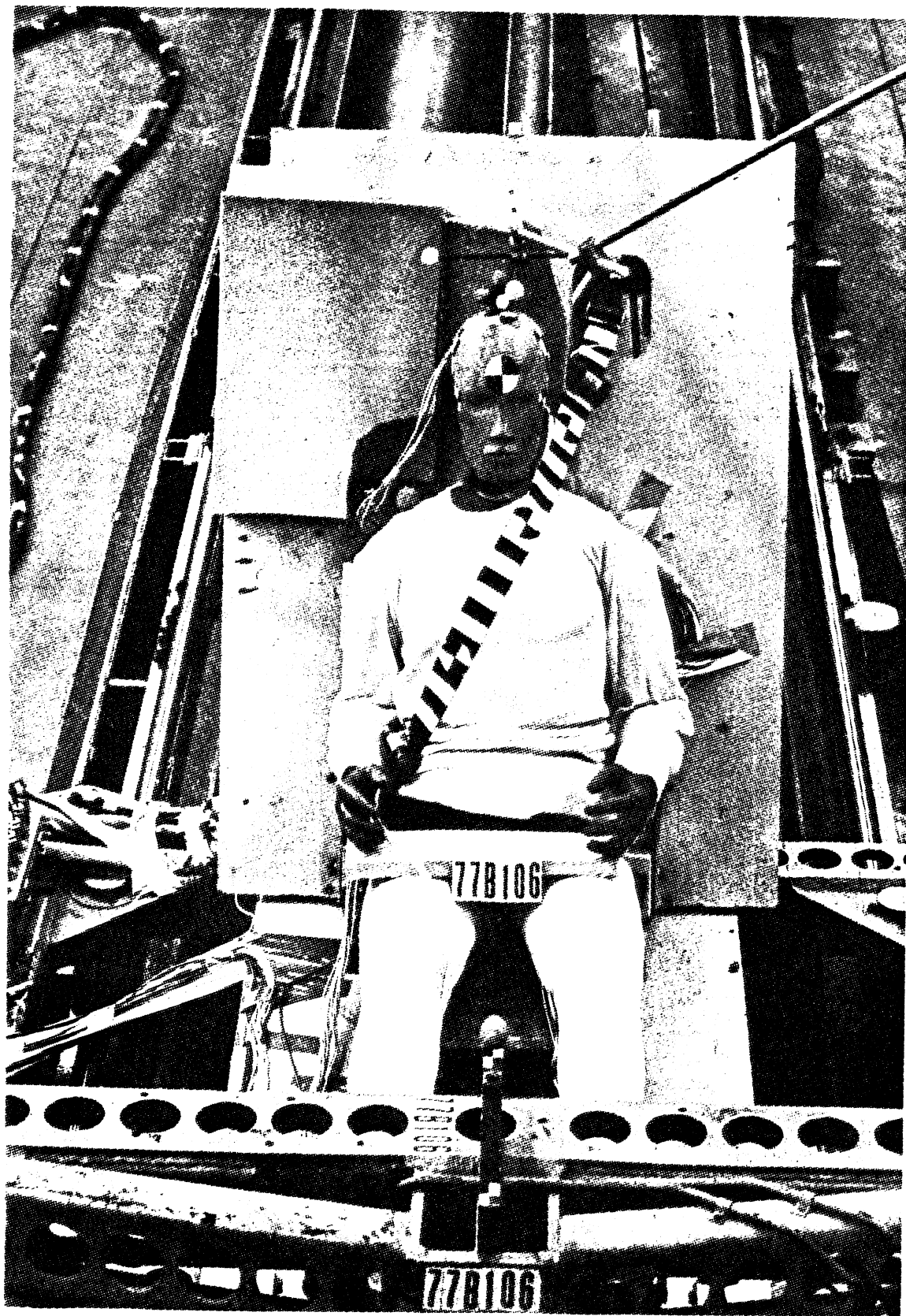
BELT LENGTH DATA

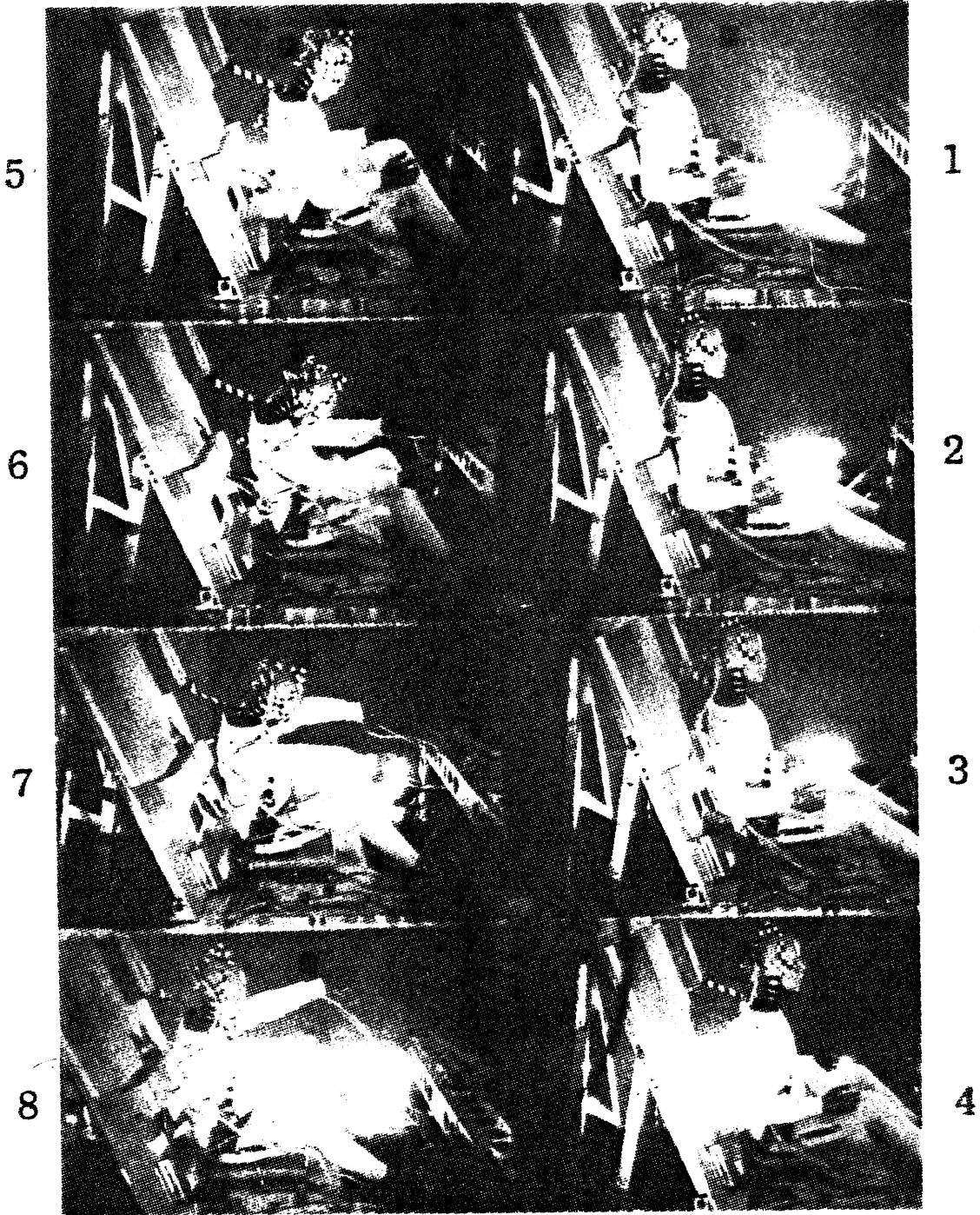
BELT POSITION	PRE-IMPACT LENGTH (in.)	POST-IMPACT LENGTH (in.)	BELT STRETCH (in.)	POST IMPACT LENGTH w/ LOAD CELLS (in.)
Rt. Lap	<u>12.13</u>	<u>12.25</u>	<u>0.13</u>	<u> </u>
Lt. Lap	<u>32.5</u>	<u>32.69</u>	<u>0.19</u>	<u> </u>
Shoulder	<u>42.0</u>	<u>42.13</u>	<u>0.13</u>	<u> </u>





B-65





77B106

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

RUN ID: 77B106-1: HYB-3M

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

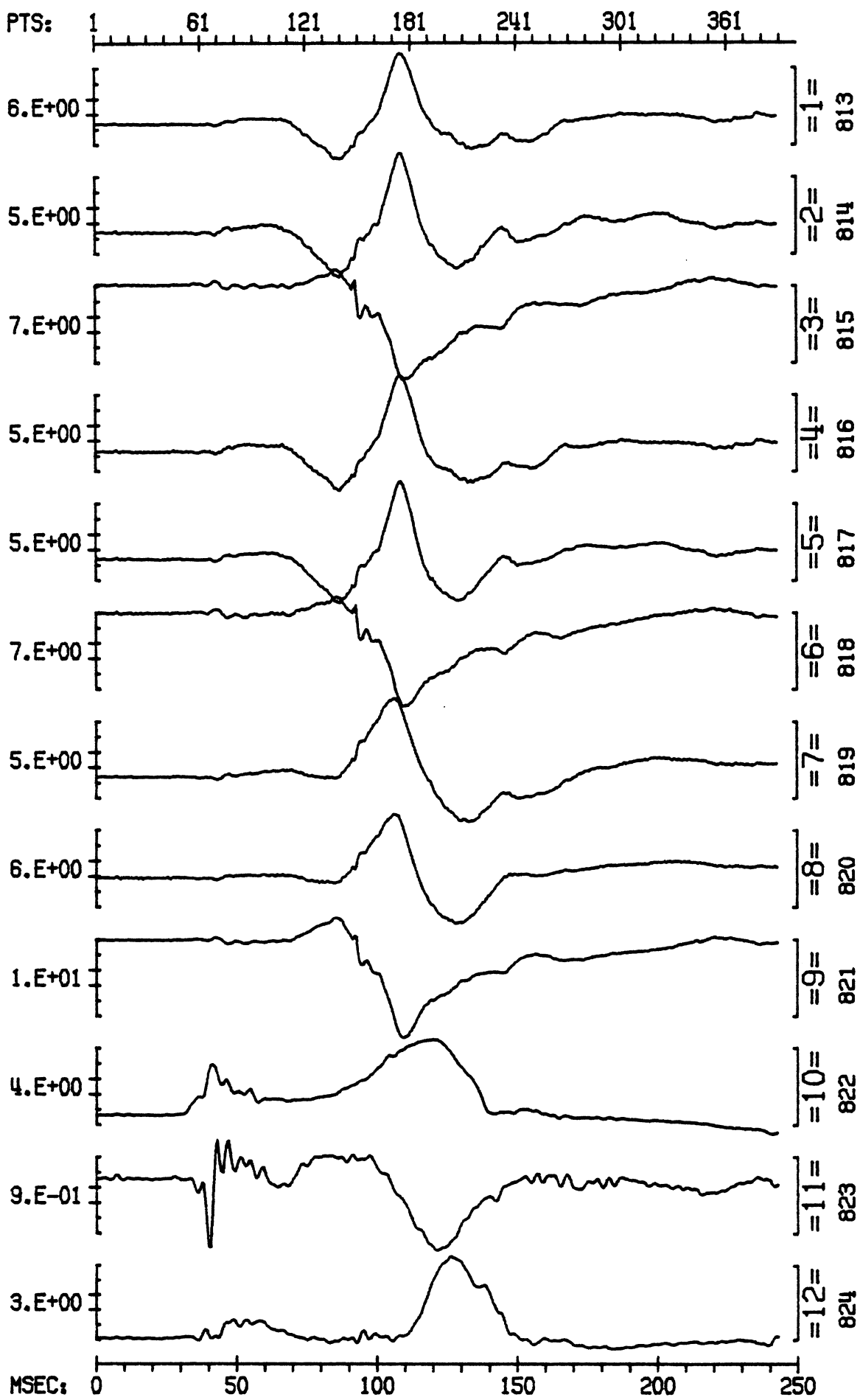
ANALOG TAPE: HSRI-138 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524, GMR- DATE: 09-FEB-77

TEST SIGNALS: 1566 PTS/CH AT 6394.28 HZ. CAL SIGNALS: NOT DIGITIZED.

FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
813	1	AX1 - HEAD ACC A * Q1	-42.20	G'S	4+1+18	569.7	389 *	1598.57
814	2	AY1 - HEAD ACC B * Q1	-33.40	G'S	4+1+18	569.7	389 *	1598.57
815	3	AZ1 - HEAD ACC C * Q1	-42.50	G'S	4+1+18	569.7	389 *	1598.57
816	4	AX2 - HEAD ACC C * Q2	-36.30	G'S	4+1+18	569.7	389 *	1598.57
817	5	AY2 - HEAD ACC A * Q2	-37.10	G'S	4+1+18	569.7	389 *	1598.57
818	6	AZ2 - HEAD ACC B * Q2	-42.50	G'S	4+1+18	569.7	389 *	1598.57
819	7	AX3 - HEAD ACC B * Q3	-40.90	G'S	4+1+18	569.7	389 *	1598.57
820	8	AY3 - HEAD ACC C * Q3	-34.10	G'S	4+1+18	569.7	389 *	1598.57
821	9	AZ3 - HEAD ACC A * Q3	-40.20	G'S	4+1+18	569.7	389 *	1598.57
822	10	A-P INTERNAL PELVIS ACC	-25.60	G'S	4+1+12	284.8	389 *	1598.57
823	11	L-R INTERNAL PELVIS ACC	-25.70	G'S	4+1+12	284.8	389 *	1598.57
824	12	S-I INTERNAL PELVIS ACC	-25.80	G'S	4+1+12	284.8	389 *	1598.57
		13						
		14						

FILTERED FILES: 813 - 824 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 77B106-1: HYB-3M

B-68



ID: 77B106-1: HYB-3M

TAPE: GMR-DUM

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

RUN ID: 778106-2; HYB-3M

PROJECT: WHOLE BODY RESPONSE; HYBRID III SERIES

ANALOG TAPE: HSRI-139 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR- DATE: 09-FEB-77

TEST SIGNALS: 1566 PTS/CH AT 6399.18 HZ. CAL SIGNALS: NOT DIGITIZED.

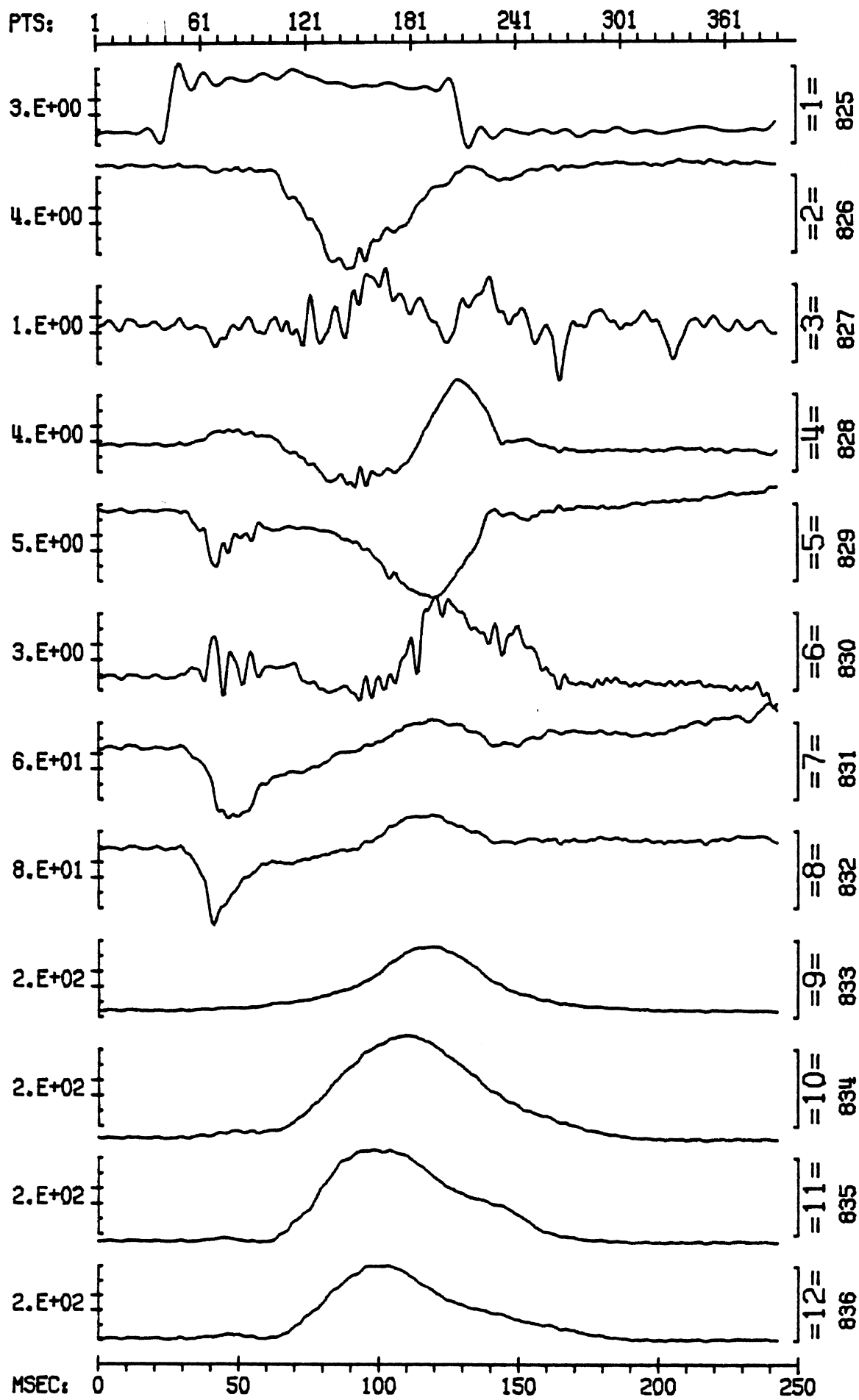
FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
825	1	SLED DECELERATION	20.00	G'S	4+1+1	80.0	389	1599.80
826	2	A-P EXTERNAL CHEST ACC	42.40	G'S	4+1+12	285.1	389	1599.80
827	3	L-R EXTERNAL CHEST ACC	35.50	G'S	4+1+12	285.1	389	1599.80
828	4	S-I EXTERNAL CHEST ACC	37.30	G'S	4+1+12	285.1	389	1599.80
829	5	A-P EXTERNAL PELVIS ACC	53.70	G'S	4+1+12	285.1	389	1599.80
830	6	S-I EXTERNAL PELVIS ACC	51.90	G'S	4+1+12	285.1	389	1599.80
831	7	RIGHT FEMUR LOAD	925.00	LBS	4+1+12	285.1	389	1599.80
832	8	LEFT FEMUR LOAD	986.00	LBS	4+1+12	285.1	389	1599.80
833	9	RIGHT LAP BELT LOAD	1000.00	LBS	4+1+12	285.1	389	1599.80
834	10	LEFT LAP BELT LOAD	1000.00	LBS	4+1+12	285.1	389	1599.80
835	11	UPPER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	285.1	389	1599.80
836	12	LOWER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	285.1	389	1599.80

