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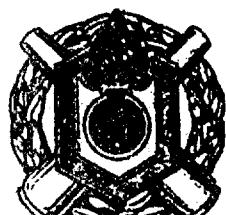
Technical Report ARAED-TR-93026

INSTRUMENTATION FOR THE FOREIGN WEAPONS EVALUATION PROGRAM

Joseph Petrellese, Jr.

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Armament Engineering Directorate

Picatinny Arsenal, New Jersey

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INTRODUCTION

The objective of the Foreign Weapons Evaluation Program is to test the foreign 155-mm semiautomatic artillery loader/assist device (SAL) for performance and applicability to U.S. Army artillery systems using the M284 cannon. After a series of tests and evaluations, several SAL candidates will be narrowed down to a single system which will ultimately be recommended for procurement.

Testing was first performed using two currently accepted ramming methods, hand ramming and positive-stroke piston ramming (hydraulic ramming). These tests were performed to establish baseline values for future evaluation of semiautomatic artillery ramming devices. Testing was then conducted on three different SAL under the same test parameters as the hand and hydraulic ram tests.

Telemetry data was recorded for each and every test, with quick look data also available. A block diagram of the telemetry test setup is shown in figure 1.

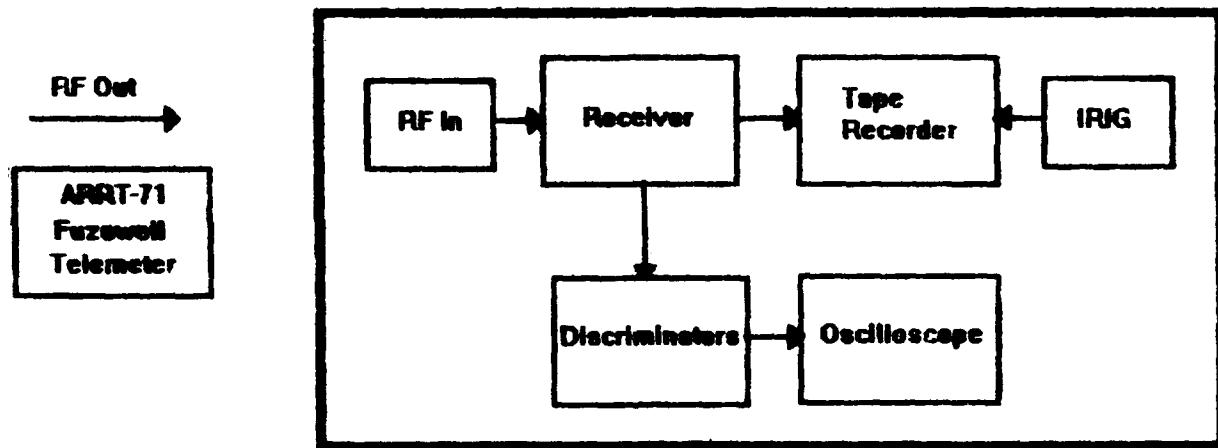


Figure 1. Telemetry test van

All tests were conducted using an ARDEC model ARRT-71 fuze well telemeter (TM). The TM consisted of a tri-axial accelerometer, transmitter, batteries, and related electronic components. A block diagram of the TM is shown in figure 2.

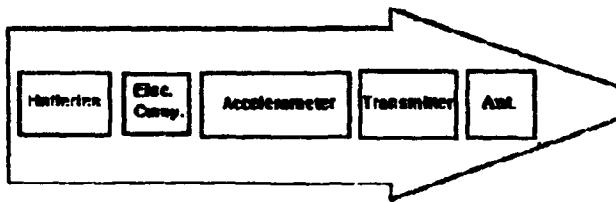


Figure 2. ARDEC model ARRT-71 fuze well telemeter

The tri-axial accelerometer was used to measure acceleration in three different axis: the traverse, vertical, and longitudinal axis.

Testing Procedure

On all test series the test configuration was as shown in figure 3.