13:

14:

FILTERED FILES: 825 - 836 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 778106-2; HYB-3M

B-70



ID: 77B106-2: HYB-3M

TAPE: GMR-DUM

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

RUN ID: 77B106-3; HYB-3M

PROJECT: WHOLE BODY RESPONSE; HYBRID III SERIES

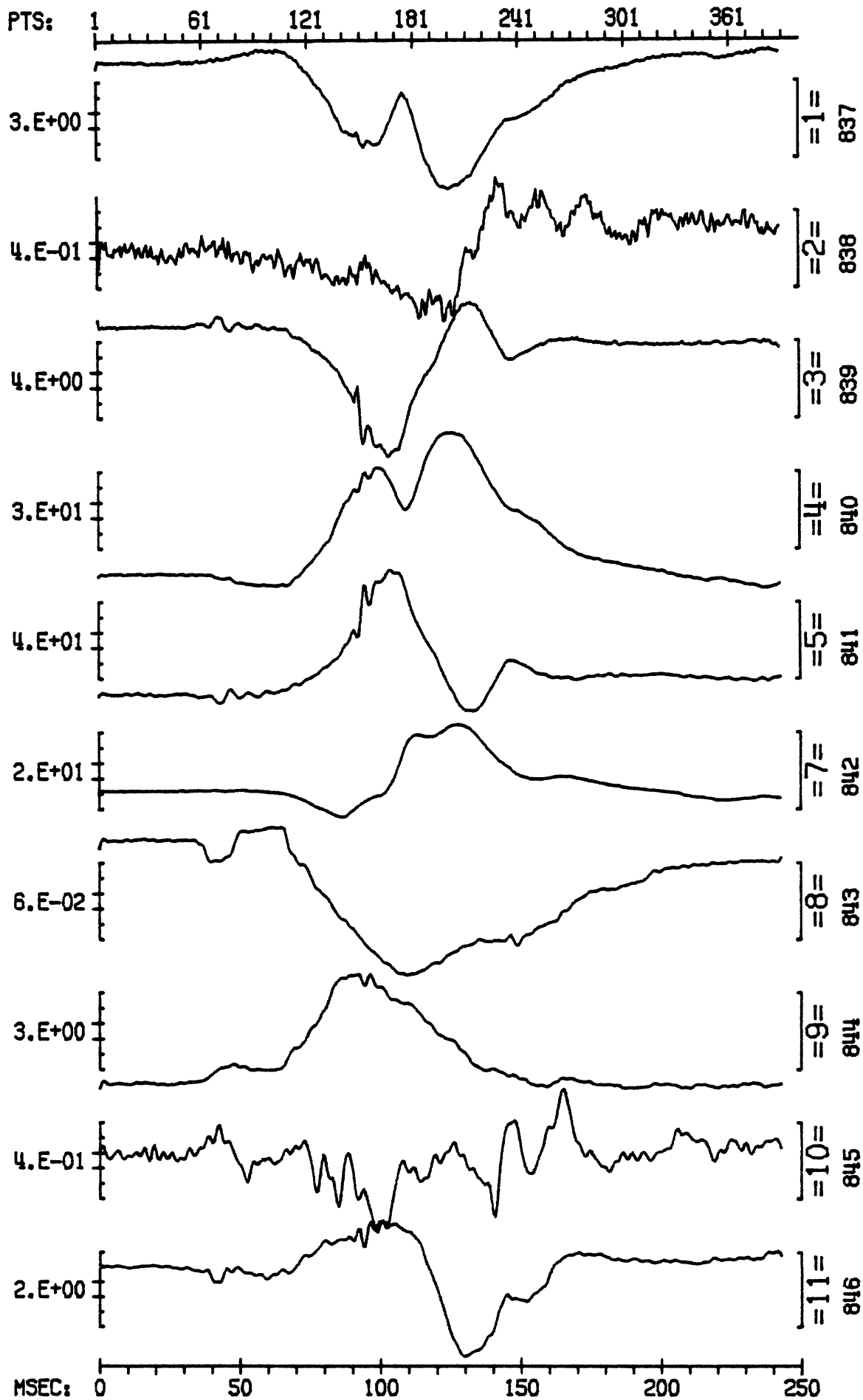
ANALOG TAPE: CR #118 EXPANDED 1611, WAS A/D CONVERTED TO DIGITAL TAPE; 524,GMR- DATE: 09-FEB-77

TEST SIGNALS: 1566 PTS/CH AT 6392.16 HZ. CAL SIGNALS: NOT DIGITIZED,

FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
837	1	A-P INTERNAL HEAD ACC	100.00	G'S	4+1+18	569.5	389	1598.04
838	2	L-R INTERNAL HEAD ACC	-100.00	G'S	4+1+18	569.5	389	1598.04
839	3	S-I INTERNAL HEAD ACC	-100.00	G'S	4+1+18	569.5	389	1598.04
840	4	A-P NECK SHEAR FORCE	1000.00	LBS	4+1+12	284.7	389	1598.04
841	5	S-I NECK AXIAL FORCE	1000.00	LBS	4+1+12	284.7	389	1598.04
	6							
842	7	L-R NECK MOMENT (0.345 IN)	2400.00	IN-LBS	4+1+12	284.7	389	1598.04
843	8	A-P CHEST DEFLECTION	3.00	INCHES	4+1+12	284.7	389	1598.04
844	9	A-P INTERNAL CHEST ACC	100.00	G'S	4+1+12	284.7	389	1598.04
845	10	L-R INTERNAL CHEST ACC	100.00	G'S	4+1+12	284.7	389	1598.04
846	11	S-I INTERNAL CHEST ACC	-100.00	G'S	4+1+12	284.7	389	1598.04
	12							
	13							
	14							

FILTERED FILES: 837 - 846 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 77B106-3; HYB-3M