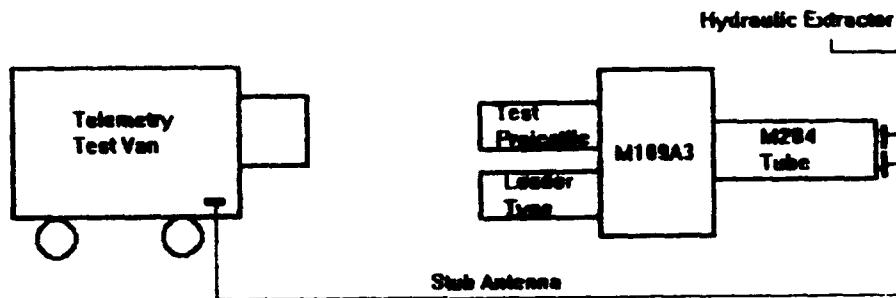


Figure 3. Test series configuration

The tests were conducted using three different inert projectile models, the M107A1, M549A1, and the M483A1. Data was recorded using each of these models at various quadrant elevation (QE) values of the howitzer. The following data was logged prior to ramming:

Vehicle type	Loader type
Vehicle serial number	Loader serial number
Tube type	Sample number
Tube serial number	Projectile number
Projectile Model	Ram number
Ram QE	

Once these parameters were recorded, an ARRT-71 TM would be installed in place of the fuze in the nose of the projectile. The round would then be placed on the loading tray. The TM was then activated to confirm TM operation and zero baseline. All data was recorded with IRIG time on 1 in. magnetic tape. Once the recorder was up

to speed the engineer would then give a 3 to 5 sec countdown to the gun crew, following which the ram would take place using either the hand ram, the hydraulic ram, or one of the SAL. Upon completion of the ram, the data was recorded for an additional 5 sec. After the round was removed from the chamber, the TM was deactivated and the peak pressure was measured. The extraction force was then calculated from the peak pressure. This procedure was repeated for the various types of loaders and projectile models used, with the data being recorded for each test. A digital oscilloscope was also used in the telemetry van, so that a quick-look analysis could be given on the ram test including the maximum longitudinal (axial) acceleration.

Testing Results

A total of 288 ramming tests were performed using a hand rammer, hydraulic rammer, and three different SAL with all data recorded on magnetic tape. Data from each test was analyzed for maximum positive and negative acceleration in the transverse, vertical, and longitudinal axis for both before seating, seating, and after seating acceleration. Maximum seating velocity was also computed by integrating the longitudinal seating acceleration. A summary of all the results can be found in tables 1 through 42. For certain loader types, the before seating acceleration (balloting) measured was so small that it was not included in summary tables. Typical sample plots for each table are shown in appendixes A through D.

SUMMARY

The telemetry section of the Armament Engineering Directorate working jointly with the Fire Support Armaments Center (FSAC) personnel obtained excellent quality telemetry data on all ramming tests. The data was analyzed, tabulated, plotted, and provided to FSAC for their use in determining future testing and/or procurement actions. Data was also provided to the Project Manager for Advance Field Artillery System (AFAS) for assistance in developing an AFAS loading system.

Table 1. Semiautomatic 155-mm artillery loader/assist device results, M107/264 mils/std hyd

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
DATE: OCT 12, 1980			VEHICLE TYPE: M108A3			TUBE TYPE: M264			PROJ MODEL: M107		
SHEET #: 1			VEH SER#: 1013			TUBE SER#: 762			RAM QTY: 264 mils		
AFTER SEATING ACCELERATION											
EXTRA	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS
#	#	#	(LBS)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
1	1	1	12588	11.32	103	139	150	94	61	496	152
2	2	1	15900	11.81	172	318	87	130	0	511	306
3	3	1	15238	11.41	254	224	282	257	0	589	278
4	4	1	16563	11.52	206	200	150	81	0	600	212
5	5	1	14575	13.28	184	214	155	149	23	587	441
6	6	1	18550	11.92	42	85	160	172	0	487	180
7	7	1	14575	11.73	98	122	80	118	0	414	147
8	8	1	14575	12.19	91	133	175	157	21	474	211
9	9	1	12588	11.73	88	18	149	93	0	428	122
10	10	1	16563	12.60	67	79	203	191	0	490	61

Table 2. Semiautomatic 155-mm artillery loader/assist device results, M107/264 mils/hand