B-72

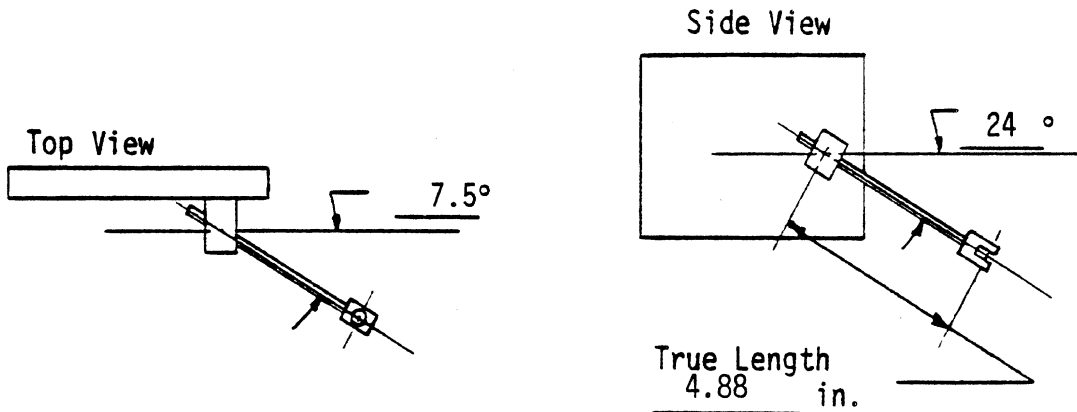


ID: 77B106-3: HYB-3M

TAPE: GMR-DUM

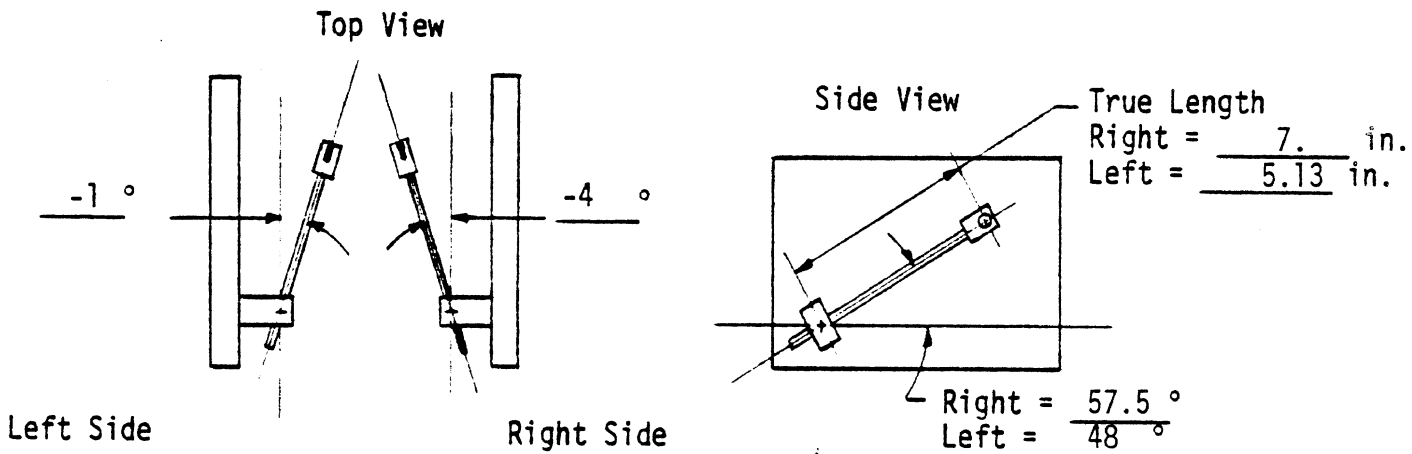
BELT ANCHOR ORIENTATIONS

A. SHOULDER BELT



B. LAP BELT

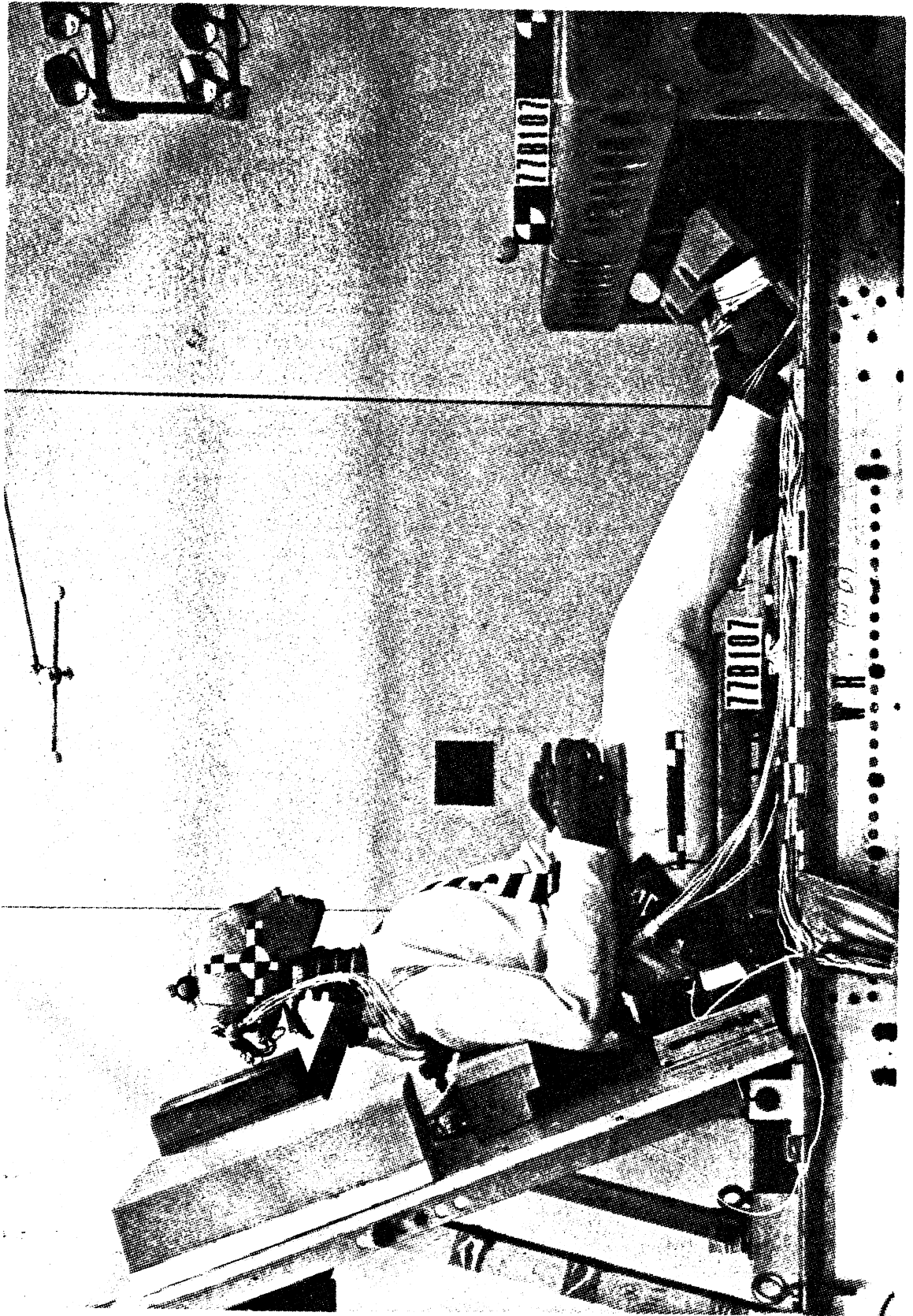
Pelvis Angle = 11.5°

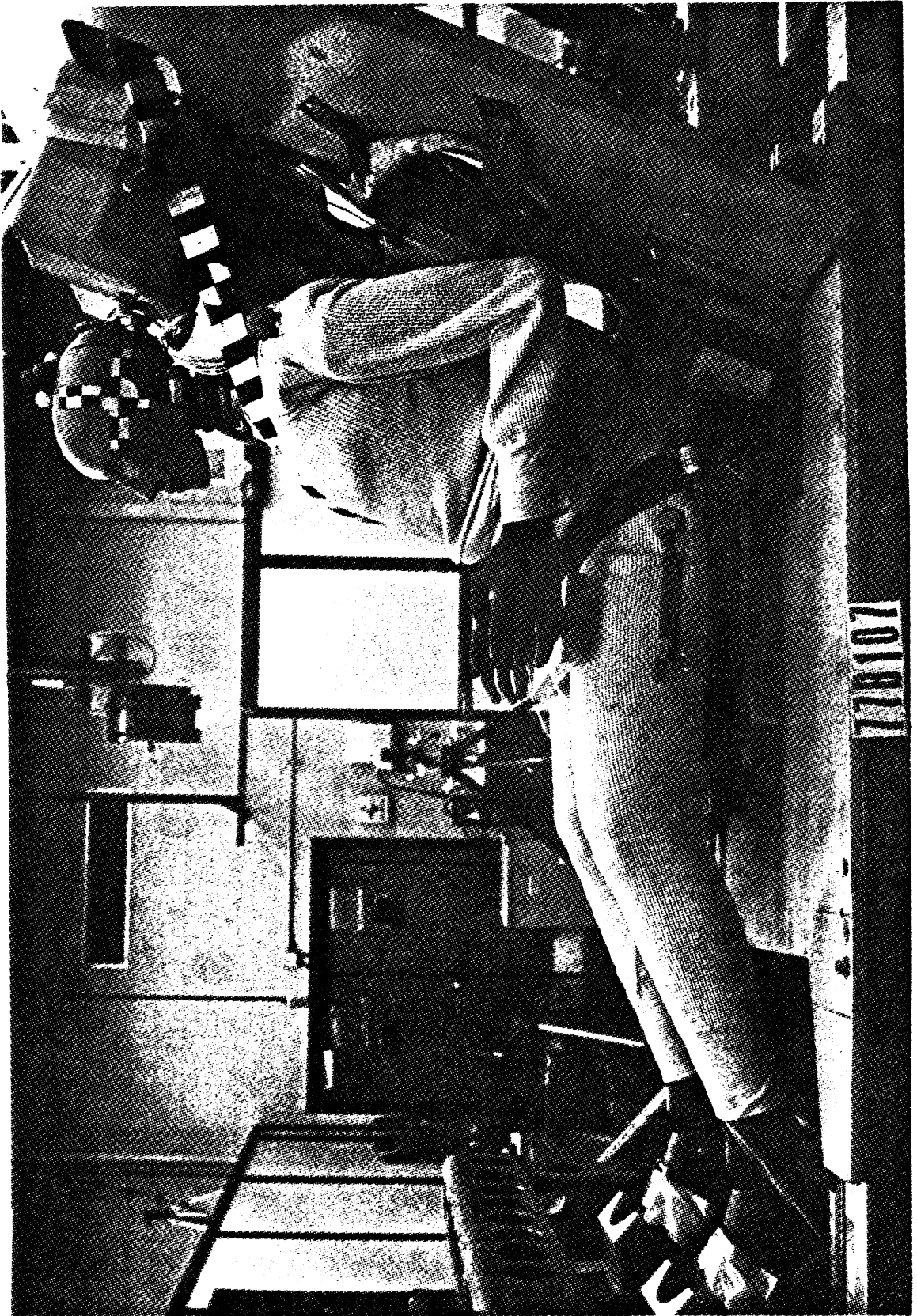


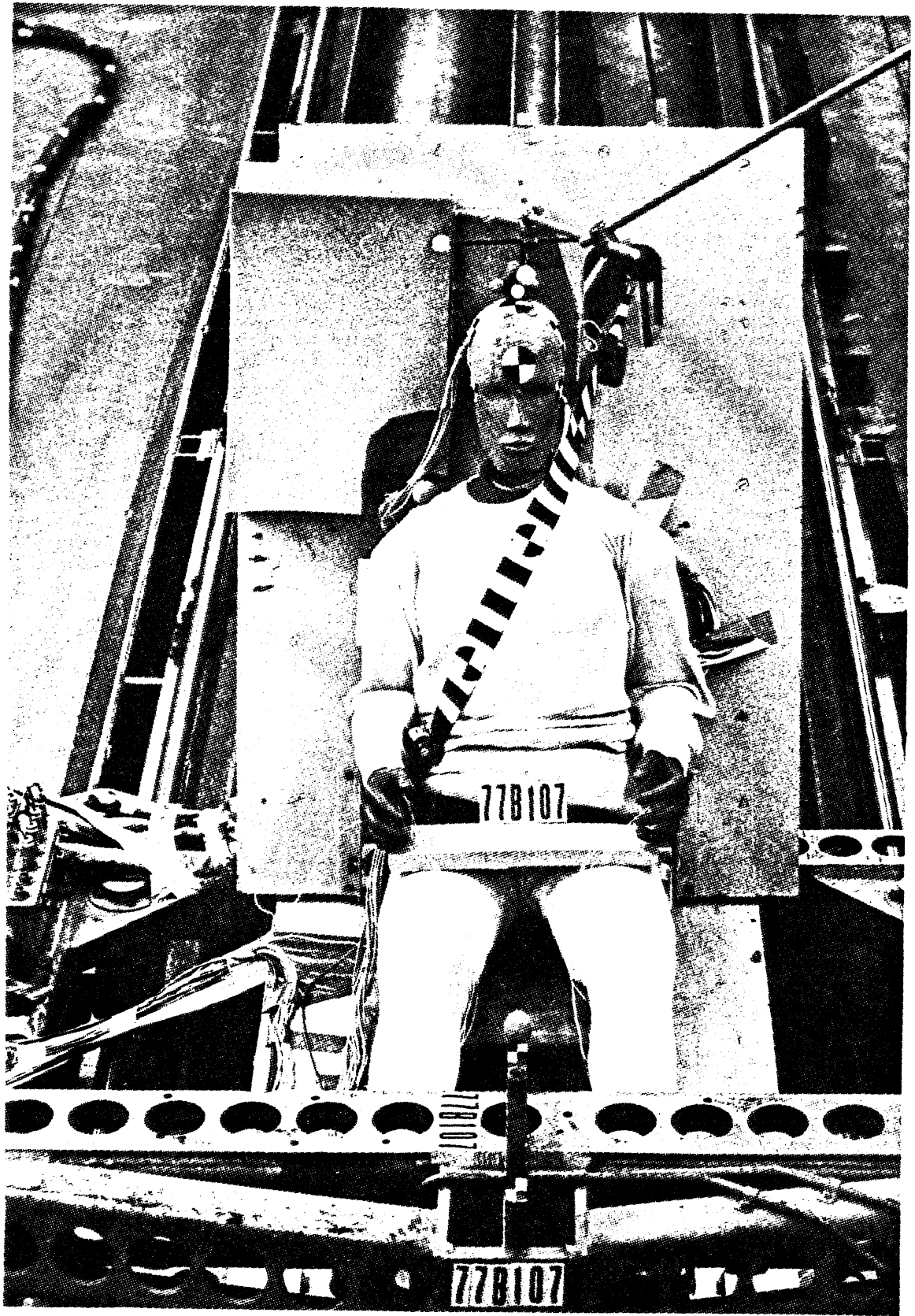
Sketch indicates positive angle directions

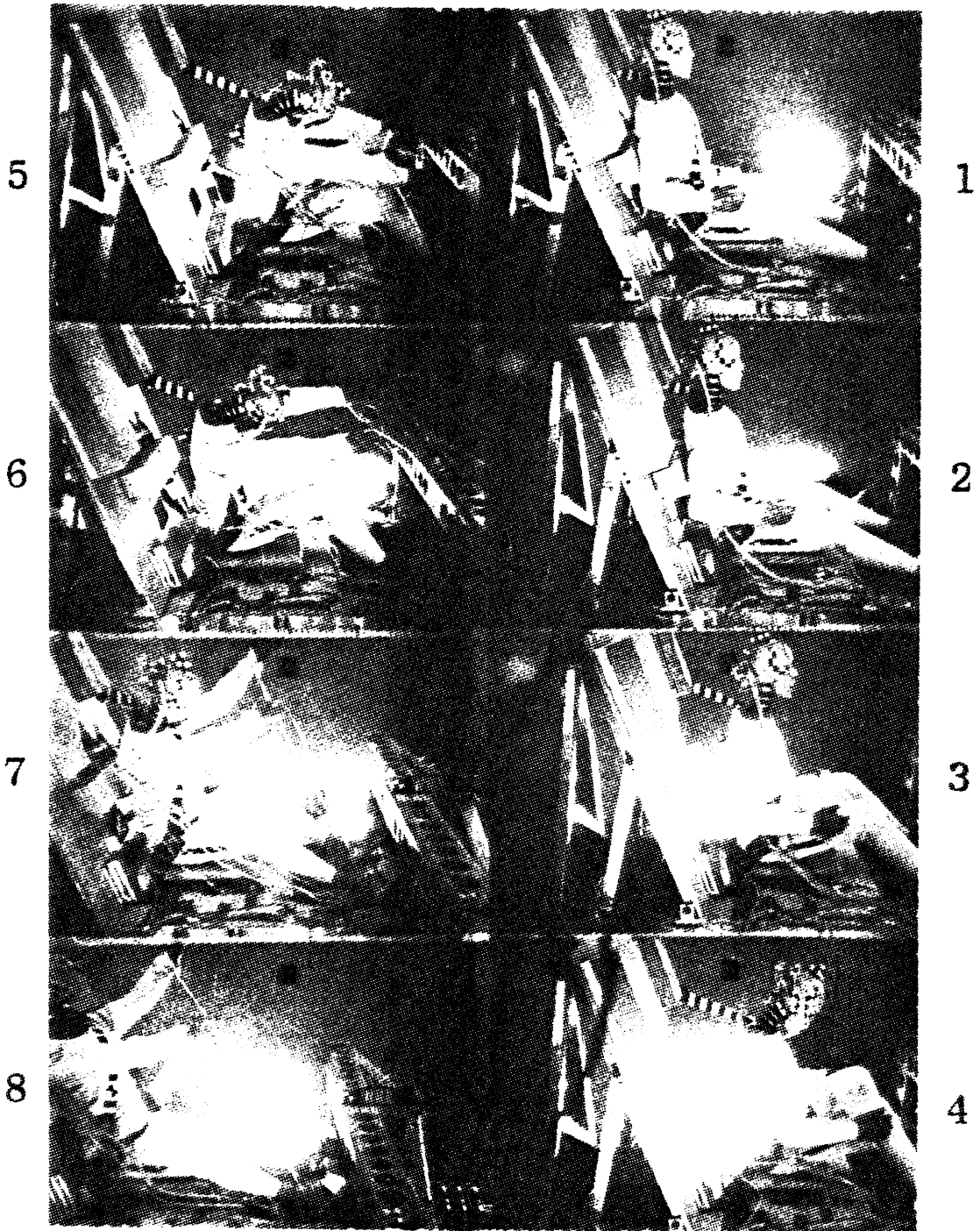
BELT LENGTH DATA

BELT POSITION	PRE-IMPACT LENGTH (in.)	POST-IMPACT LENGTH (in.)	BELT STRETCH (in.)	POST IMPACT LENGTH w/ LOAD CELLS (in.)
Rt. Lap	<u>12.25</u>	<u>12.56</u>	<u>0.31</u>	<u> </u>
Lt. Lap	<u>32.5</u>	<u>32.63</u>	<u>0.13</u>	<u> </u>
Shoulder	<u>42.0</u>	<u>42.38</u>	<u>0.38</u>	<u> </u>









77B107

 RUN ID: 778107-1: HYB-3H

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: HSRI-138 EXPANDED 1681, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR- DATE: 09-FEB-77

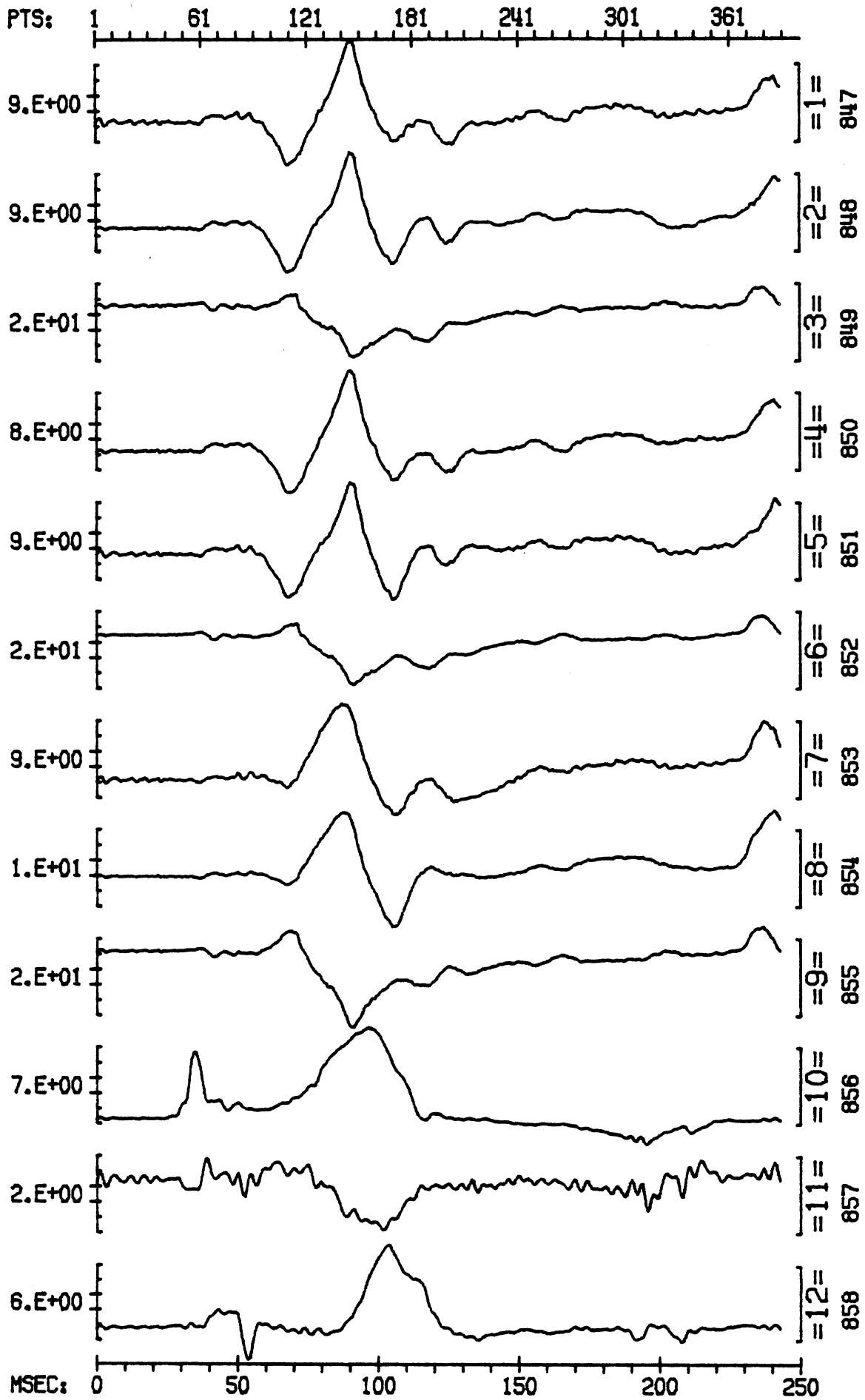
TEST SIGNALS: 1570 PTS/CH AT 6394.62 HZ. CAL SIGNALS: NOT DIGITIZED.

FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
847	1	AX1 - HEAD ACC A 0 Q1	-42.20	G'S	4+1+18	569.7	389 0	1598.66
848	2	AY1 - HEAD ACC B 0 Q1	-33.40	G'S	4+1+18	569.7	389 0	1598.66
849	3	AZ1 - HEAD ACC C 0 Q1	-42.50	G'S	4+1+18	569.7	389 0	1598.66
850	4	AX2 - HEAD ACC C 0 Q2	-38.30	G'S	4+1+18	569.7	389 0	1598.66
851	5	AY2 - HEAD ACC A 0 Q2	-37.10	G'S	4+1+18	569.7	389 0	1598.66
852	6	AZ2 - HEAD ACC B 0 Q2	-42.50	G'S	4+1+18	569.7	389 0	1598.66
853	7	AX3 - HEAD ACC B 0 Q3	-40.90	G'S	4+1+18	569.7	389 0	1598.66
854	8	AY3 - HEAD ACC C 0 Q3	-34.10	G'S	4+1+18	569.7	389 0	1598.66
855	9	AZ3 - HEAD ACC A 0 Q3	-40.20	G'S	4+1+18	569.7	389 0	1598.66
856	10	A-P INTERNAL PELVIS ACC	-25.60	G'S	4+1+12	284.8	389 0	1598.66
857	11	L-R INTERNAL PELVIS ACC	-25.70	G'S	4+1+12	284.8	389 0	1598.66
858	12	S-I INTERNAL PELVIS ACC	-25.80	G'S	4+1+12	284.8	389 0	1598.66

131

141

 FILTERED FILES: 847 - 858 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 778107-1: HYB-3H



ID: 77B107-1: HYB-3H

TAPE: GMR-DUM

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

RUN ID: 77B107-2: HYB-3H

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: HSRI-139 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR- DATE: 09-FEB-77

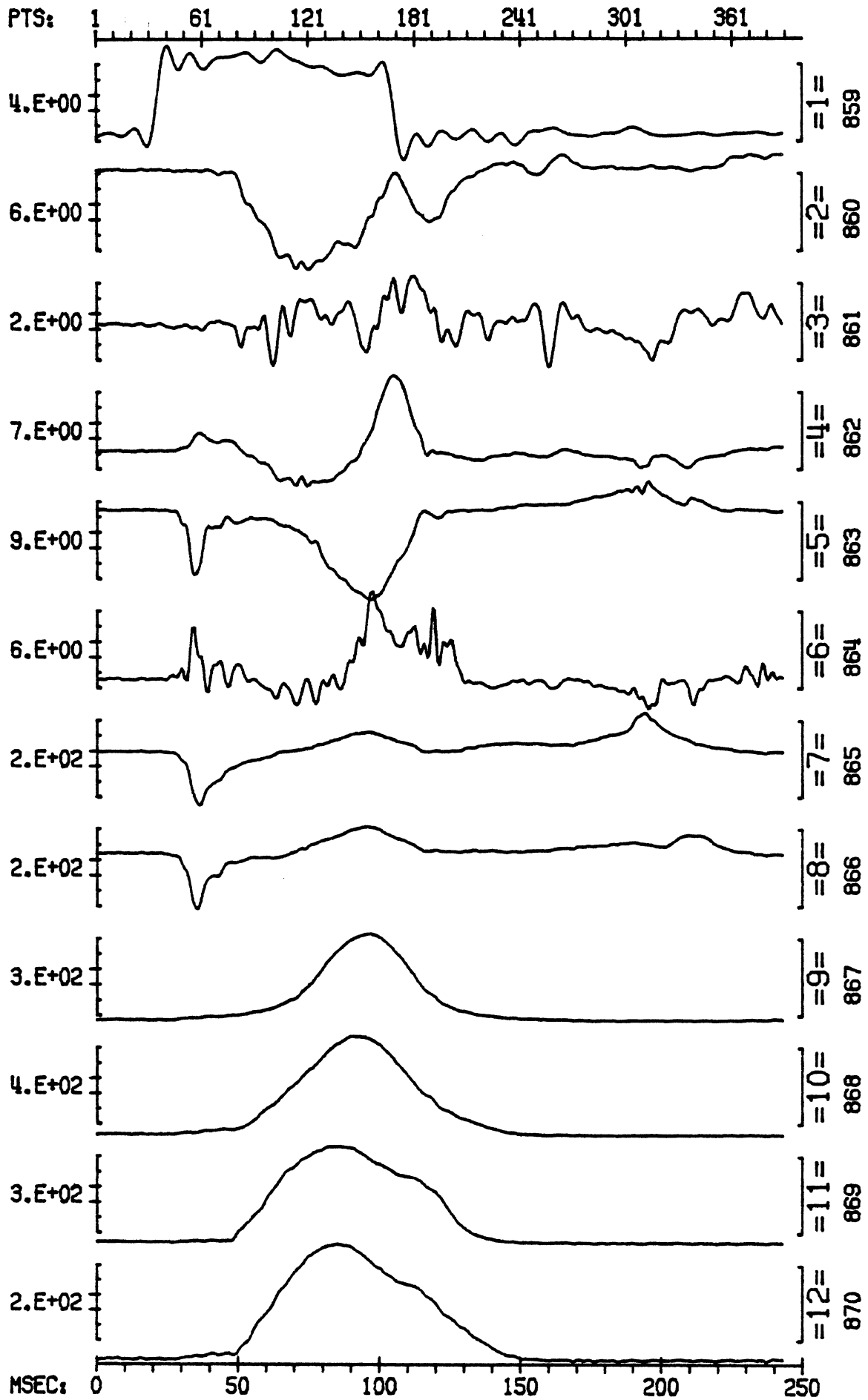
TEST SIGNALS: 1569 PTS/CH AT 6392.34 HZ. CAL SIGNALS: NOT DIGITIZED,

FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
859	1	SLED DECELERATION	20.00	G'S	4+1+1	79.9	389	1598.09
860	2	A-P EXTERNAL CHEST ACC	42.40	G'S	4+1+12	284.7	389	1598.09
861	3	L-R EXTERNAL CHEST ACC	35.50	G'S	4+1+12	284.7	389	1598.09
862	4	S-I EXTERNAL CHEST ACC	37.30	G'S	4+1+12	284.7	389	1598.09
863	5	A-P EXTERNAL PELVIS ACC	-53.70	G'S	4+1+12	284.7	389	1598.09
864	6	S-I EXTERNAL PELVIS ACC	51.90	G'S	4+1+12	284.7	389	1598.09
865	7	RIGHT FEMUR LOAD	925.00	LBS	4+1+12	284.7	389	1598.09
866	8	LEFT FEMUR LOAD	986.00	LBS	4+1+12	284.7	389	1598.09
867	9	RIGHT LAP BELT LOAD	1000.00	LBS	4+1+12	284.7	389	1598.09
868	10	LEFT LAP BELT LOAD	1000.00	LBS	4+1+12	284.7	389	1598.09
869	11	UPPER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	284.7	389	1598.09
870	12	LOWER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	284.7	389	1598.09

13:

14:

FILTERED FILES: 859 - 870 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 77B107-2: HYB-3H



ID: 77B107-2: HYB-3H

TAPE: GMR-DUM

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

RUN ID: 77B107-3: HYB-3H

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

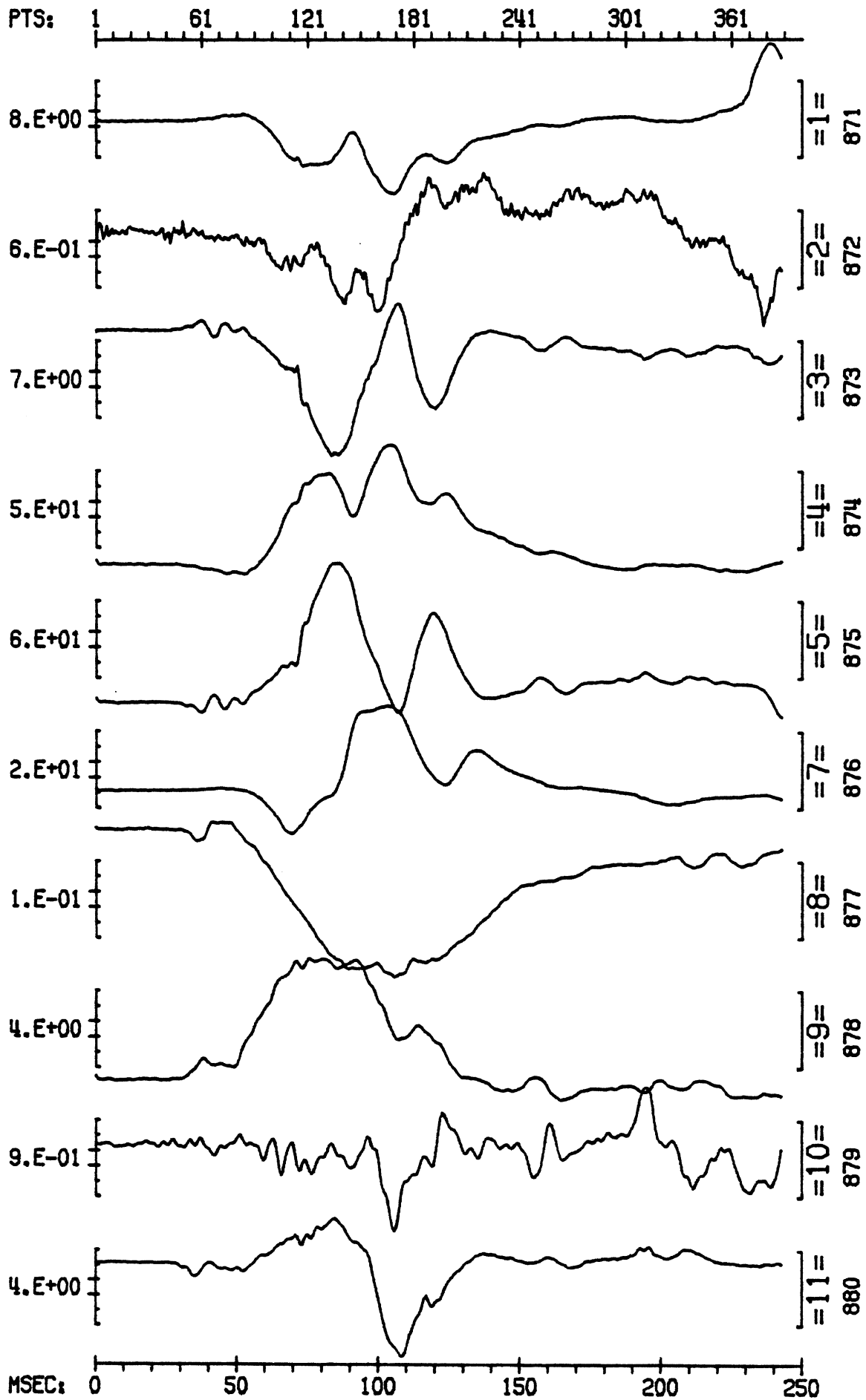
ANALOG TAPE: CR #118 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR- DATE: 09-FEB-77

TEST SIGNALS: 1571 PTS/CH AT 6397.39 HZ. CAL SIGNALS: NOT DIGITIZED.

FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
871	1	A-P INTERNAL HEAD ACC	100.00	G'S	4+1+18	569.9	389	1599.35
872	2	L-R INTERNAL HEAD ACC	-100.00	G'S	4+1+18	569.9	389	1599.35
873	3	S-I INTERNAL HEAD ACC	-100.00	G'S	4+1+18	569.9	389	1599.35
874	4	A-P NECK SHEAR FORCE	1000.00	LBS	4+1+12	285.0	389	1599.35
875	5	S-I NECK AXIAL FORCE	1000.00	LBS	4+1+12	285.0	389	1599.35
	6							
876	7	L-R NECK MOMENT (0.345 IN)	2400.00	IN-LBS	4+1+12	285.0	389	1599.35
877	8	A-P CHEST DEFLECTION	3.00	INCHES	4+1+12	285.0	389	1599.35
878	9	A-P INTERNAL CHEST ACC	100.00	G'S	4+1+12	285.0	389	1599.35
879	10	L-R INTERNAL CHEST ACC	100.00	G'S	4+1+12	285.0	389	1599.35
880	11	S-I INTERNAL CHEST ACC	-100.00	G'S	4+1+12	285.0	389	1599.35
	12							
	13							
	14							

FILTERED FILES: 871 - 880 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 77B107-3: HYB-3H

B-84



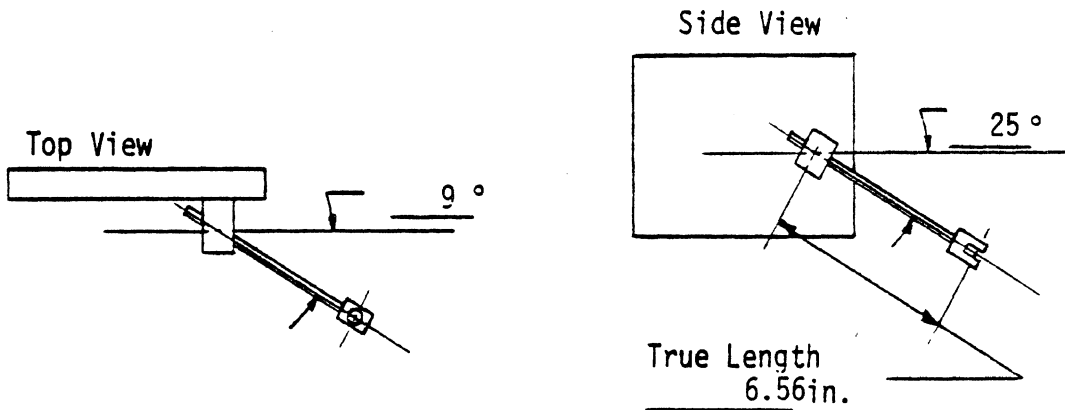
ID: 77B107-3: HYB-3H

ID:

TAPE: GMR-DUM

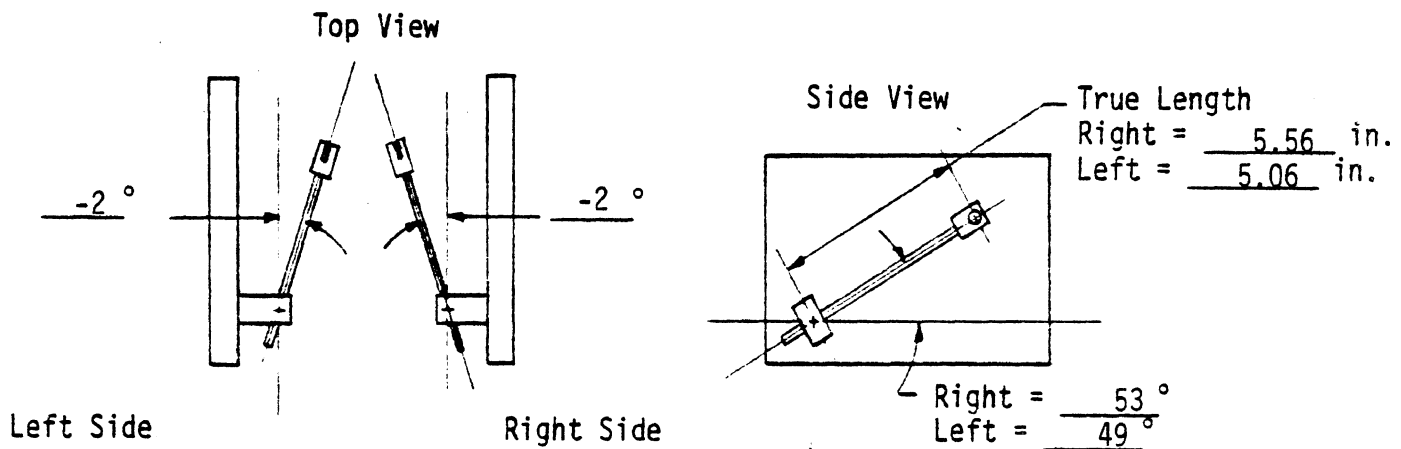
BELT ANCHOR ORIENTATIONS

A. SHOULDER BELT



B. LAP BELT

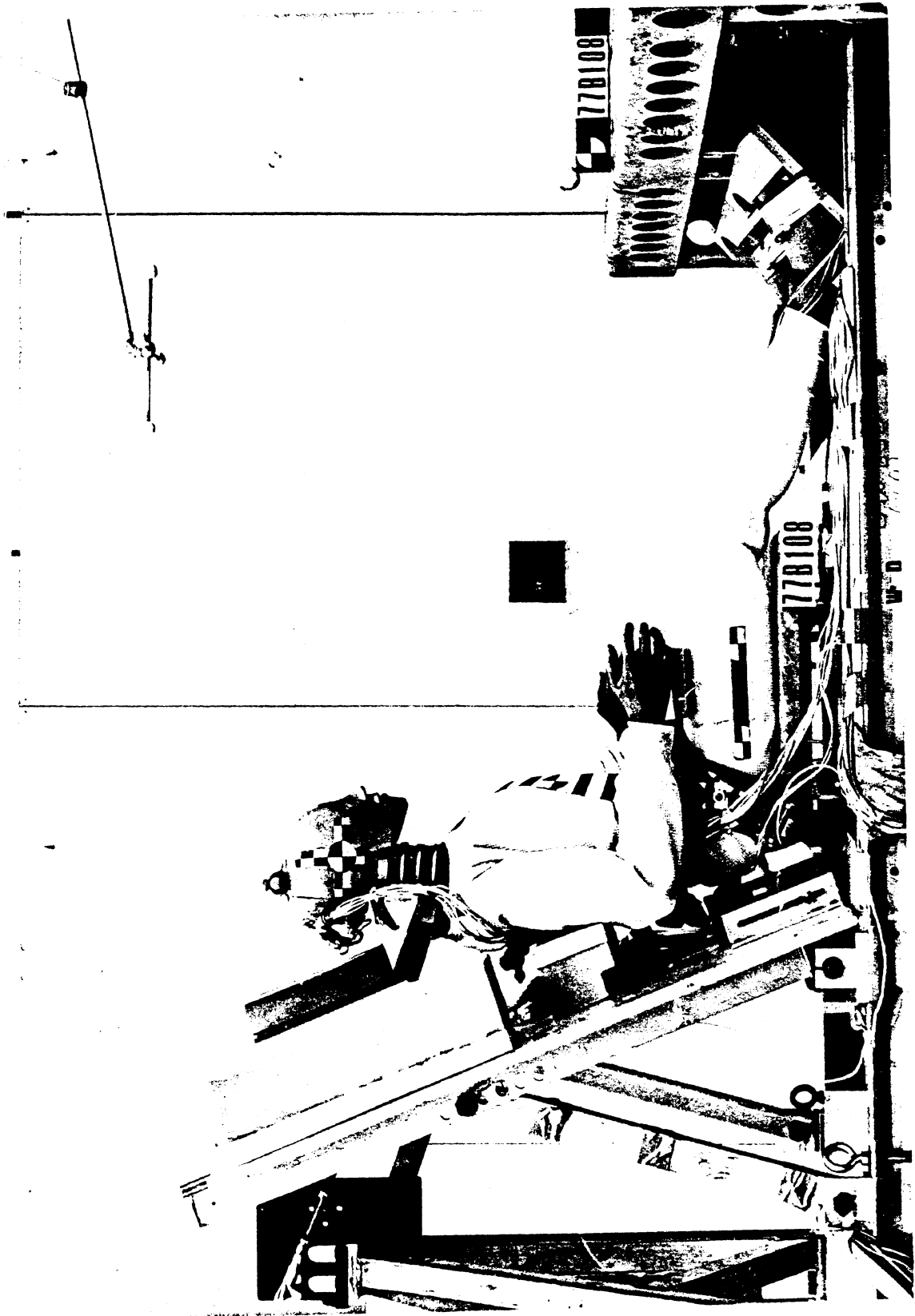
Peak Angle = -15°

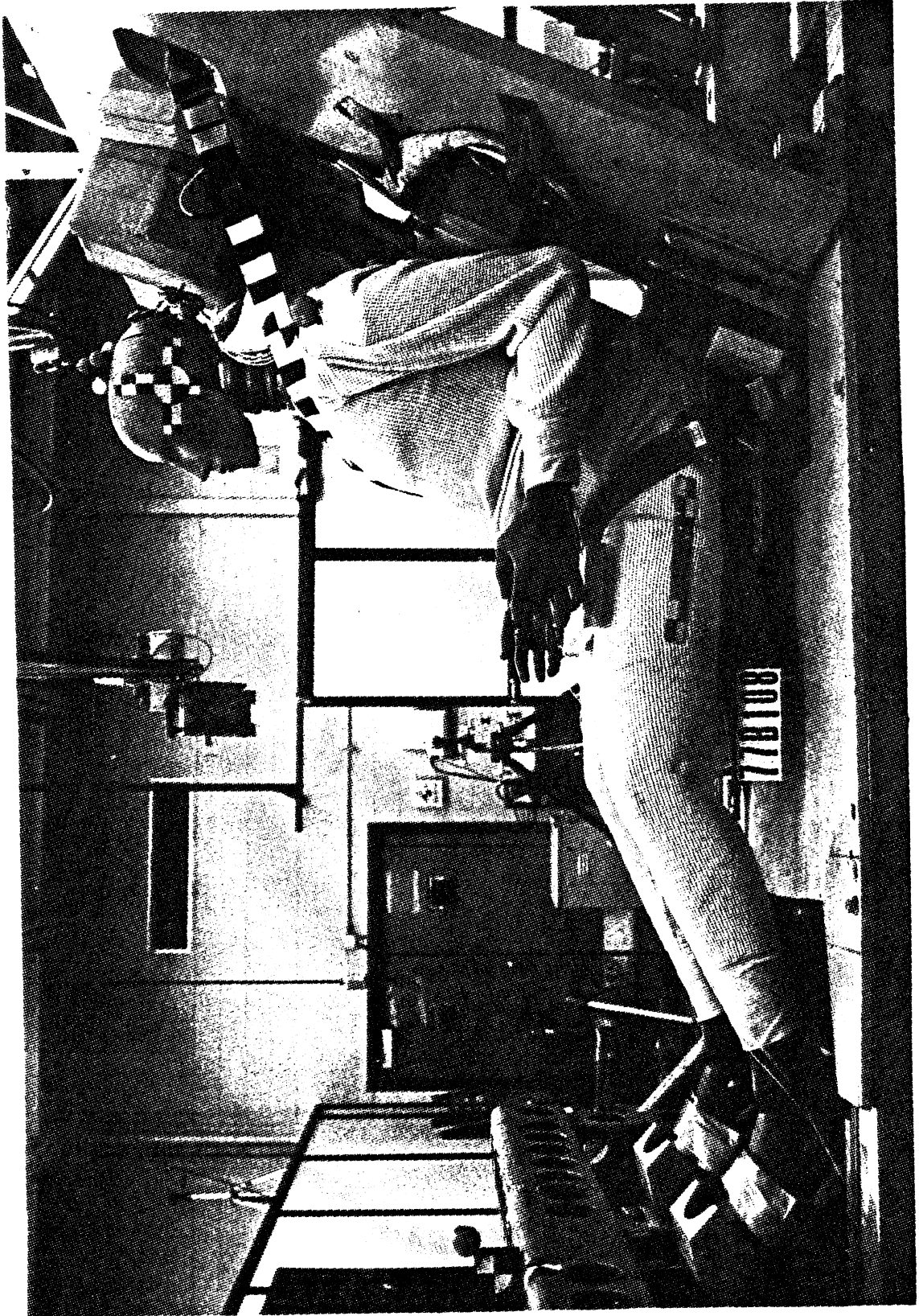


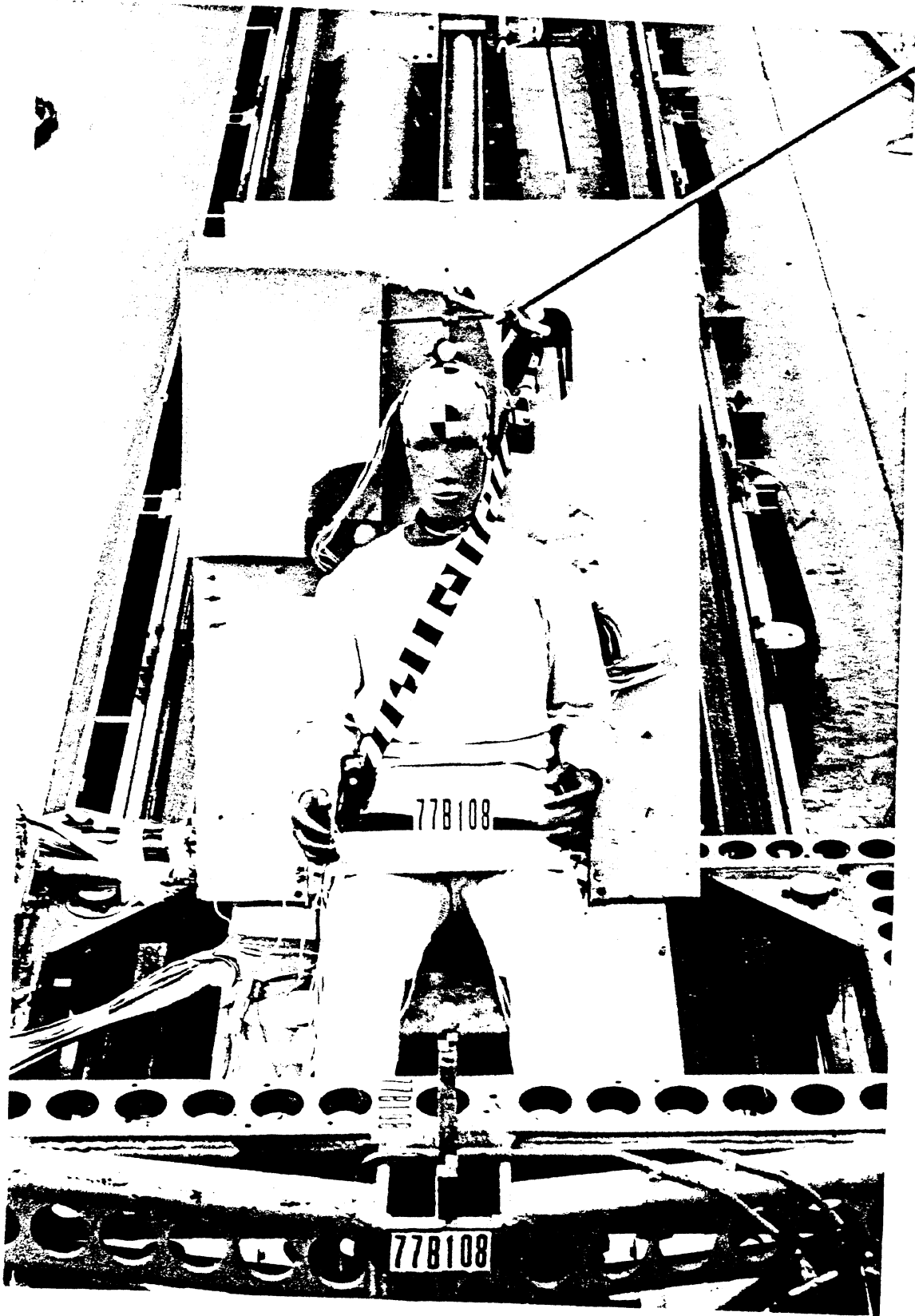
Sketch indicates positive angle directions

BELT LENGTH DATA

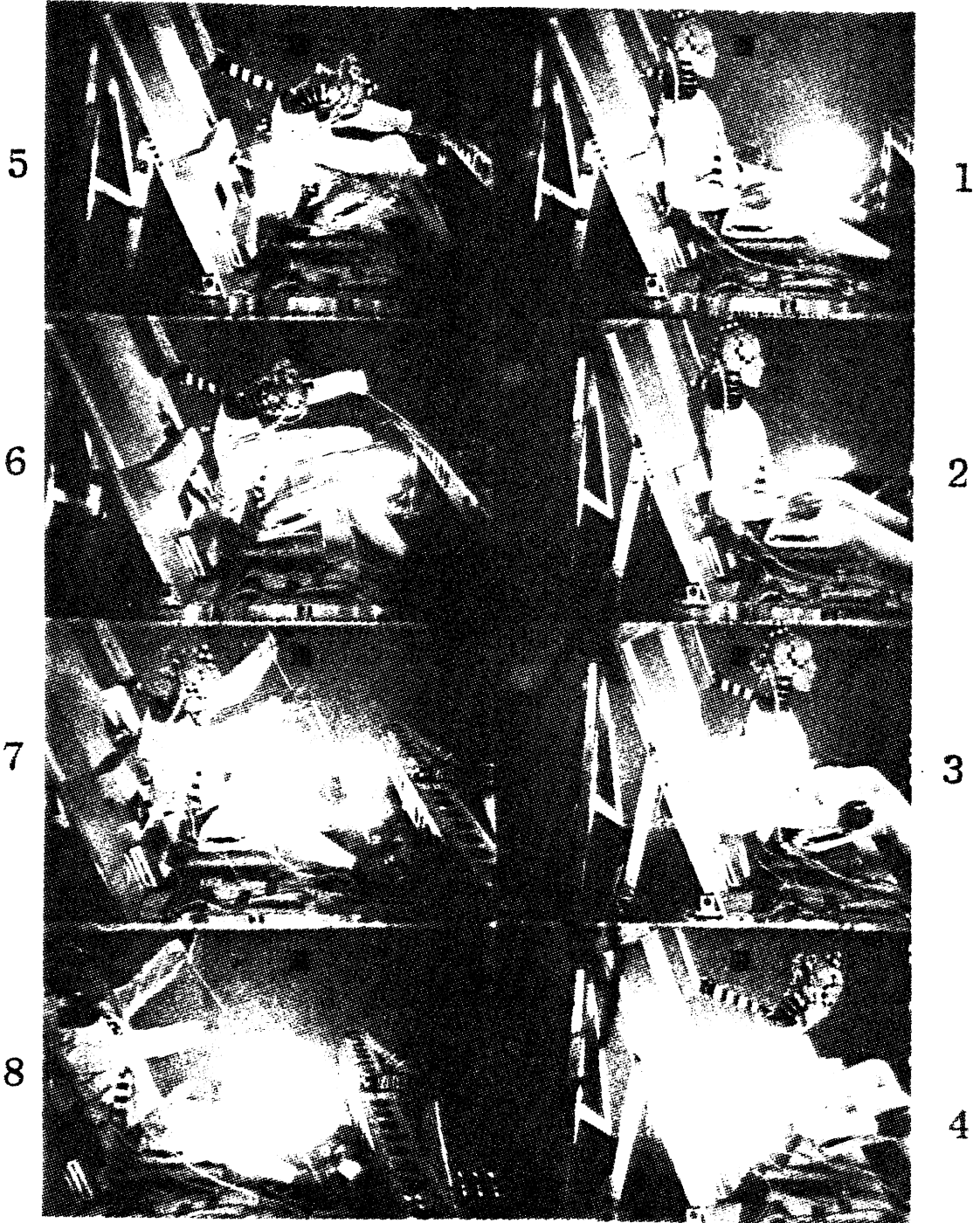
BELT POSITION	PRE-IMPACT LENGTH (in.)	POST-IMPACT LENGTH (in)	BELT STRETCH (in)	POST IMPACT LENGTH w/ LOAD CELLS (in.)
Rt. Lap	<u>12.25</u>	<u>12.63</u>	<u>0.13</u>	<u> </u>
Lt. Lap	<u>32.5</u>	<u>32.75</u>	<u>0.25</u>	<u> </u>
Shoulder	<u>42</u>	<u>42.25</u>	<u>0.25</u>	<u> </u>







B-90



77B108

 RUN ID: 77B108-1; HYB-3H

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: HSKI-138 EXPANDED 1611, WAS A/D CONVERTED TO DIGITAL TAPE; 524,GMR= DATE: 09-FEB-77

TEST SIGNALS: 1616 PTS/CH AT 6393.67 HZ. CAL SIGNALS: NOT DIGITIZED.

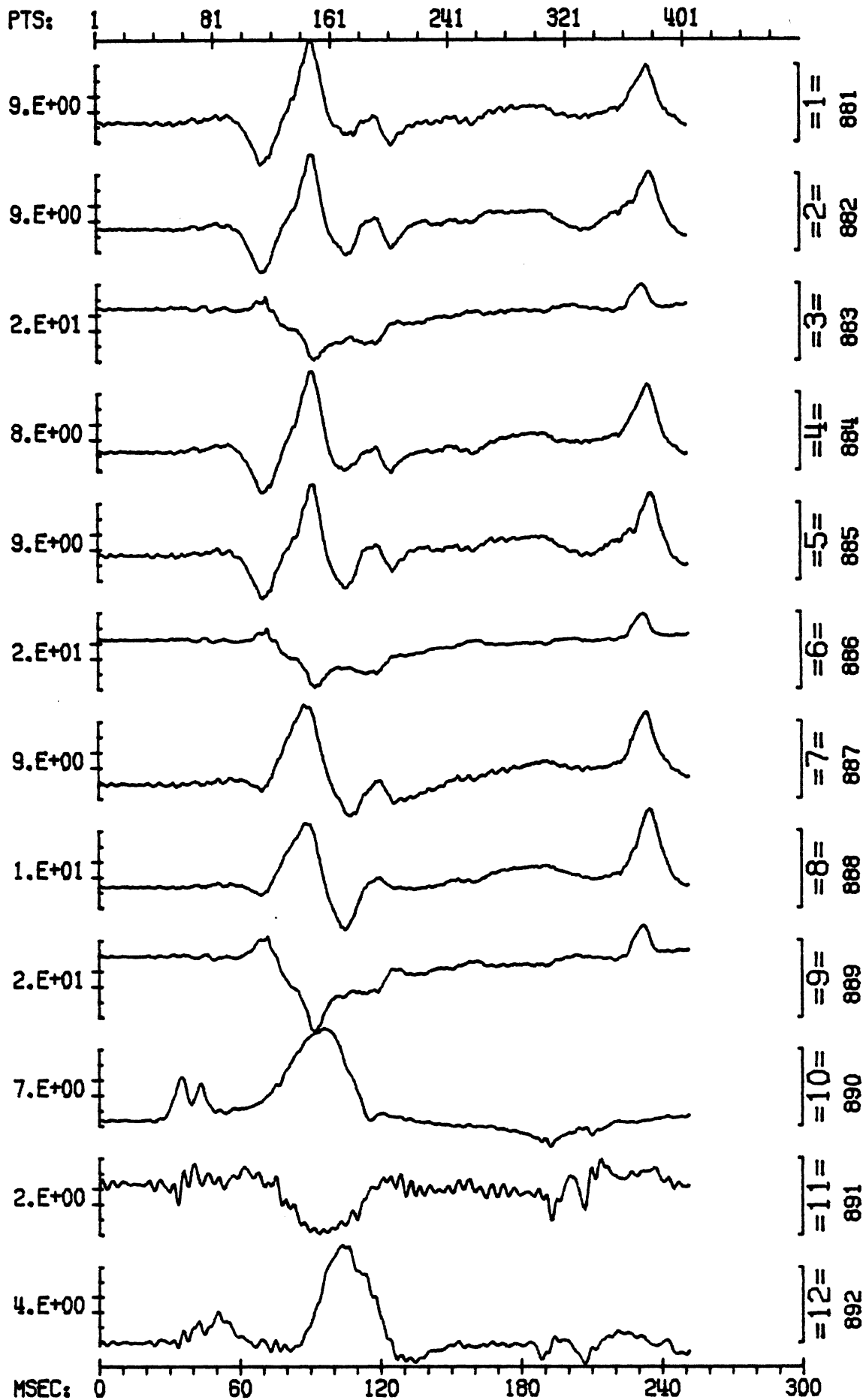
FILE CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
881	1: AX1 - HEAD ACC A 0 Q1	-42.20	G'S	4+1+18	569.6	403 0	1598.42
882	2: AY1 - HEAD ACC B 0 Q1	-33.40	G'S	4+1+18	569.6	403 0	1598.42
883	3: AZ1 - HEAD ACC C 0 Q1	-42.50	G'S	4+1+18	569.6	403 0	1598.42
884	4: AX2 - HEAD ACC C 0 Q2	-38.30	G'S	4+1+18	569.6	403 0	1598.42
885	5: AY2 - HEAD ACC A 0 Q2	-37.10	G'S	4+1+18	569.6	403 0	1598.42
886	6: AZ2 - HEAD ACC B 0 Q2	-42.50	G'S	4+1+18	569.6	403 0	1598.42
887	7: AX3 - HEAD ACC B 0 Q3	-40.90	G'S	4+1+18	569.6	403 0	1598.42
888	8: AY3 - HEAD ACC C 0 Q3	-34.10	G'S	4+1+18	569.6	403 0	1598.42
889	9: AZ3 - HEAD ACC A 0 Q3	-40.20	G'S	4+1+18	569.6	403 0	1598.42
890	10: A-P INTERNAL PELVIS ACC	-25.60	G'S	4+1+12	284.8	403 0	1598.42
891	11: L-R INTERNAL PELVIS ACC	-25.70	G'S	4+1+12	284.8	403 0	1598.42
892	12: S-I INTERNAL PELVIS ACC	-25.80	G'S	4+1+12	284.8	403 0	1598.42