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
				TUBE TYPE: M284				PROJ MODEL: M107			
DATE: OCT 12, 1990		VEHICLE TYPE: M109A3		TUBE SER#: 782		RAM QE: 264 mils		LOADER TYPE: HAND		LOADER SER#: UNKNOWN	
SHEET # : 2	VEH SER#:	1813									
SEATING ACCELERATION											
	EXTRA	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	TRANSV.	VERTICAL	TRANSV.	LONGITUDE
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS
#	#	#	(LBS)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
11	11	1	17225	10.48	257	306	300	350	0	460	184
12	12	1	15200	8.93	339	397	194	138	18	508	151
13	13	1	21200	12.72	31	67	288	286	0	580	165
14	14	1	19213	10.88	85	151	125	150	0	588	97
15	15	1	20538	11.16	18	153	138	155	0	505	288
16	16	1	19213	10.88	197	384	232	232	0	621	203
17	17	1	18550	11.49	98	116	217	149	23	488	220
18	18	1	19875	11.07	224	236	289	169	58	535	327
19	19	1	19875	12.50	117	171	173	56	0	488	306
20	20	1	23850	11.63	180	70	219	175	0	584	154

Table 3. Semiautomatic 155-mm artillery loader/assist device results, M549/264 mils/std hyd

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET																				
DATE: OCT 12, 1990			VEHICLE TYPE: M109A3			TUBE TYPE: M284			PROJ MODEL: M549											
SHEET #: 3			VEH SER#: 1813			TUBE SER#: 782			RAM QE: 264 mils											
SEATING ACCELERATION																				
AFTER SEATING ACCELERATION																				
SAMP	PROJ	EXTRA	SEATING	SEATING	TRANSV.	TRANSV.	VERTICAL	TRANSV.	VERTICAL	TRANSV.	VERTICAL									
#	#	#	RAM FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS									
			(LBS)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)									
21	1	20538	11.32	103	139	194	94	67	496	161	97									
22	2	23188	10.59	171	110	309	279	0	499	214	190									
23	3	23188	12.06	109	121	275	376	0	774	127	200									
24	4	21863	10.43	73	166	130	136	0	618	165	147									
25	5	23188	11.76	139	151	244	238	0	746	103	127									
26	6	26176	10.60	337	330	167	99	0	611	263	422									
37	17	18801	11.24	194	212	169	131	0	709	218	200									
38	18	20538	10.28	140	116	158	90	0	584	129	98									
39	19	21863	11.67	182	206	200	69	0	722	357	212									
41	20	21863	10.92	80	92	173	124	0	488	324	337									

Table 4. Semiautomatic 155-mm artillery loader/assist device results, M549/264 mils/hand

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
DATE: OCT 12, 1990				VEHICLE TYPE: M109A3				TUBE TYPE: M284			
SHEET #: 4				VEH SER#: 1813				TUBE SER#: 782			
PROJ MODEL: M549				RAM QE: 264 mils				LOADER TYPE: HAND			
LOADER SER#: UNKNOWN											
SEATING ACCELERATION											
EXTRA SEATING			TRANSV.			VERTICAL			LONGITUDE		
SAMP	PROJ	RAM	FORCE	VELOCITY		POS	NEG	POS	NEG	POS	NEG
#	#	#	(LBS)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
27	7	1	23188	10.75	73	127	50	88	505	484	303
28	8	1	21200	9.94	86	73	118	136	17	363	208
29	9	1	17888	6.14	133	61	182	94	0	282	182
30	10	1	18213	11.54	129	318	223	111	0	485	289
31	11	1	19213	9.89	91	133	200	125	0	413	67
32	12	1	18881	9.41	257	245	124	82	0	403	287
33	13	1	20538	10.93	182	297	163	275	40	603	184
34	14	1	18550	9.07	153	110	130	149	0	417	98
35	15	1	20208	10.74	115	115	200	88	0	410	157
36	16	1	21863	8.23	110	116	138	82	0	301	441

Table 5. Semiautomatic 155-mm artillery loader/assist device results, M483/264 mils/std hyd

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
DATE: OCT 12, 1990			VEHICLE TYPE: M109A3			TUBE TYPE: M284			PROJ MODEL: M483		
SHEET #: 6			VEH SER#: 1013			TUBE SER#: 782			RAM QE: 264 mm		
AFTER SEATING ACCELERATION											
EXTRA SEATING	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS
#	#	#	(LBS)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
43	1	2	21863	12.79	139	87	263	213	0	477	109
44	2	1	20638	13.08	43	80	111	142	0	608	250
45	3	1	22625	14.04	128	91	88	170	0	558	109
46	4	1	22625	12.58	67	86	161	161	0	540	116
47	5	1	22194	13.34	167	115	81	88	0	588	188
48	6	1	23188	12.03	104	214	173	186	0	535	135
49	7	1	21863	14.54	61	151	194	0	636	133	115
50	8	1	23519	11.78	86	61	229	188	0	613	153
51	9	1	23188	12.92	73	97	162	213	0	678	103
52	10	1	22194	12.51	31	87	186	161	0	695	166

Table 6. Semiautomatic 155-mm artillery loader/assist device results, M483/264 mils/hand

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET																
DATE: OCT 12, 1980		VEHICLE TYPE: M109A3		TUBE TYPE: M284		PROJ MODEL: M483		LOADER TYPE: HAND		RAM SER#: 782		RAM QE: 284 mils		LOADER SER#: UNKNOWN		
SHEET #: 6																
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG		
#	#	(LBS)	(FT/SEC)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)		
53	11	1	21531	11.16	49	151	225	213	0	553	218	85	138	376	879	684
54	12	1	16563	10.24	245	349	80	111	57	420	190	288	130	130	818	340
55	13	1	19875	10.92	115	194	144	44	0	51 ^c	133	109	144	157	808	601
56	14	1	20538	11.35	98	228	50	68	0	536	184	177	87	75	871	663
57	15	1	25838	14.14	182	157	275	219	0	685	163	212	100	182	1155	813
58	16	1	21863	11.17	196	312	105	93	0	595	196	202	142	149	812	713
59	17	1	19213	11.70	67	85	207	213	0	524	133	151	289	200	835	729
60	18	1	21202	11.46	245	153	130	180	0	517	177	141	136	142	844	608
61	19	1	22858	13.17	133	91	113	44	0	587	187	145	144	157	979	891
62	20	1	22194	13.24	98	110	167	272	0	472	86	159	167	136	753	581

Table 7. Semiautomatic 155-mm artillery loader/assist device results, M107/264 mils/SAL 1

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
DATE: JAN 7, 1981		VEHICLE TYPE: M106A3		TUBE TYPE: M284		PROJ MODEL: M107		LOADER TYPE: SAL 1			
SHEET # : 7		VEH SER#: 1813		TUBE SER#: 782		RAM OE: 284 mils		LOADER SER#: UNKNOWN			
SEATING ACCELERATION											
EXTRA SAMP	SEATING #	SEATING (#)	TRANSV. FORCE (LBS)	VELOCITY (FT/SEC)	POS (g's)	NEG (g's)	POS (g's)	NEG (g's)	POS (g's)	NEG (g's)	POS (g's)
63	21	1	34450	17.57	290	315	163	81	0	852	575
64	22	1	33125	14.93	366	355	136	326	0	753	447
65	23	1	36438	17.09	204	477	285	346	0	1150	297
66	24	1	36438	18.19	0	257	200	100	0	850	777
67	25	1	35775	15.31	373	367	192	223	0	821	343
68	26	1	31800	16.59	254	463	149	359	0	740	359
69	27	1	33788	18.44	182	339	100	100	0	1013	345
70	28	1	34450	16.20	330	416	241	285	0	787	308
71	29	1	31800	17.65	87	186	235	265	0	998	68
72	30	1	33125	14.84	224	284	319	270	0	783	442