13:

14:

 FILTERED FILES: 881 - 892 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77

 RUN ID: 77B108-1; HYB-3H



ID: 77B108-1: HYB-3H

TAPE: GMR-DUM

=====
 RUN ID: 77B108-2; HYB-3H
 =====

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

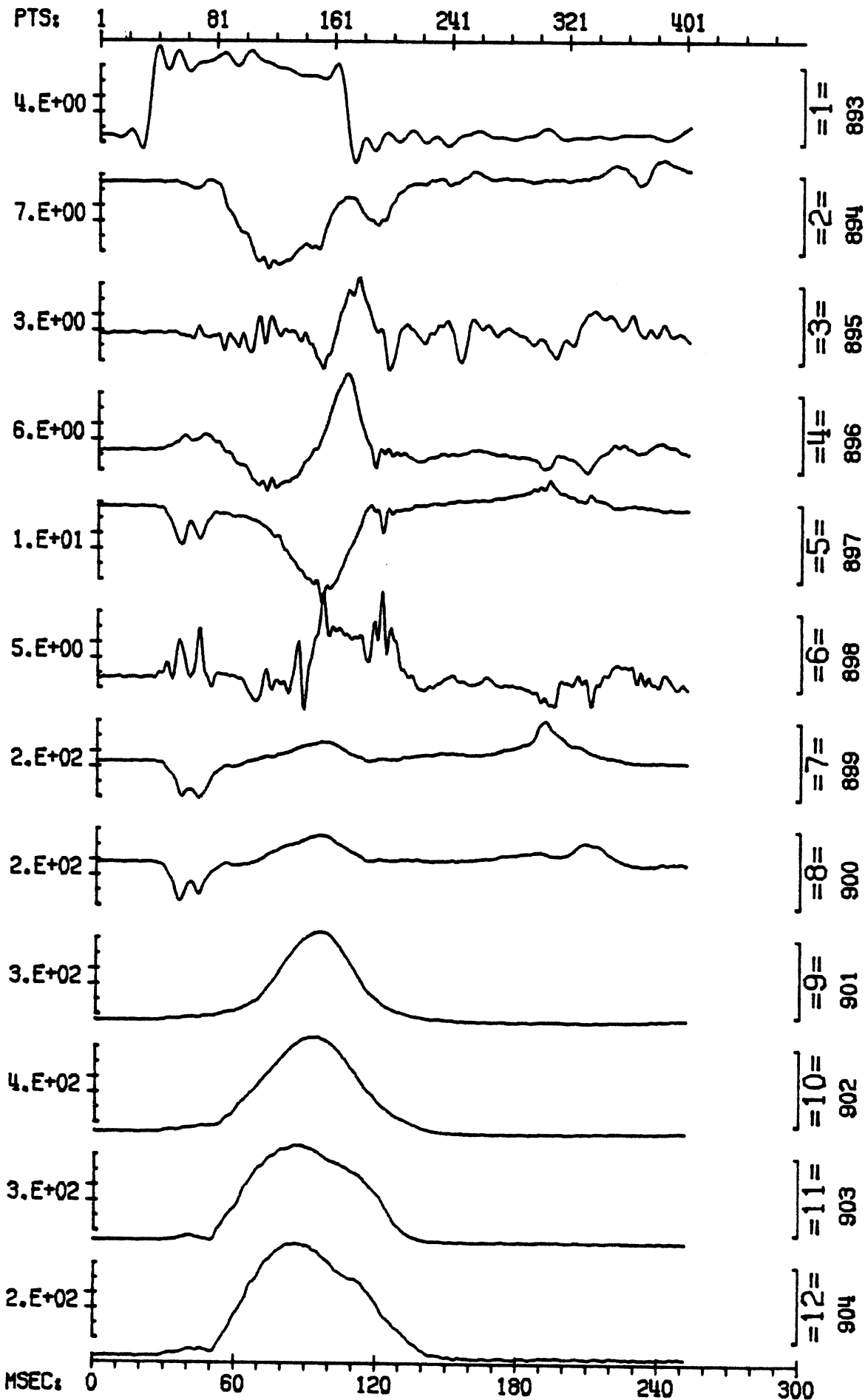
ANALOG TAPE: HSHI-139 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR- DATE: 09-FEB-77
 TEST SIGNALS: 1616 PTS/CH AT 6395.73 HZ. CAL SIGNALS: NOT DIGITIZED.

FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
893	1	SLED DECELERATION	20.00	G'S	4+1+1	79.9	403	1598.93
894	2	A-P EXTERNAL CHEST ACC	42.40	G'S	4+1+12	284.9	403	1598.93
895	3	L-R EXTERNAL CHEST ACC	35.50	G'S	4+1+12	284.9	403	1598.93
896	4	S-I EXTERNAL CHEST ACC	37.30	G'S	4+1+12	284.9	403	1598.93
897	5	A-P EXTERNAL PELVIS ACC	53.70	G'S	4+1+12	284.9	403	1598.93
898	6	S-I EXTERNAL PELVIS ACC	51.90	G'S	4+1+12	284.9	403	1598.93
899	7	RIGHT FEMUR LOAD	925.00	LBS	4+1+12	284.9	403	1598.93
900	8	LEFT FEMUR LOAD	986.00	LBS	4+1+12	284.9	403	1598.93
901	9	RIGHT LAP BELT LOAD	1000.00	LBS	4+1+12	284.9	403	1598.93
902	10	LEFT LAP BELT LOAD	1000.00	LBS	4+1+12	284.9	403	1598.93
903	11	UPPER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	284.9	403	1598.93
904	12	LOWER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	284.9	403	1598.93

13:

14:

 FILTERED FILES: 893 - 904 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 77B108-2; HYB-3H



ID: 77B108-2: HYB-3H

TAPE: GMR-DUM

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RUN ID: 77B100-3: HYB-3H

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ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: CR #118 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR= DATE: 09-FEB-77

TEST SIGNALS: 1617 PTS/CH AT 6395.89 HZ. CAL SIGNALS: NOT DIGITIZED.

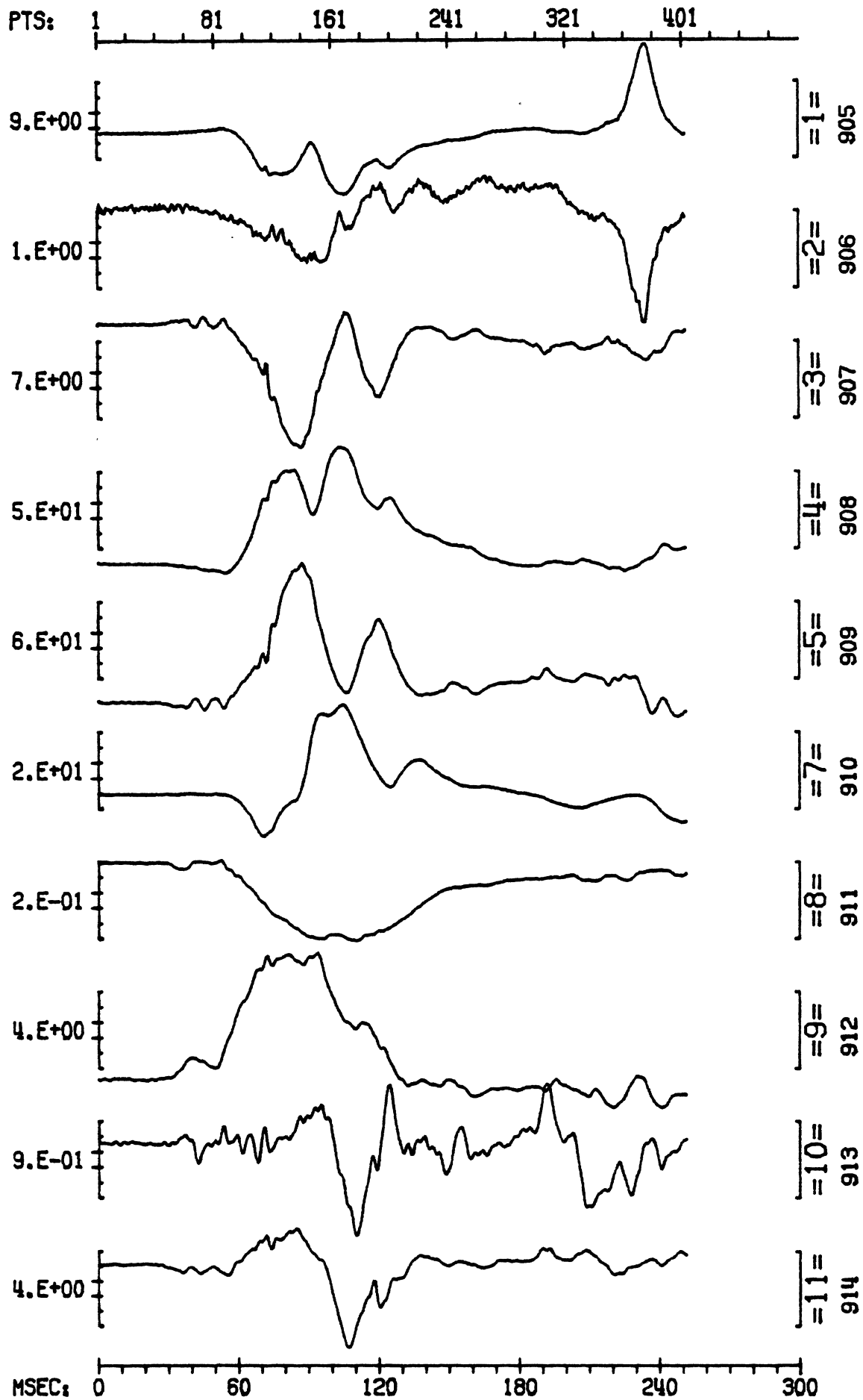
FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
905	- 1:	A-P INTERNAL HEAD ACC	100.00	G'S	4+1+18	569.8	403	1598.97
906	- 2:	L-R INTERNAL HEAD ACC	-100.00	G'S	4+1+18	569.8	403	1598.97
907	- 3:	S-I INTERNAL HEAD ACC	-100.00	G'S	4+1+18	569.8	403	1598.97
908	- 4:	A-P NECK SHEAR FORCE	1000.00	LBS	4+1+12	284.9	403	1598.97
909	- 5:	S-I NECK AXIAL FORCE	1000.00	LBS	4+1+12	284.9	403	1598.97
910	- 7:	L-R NECK MOMENT (0.345 IN)	2400.00	IN-LBS	4+1+12	284.9	403	1598.97
911	- 8:	A-P CHEST DEFLECTION	3.00	INCHES	4+1+12	284.9	403	1598.97
912	- 9:	A-P INTERNAL CHEST ACC	100.00	G'S	4+1+12	284.9	403	1598.97
913	- 10:	L-R INTERNAL CHEST ACC	100.00	G'S	4+1+12	284.9	403	1598.97
914	- 11:	S-I INTERNAL CHEST ACC	-100.00	G'S	4+1+12	284.9	403	1598.97

12:

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===== FILTERED FILES: 905 - 914 DIGITAL TAPE: GMR-DUN DATE: 09-FEB-77 RUN ID: 77B100-3: HYB-3H =====