AFTER SEATING ACCELERATION											
EXTRA SAMP	SEATING #	SEATING (#)	TRANSV. FORCE (LBS)	VELOCITY (FT/SEC)	POS (g's)	NEG (g's)	POS (g's)	NEG (g's)	POS (g's)	NEG (g's)	POS (g's)
63	21	1	34450	17.57	290	315	163	81	0	852	575
64	22	1	33125	14.93	366	355	136	326	0	753	447
65	23	1	36438	17.09	204	477	285	346	0	1150	297
66	24	1	36438	18.19	0	257	200	100	0	850	777
67	25	1	35775	15.31	373	367	192	223	0	821	343
68	26	1	31800	16.59	254	463	149	359	0	740	359
69	27	1	33788	18.44	182	339	100	100	0	1013	345
70	28	1	34450	16.20	330	416	241	285	0	787	308
71	29	1	31800	17.65	87	186	235	265	0	998	68
72	30	1	33125	14.84	224	284	319	270	0	783	442

Table 8. Semiautomatic 155-mm artillery loader/assist device results, M107/600 mils/SAL 1

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
				TUBE TYPE: M284				PROJ MODEL: M107			
				VEHICLE TYPE: M108A3				LOADER TYPE: SAL 1			
				VEH SER#: 1813				RAM QE: 600 mils			
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS
#	#	#	(#)	(ft/sec)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
73	32	1	31800	17.25	297	286	322	217	0	750	594
74	31	1	29150	14.78	257	289	198	192	0	631	282
75	33	1	33125	15.81	176	85	294	313	0	813	315
76	34	1	31138	15.83	159	392	167	470	0	808	227
77	35	1	30475	16.86	136	378	217	402	0	834	353

Table 9. Semiautomatic 155-mm artillery loader/assist device results, M107/0 mils/SAL 1

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET																
DATE: JAN 7, 1991		VEHICLE TYPE: M109A3		TUBE TYPE: M284		PROJ MODEL: M107		RAM QE: 0 mils		LOADER TYPE: SAL 1		LOADER SER#: UNKNOWN				
SHEET #: 9		VEH SER#: 1813		TUBE SER#: 782												
SEATING ACCELERATION																
EXTRA	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	POS	NEG	POS	NEG			
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG		
#	#	#	#	(ft/sec)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)		
78	36	1	32463	17.60	264	303	232	176	0	827	581	212	367	267	1140	524
79	37	1	31138	16.31	261	312	229	173	0	767	581	220	353	254	1068	489
80	38	1	29150	17.48	310	260	322	149	0	1110	384	545	260	272	811	1035
81	39	1	36438	16.38	73	85	169	213	0	894	176	133	294	438	1799	1187
82	40	1	27823	16.48	129	312	260	210	0	726	184	226	385	408	1280	840

Table 10. Semiautomatic 155-mm artillery loader/assist device results, M107/900 mils/SAL 1

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET																
DATE: JAN 7, 1991				VEHICLE TYPE: M109A3				TUBE TYPE: M284				PROJ MODEL: M107		LOADER TYPE: SAL 1		
SHEET # : 10		VEH SER#: 1813		TUBE SER#: 782		RAM QE: 900 mils								LOADER SER#: UNKNOWN		
SAMP	PROJ	RAM	FORCE	VELOCITY	EXTRA	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	AFTER SEATING ACCELERATION			
#	#	#	(LBS)	(FT/SEC)	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG
					(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	
83	41	1	26500	15.08	183	251	167	130	0	754	417	300	204	268	576	408
84	42	1	28488	14.47	260	290	297	203	0	710	424	260	178	135	935	357
85	43	1	29150	14.31	165	386	204	347	0	803	312	349	353	309	712	558
86	44	1	25838	18.11	173	272	235	297	0	773	297	291	322	254	1129	417
87	45	1	25175	15.07	97	139	175	269	0	876	194	272	369	388	720	446

Table 11. Semiautomatic 155-mm artillery loader/assist device results, M549/264 mills/SAL 1

FOREIGN COMPARATIVE TESTING- SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
DATE: JAN 7 1991			VEHICLE TYPE: M109A3			TUBE TYPE: M284			PROJ MODEL: M549		
SHEET # : 11			VEH SER#: 1813			TUBE SER#: 782			RAM QE: 264 mils		
LOADING TYPE: SAL ¹											
SAMP	PROJ	RAM	EXTRA	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	LONGITUDE
#	#	#	(LBS)	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG
			(ft/sec)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
88	21	1	27163	12.72	129	190	260	192	0	1039	226
89	22	1	28488	11.98	241	551	272	229	0	1143	241
90	23	1	28488	14.98	91	121	150	194	0	803	321
91	24	1	27825	13.98	92	239	246	167	0	862	171
92	25	1	27825	16.41	87	309	105	217	0	768	322
93	26	1	33788	15.05	163	115	107	100	0	633	206
94	27	1	34460	14.70	135	245	161	198	0	699	233
95	28	1	35775	14.28	167	551	272	280	0	1253	365
96	29	1	29813	15.00	85	91	125	207	0	592	194
97	30	1	28488	13.27	275	208	118	105	0	686	251

Table 12. Semiautomatic 155-mm artillery loader/assist device results, M549/600 mils/SAL 1

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET												
DATE: JAN 7, 1991			VEHICLE TYPE: M109A3			TUBE TYPE: M284			PROJ MODEL: M549			LOADER TYPE: SAL 1
SHEET #: 12			VEH SER#: 1813			TUBE SER#: 782			RAM QE: 600 mils			LOADER SER#: UNKNOWN
SEATING ACCELERATION												AFTER SEATING ACCELERATION
EXTRA	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	AFTER SEATING ACCELERATION
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS	NEG
#	#	#	(LBS)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
98	31	1	32463	13.57	130	173	149	124	0	621	483	285
99	32	1	29813	15.56	121	97	282	108	0	663	85	133
100	33	1	32463	13.24	226	245	186	136	0	840	208	306
101	34	1	34450	15.03	130	130	280	186	0	740	229	210
102	35	1	32463	13.96	284	412	212	194	0	1028	351	284
												194
												219
												656
												578

Table 13. Semiautomatic 155-mm artillery loader/assist device results, M549/900 mils/SAL 1

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
TESTING DATE: JAN 7, 1991			VEHICLE TYPE: M109A3			TUBE TYPE: M284			PROJ MODEL: M549		
SHEET #: 13			VEH SER#: 1813			TUBE SER#: 782			RAM QF: 900 mils		
SEATING ACCELERATION											
EXTRA SEATING	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.
SAMP #	PROJ #	RAM #	FORCE #	VELOCITY (FT/SEC)	POS (LBS)	NEG (LBS)	POS (LBS)	NEG (LBS)	POS (g's)	NEG (g's)	POS (g's)
103	36	1	26836	13.07	177	206	62	111	0	812	202
104	37	1	30475	13.88	186	93	136	235	0	670	241
105	38	1	32463	14.03	109	133	200	200	0	514	145
106	39	1	32483	11.78	190	73	142	192	0	462	196
107	40	1	27163	13.04	136	149	142	99	0	644	105
									93	124	155
									229	229	489
									124	124	262
									164	164	275

Table 14. Semiautomatic 155-mm artillery loader/assist device results, M549/0 mils/SAL 1

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
TEST DATA			TEST EQUIPMENT			TEST RESULTS					
DATE:	JAN 7, 1991	VEHICLE TYPE:	M109A3	TUBE TYPE:	M284	PROJ MODEL:	M549	LOADER TYPE: SAL 1			
SHEET #:	14	VEH SER#:	1813	TUBE SER#:	782	RAM QE: 0 mils		LOADER SER#: UNKNOWN			
SEATING ACCELERATION											
EXTRA	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.
SAMP	PROJ	RAM FORCE	VELOCITY	POS NEG	POS	NEG	POS	NEG	POS	NEG	POS
#	#	#	(LBS)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
108	41	1	33125	13.34	97	61	194	182	0	483	254
109	42	1	31138	14.32	116	73	124	254	0	483	220
110	43	1	29150	13.25	118	173	165	165	0	561	173
111	44	1	34450	13.85	163	163	150	50	0	364	242
112	45	1	29813	13.64	166	89	229	309	0	474	144

AFTER SEATING ACCELERATION											
EXTRA	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.
SAMP	PROJ	RAM FORCE	VELOCITY	POS NEG	POS	NEG	POS	NEG	POS	NEG	POS
#	#	#	(LBS)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
108	41	1	33125	13.34	97	61	194	182	0	483	254
109	42	1	31138	14.32	116	73	124	254	0	483	220
110	43	1	29150	13.25	118	173	165	165	0	561	173
111	44	1	34450	13.85	163	163	150	50	0	364	242
112	45	1	29813	13.64	166	89	229	309	0	474	144