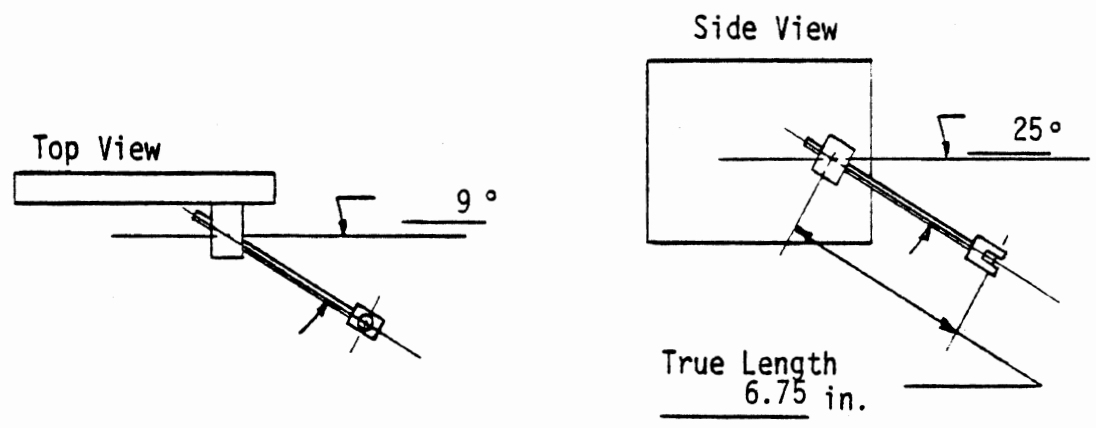


ID: 77B108-3: HYB-3H

TAPE: GMR-DUM

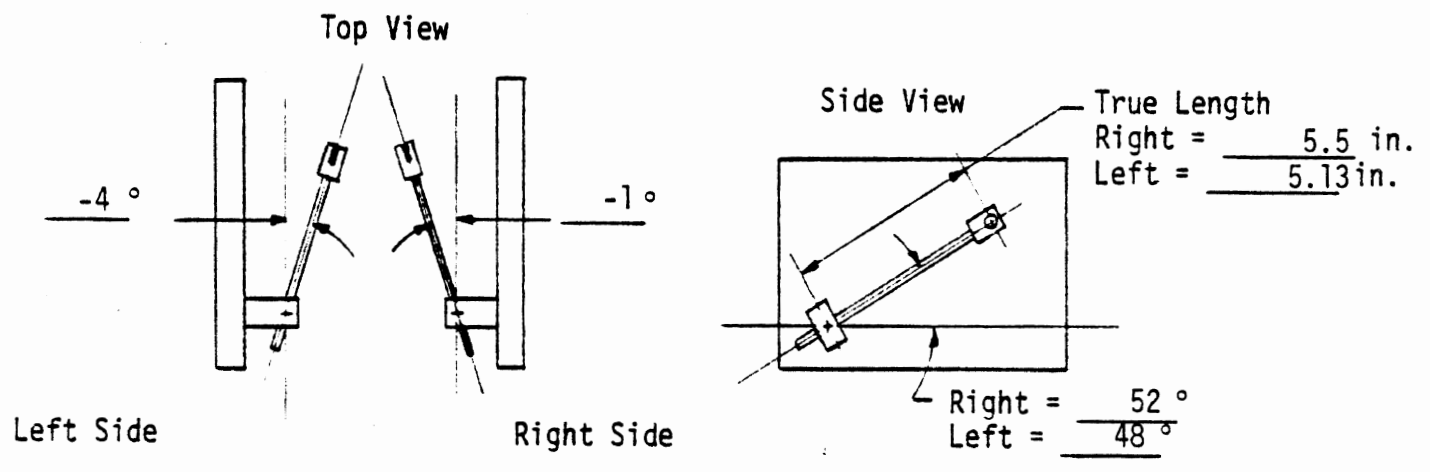
BELT ANCHOR ORIENTATIONS

A. SHOULDER BELT



B. LAP BELT

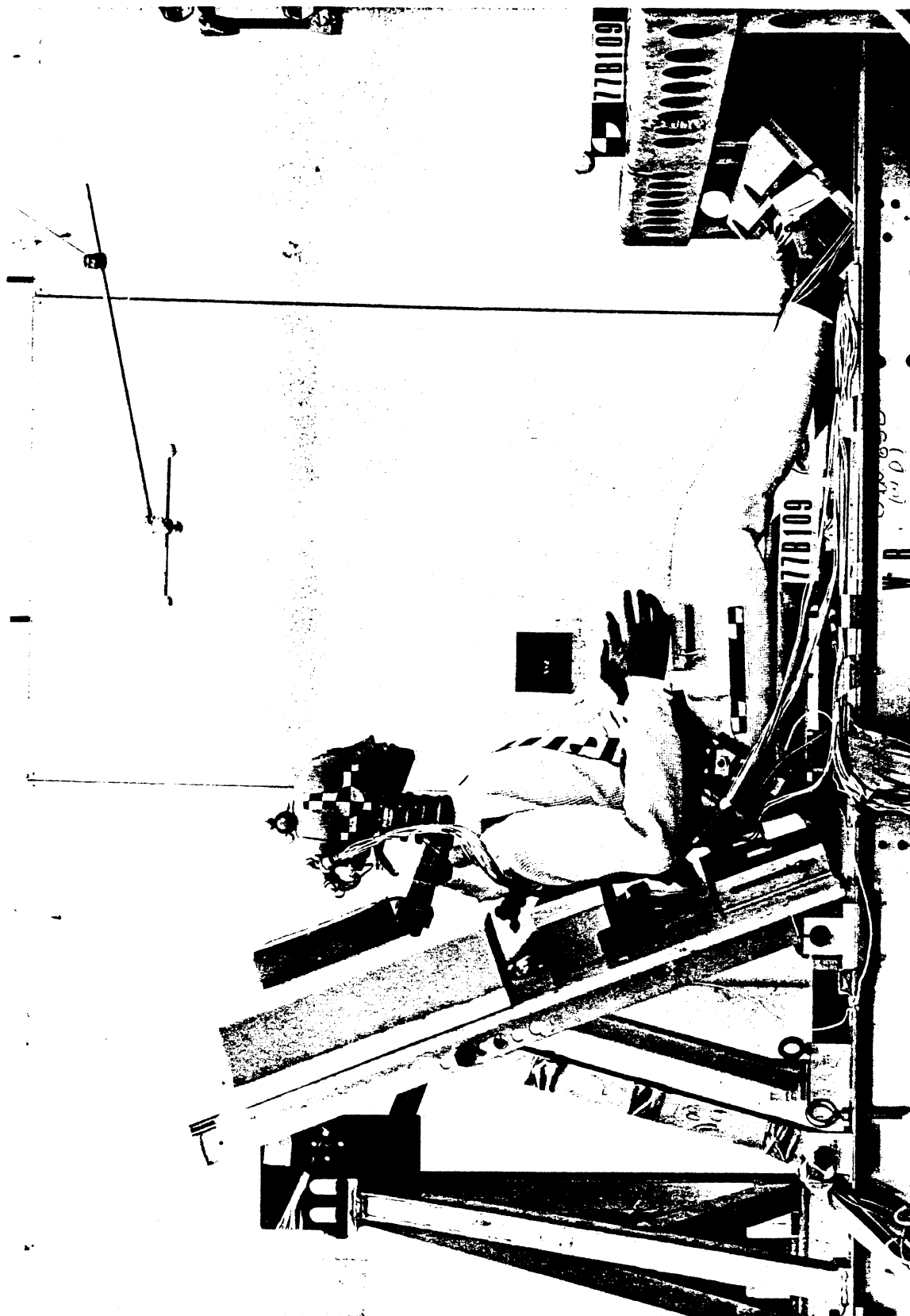
Pelvis Angle = 12.5°

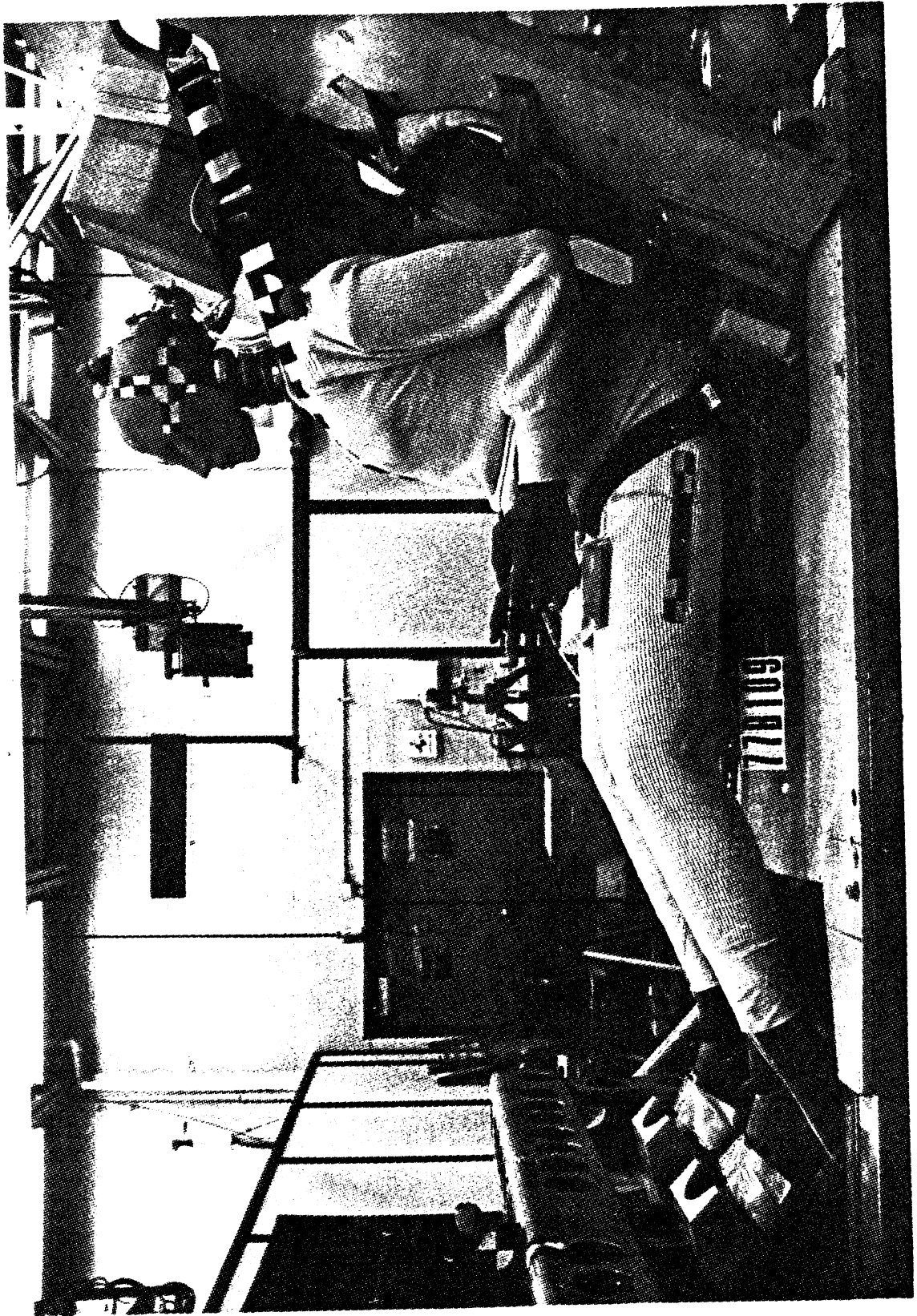


Sketch indicates positive angle directions

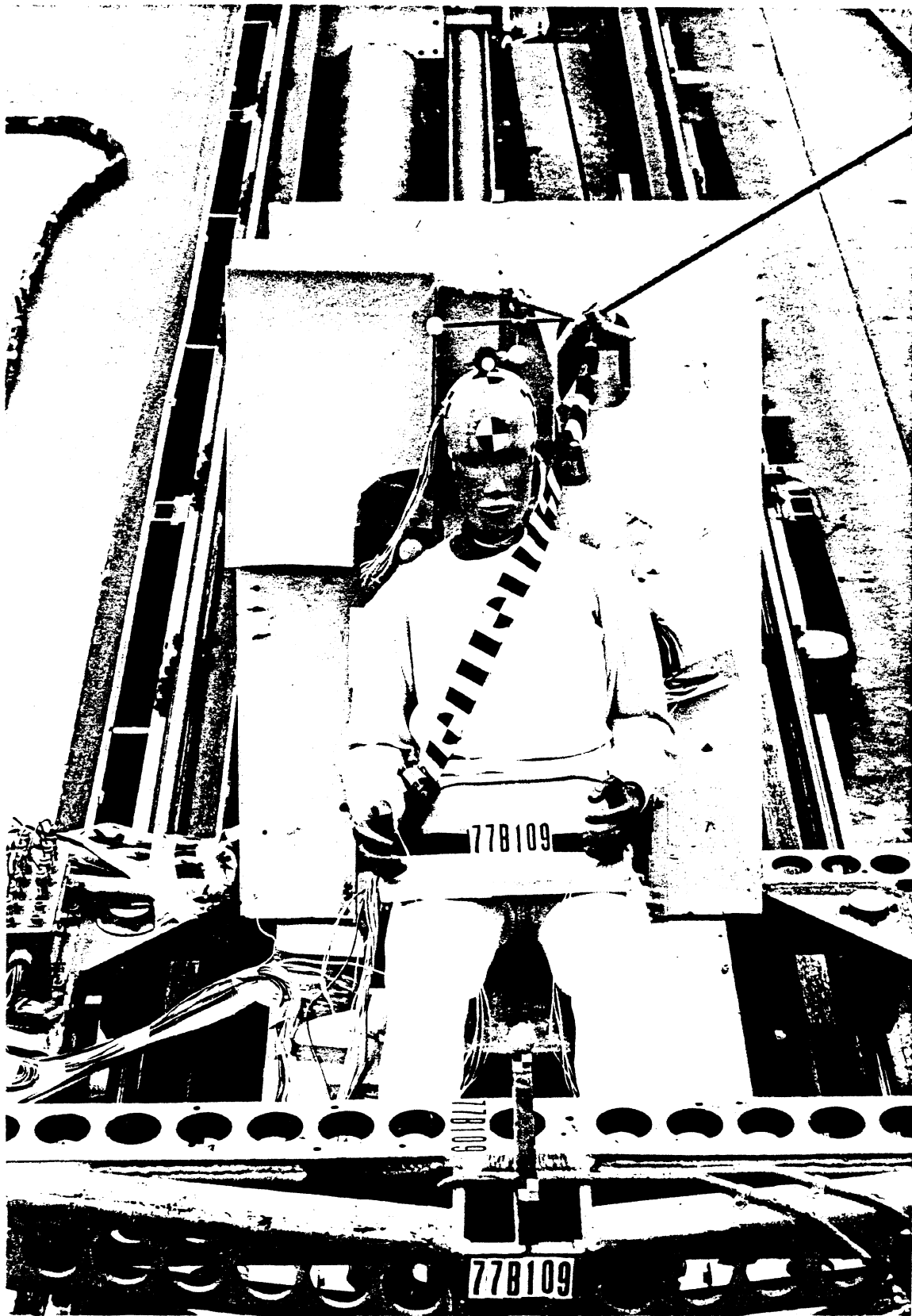
BELT LENGTH DATA

BELT POSITION	PRE-IMPACT LENGTH (in.)	POST-IMPACT LENGTH (in)	BELT STRETCH (in)	POST IMPACT LENGTH w/ LOAD CELLS (in.)
Rt. Lap	<u>12.13</u>	<u>12.38</u>	<u>0.25</u>	_____
Lt. Lap	<u>32.50</u>	<u>32.63</u>	<u>0.13</u>	_____
Shoulder	<u>42.</u>	<u>42.31</u>	<u>0.31</u>	_____

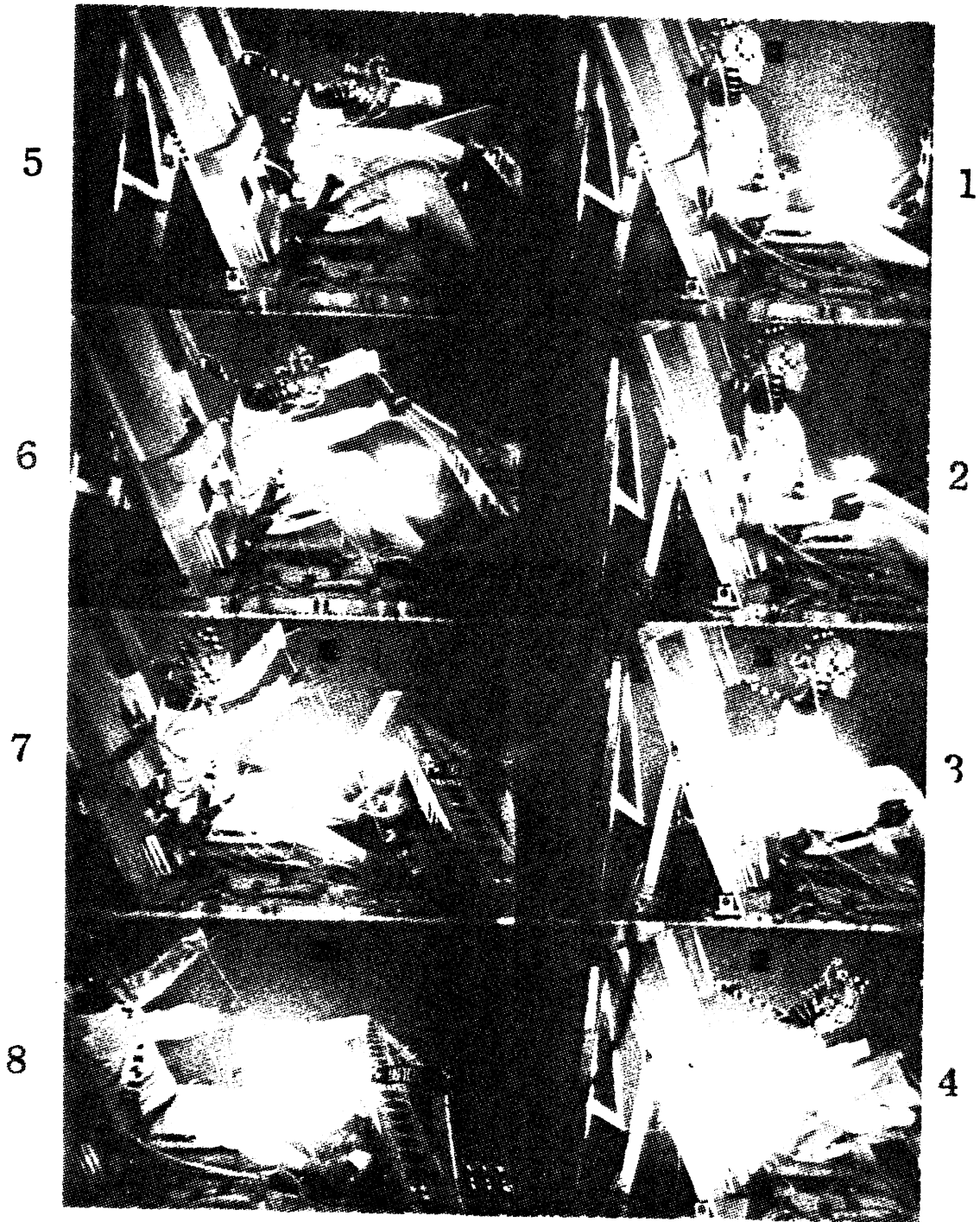




B-101



B-102



77B109

B-103

ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

RUN ID: 77B109-1; HYB-3H

PROJECT: WHOLE BODY RESPONSE; HYBRID III SERIES

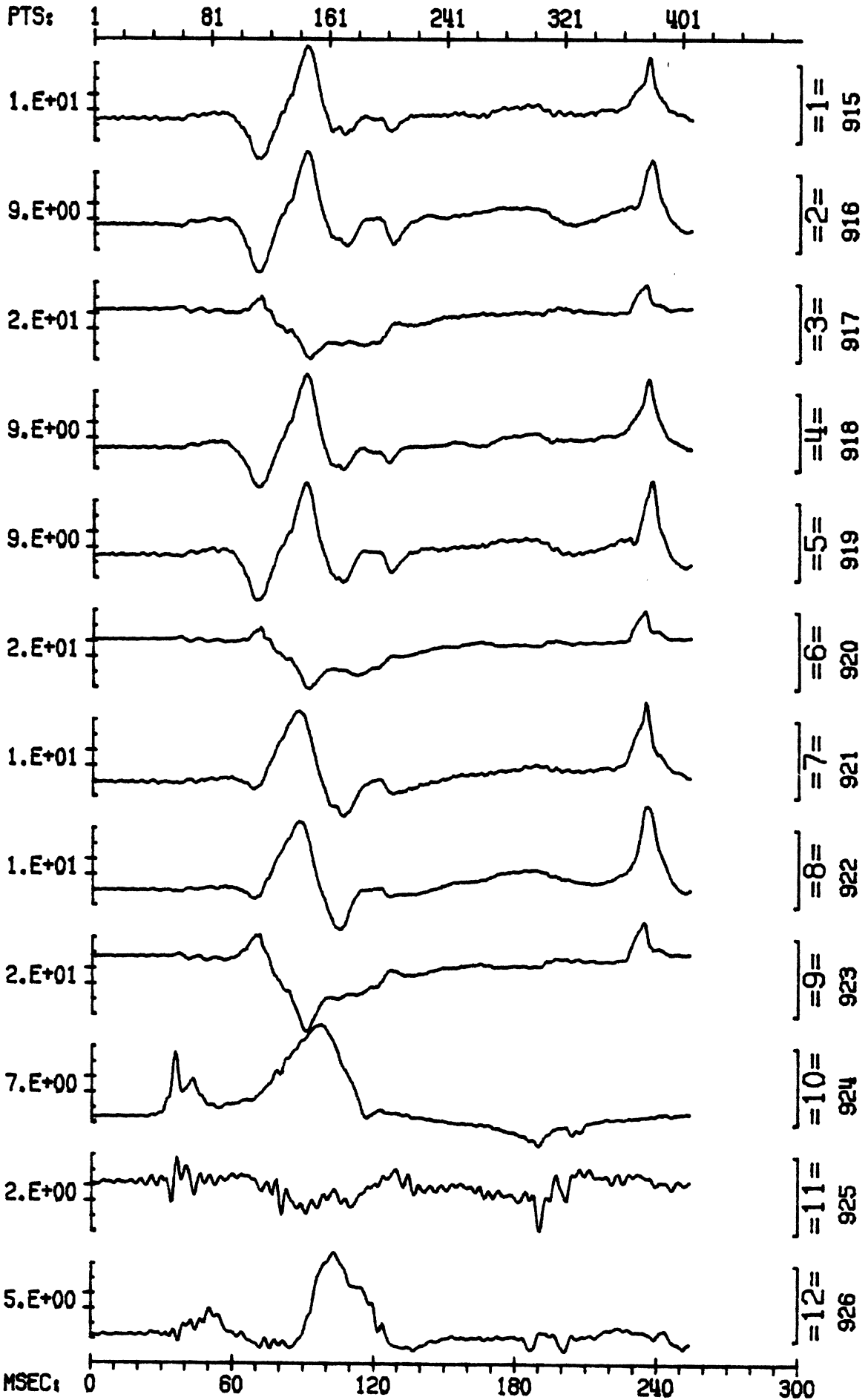
ANALOG TAPE: HSRI-138 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE; 524,GMR- DATE: 09-FEB-77

TEST SIGNALS: 1642 PTS/CH AT 6398.44 HZ, CAL SIGNALS; NOT DIGITIZED.

FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
915	1	AX1 - HEAD ACC A @ Q1	-42.20	G'S	4+1+18	570.0	407 @	1599.61
916	2	AY1 - HEAD ACC B @ Q1	-33.40	G'S	4+1+18	570.0	407 @	1599.61
917	3	AZ1 - HEAD ACC C @ Q1	-42.50	G'S	4+1+18	570.0	407 @	1599.61
918	4	AX2 - HEAD ACC C @ Q2	-38.30	G'S	4+1+18	570.0	407 @	1599.61
919	5	AY2 - HEAD ACC A @ Q2	-37.10	G'S	4+1+18	570.0	407 @	1599.61
920	6	AZ2 - HEAD ACC B @ Q2	-42.50	G'S	4+1+18	570.0	407 @	1599.61
921	7	AX3 - HEAD ACC B @ Q3	-40.90	G'S	4+1+18	570.0	407 @	1599.61
922	8	AY3 - HEAD ACC C @ Q3	-34.10	G'S	4+1+18	570.0	407 @	1599.61
923	9	AZ3 - HEAD ACC A @ Q3	-40.20	G'S	4+1+18	570.0	407 @	1599.61
924	10	A-P INTERNAL PELVIS ACC	-25.60	G'S	4+1+12	285.0	407 @	1599.61
925	11	L-R INTERNAL PELVIS ACC	-25.70	G'S	4+1+12	285.0	407 @	1599.61
926	12	S-I INTERNAL PELVIS ACC	-25.80	G'S	4+1+12	285.0	407 @	1599.61
		13:						
		14:						

FILTERED FILES: 915 - 926 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 77B109-1; HYB-3H

B-104



ID: 77B109-1: HYB-3H

TAPE: GMR--DUM

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 RUN ID: 77B109-2: HYB-3H
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ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING
 =====

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

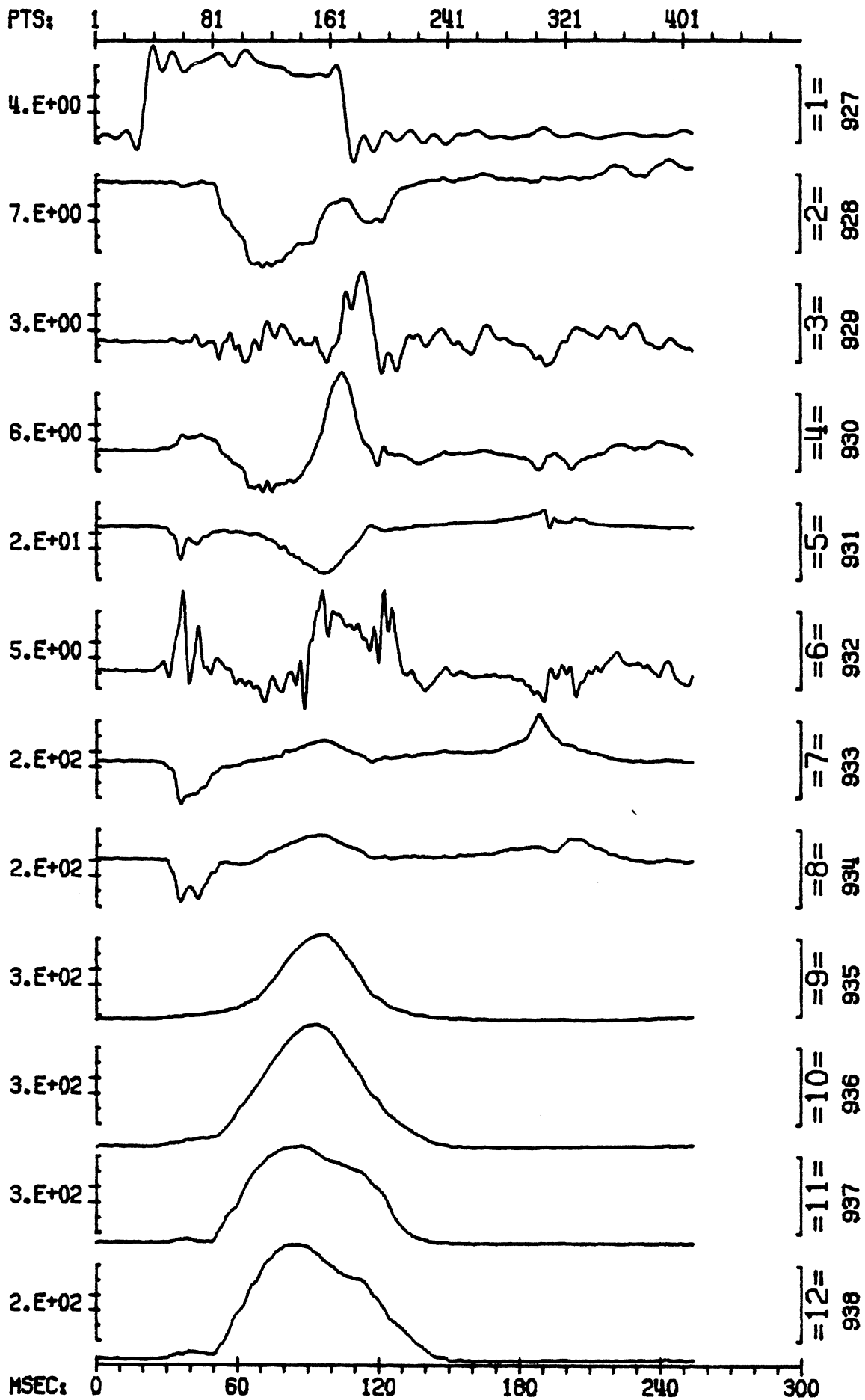
ANALOG TAPE: MSKI-139 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: 524,GMR DATE: 09-FEB-77
 TEST SIGNALS: 1641 PTS/CH AT 6397.51 HZ. CAL SIGNALS: NOT DIGITIZED.

FILE CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
927 - 1:	SLED DECELERATION	20.00	G'S	4+1+1	80.0	407	1599.30
928 - 2:	A-P EXTERNAL CHEST ACC	42.40	G'S	4+1+12	285.0	407	1599.30
929 - 3:	L-R EXTERNAL CHEST ACC	35.50	G'S	4+1+12	285.0	407	1599.30
930 - 4:	S-I EXTERNAL CHEST ACC	37.30	G'S	4+1+12	285.0	407	1599.30
931 - 5:	A-P EXTERNAL PELVIS ACC	53.70	G'S	4+1+12	285.0	407	1599.30
932 - 6:	S-I EXTERNAL PELVIS ACC	51.90	G'S	4+1+12	285.0	407	1599.30
933 - 7:	RIGHT FEMUR LOAD	925.00	LBS	4+1+12	285.0	407	1599.30
934 - 8:	LEFT FEMUR LOAD	986.00	LBS	4+1+12	285.0	407	1599.30
935 - 9:	RIGHT LAP BELT LOAD	1000.00	LBS	4+1+12	285.0	407	1599.30
936 - 10:	LEFT LAP BELT LOAD	1000.00	LBS	4+1+12	285.0	407	1599.30
937 - 11:	UPPER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	285.0	407	1599.30
938 - 12:	LOWER SHOULDER BELT LOAD	1000.00	LBS	4+1+12	285.0	407	1599.30

13:

14:

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 FILTERED FILES: 927 - 938 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 77B109-2: HYB-3H
 =====



ID: 77B109-2: HYB-3H

TAPE: GMR-DUM

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RUN ID: 778109-3: HYB-3M

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ANALOG-TO-DIGITAL CONVERSION & DIGITAL FILTERING

PROJECT: WHOLE BODY RESPONSE: HYBRID III SERIES

ANALOG TAPE: CR #118 EXPANDED 16:1, WAS A/D CONVERTED TO DIGITAL TAPE: GMR-U1A DATE: 09-FEB-77

TEST SIGNALS: 1642 PTS/CH AT 6397.51 HZ. CAL SIGNALS: NOT DIGITIZED.

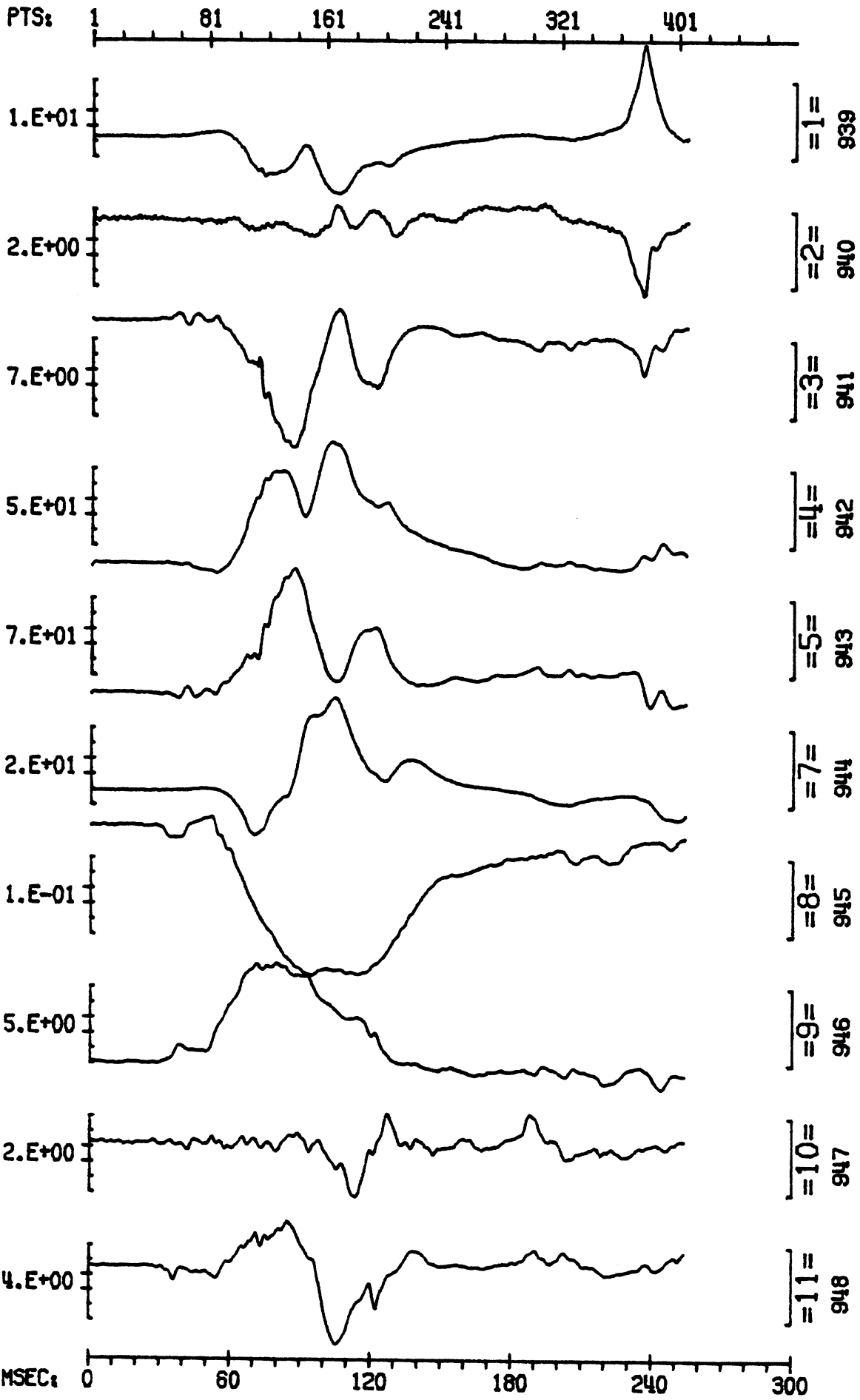
FILE	CH	CONTENT OF CHANNEL	UNITS/VOLT	UNITS	FILTER STAGES	FILTER CUTOFF	NO. PTS	SAMPLING HERTZ
939	1	A-P INTERNAL HEAD ACC	100.00	G'S	4+1+10	570.0	407	1599.30
940	2	L-R INTERNAL HEAD ACC	-100.00	G'S	4+1+10	570.0	407	1599.30
941	3	S-I INTERNAL HEAD ACC	-100.00	G'S	4+1+10	570.0	407	1599.30
942	4	A-P NECK SHEAR FORCE	1000.00	LBS	4+1+12	285.0	407	1599.30
943	5	S-I NECK AXIAL FORCE	1000.00	LBS	4+1+12	285.0	407	1599.30
944	7	L-R NECK MOMENT (0.345 IN)	2400.00	IN-LBS	4+1+12	285.0	407	1599.30
945	8	A-P CHEST DEFLECTION	3.00	INCHES	4+1+12	285.0	407	1599.30
946	9	A-P INTERNAL CHEST ACC	100.00	G'S	4+1+12	285.0	407	1599.30
947	10	L-R INTERNAL CHEST ACC	100.00	G'S	4+1+12	285.0	407	1599.30
948	11	S-I INTERNAL CHEST ACC	-100.00	G'S	4+1+12	285.0	407	1599.30

12:

13:

14:

----- FILTERED FILES: 939 = 948 DIGITAL TAPE: GMR-DUM DATE: 09-FEB-77 RUN ID: 778109-3: HYB-3M -----



ID: 77B109-3: HYB-3H

TAPE: GMR-DUM