Table 15. Semiautomatic 155-mm artillery loader/assist device results, M483/264 mils/SAL 1

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
DATE: JAN 7, 1991			VEHICLE TYPE: M109A3			TUBE TYPE: M264			PROJ MODEL: M483		
SHEET #: 16			VEH SER#: 1813			TUBE SER#: 782			RAM QE: 264 mils		
SEATING ACCELERATION											
SAMP	PROJ	RAM	FORCE	VELOCITY	EXTRA SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE
#	(LBS)	(FT/SEC)	(g's)	(g's)	POS	NEG	POS	NEG	POS	NEG	POS
113	21	1	33125	17.71	353	238	198	210	0	926	462
114	22	1	34450	19.80	242	176	113	138	0	1065	127
115	23	1	35113	17.16	229	165	142	93	0	919	477
116	24	1	31800	15.68	37	99	272	285	0	926	223
117	25	1	34450	19.83	339	176	213	75	0	893	127
118	26	1	32463	15.16	246	184	179	192	0	874	220
119	27	1	36113	18.87	118	149	254	192	0	972	279
120	28	1	34450	19.87	145	151	125	119	0	1114	188
121	29	1	34450	18.33	171	104	210	254	0	885	171
122	30	1	31138	16.60	81	229	229	272	0	937	415

AFTER SEATING ACCELERATION											
SAMP	PROJ	RAM	FORCE	VELOCITY	EXTRA SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE
#	(LBS)	(FT/SEC)	(g's)	(g's)	POS	NEG	POS	NEG	POS	NEG	POS
113	21	1	33125	17.71	353	238	198	210	0	926	462
114	22	1	34450	19.80	242	176	113	138	0	1065	127
115	23	1	35113	17.16	229	165	142	93	0	919	477
116	24	1	31800	15.68	37	99	272	285	0	926	223
117	25	1	34450	19.83	339	176	213	75	0	893	127
118	26	1	32463	15.16	246	184	179	192	0	874	220
119	27	1	36113	18.87	118	149	254	192	0	972	279
120	28	1	34450	19.87	145	151	125	119	0	1114	188
121	29	1	34450	18.33	171	104	210	254	0	885	171
122	30	1	31138	16.60	81	229	229	272	0	937	415

Table 16. Semiautomatic 155-mm artillery loader/assist device results, M483/0 mils/SAL 1

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
DATE: JAN 7, 1991			VEHICLE TYPE: M109A3			TUBE TYPE: M284			PROJ MODEL: M483		
SHEET #: 16			VEH SER#: 1813			TUBE SER#: 182			RAM QE: 0 mils		
SEATING ACCELERATION											
SAMP	PROJ	RAM	FORCE	VELOCITY	EXTRA	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL
#	#	#	(LBS)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
123	31	1	32463	14.80	327	315	250	200	0	820	169
124	32	1	35113	17.54	98	80	235	359	0	726	159
125	33	1	35113	19.03	161	286	130	155	0	1089	588
126	34	1	35775	17.37	145	103	200	250	0	942	309
127	35	1	35113	19.06	269	141	223	372	0	874	263
AFTER SEATING ACCELERATION											
SAMP	PROJ	RAM	FORCE	VELOCITY	EXTRA	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL
#	#	#	(LBS)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
123	31	1	32463	14.80	327	315	250	200	0	127	200
124	32	1	35113	17.54	98	80	235	359	0	118	130
125	33	1	35113	19.03	161	286	130	155	0	408	266
126	34	1	35775	17.37	145	103	200	250	0	390	309
127	35	1	35113	19.06	269	141	223	372	0	208	182

Table 17. Semiautomatic 155-mm artillery loader/assist device results, M483/600 mils/SAL 1

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET												
DATE: JAN 7, 1991			VEHICLE TYPE: M109A3			TUBE TYPE: M284			PROJ MODEL: M483			
SHEET #: 17			VEH SER#: 1813			TUBE SER#: 782			PAM QE: 600 mils			
AFTER SEATING ACCELERATION												
EXTRA	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	
SAMP	PROJ	RAIM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS	NEG
#	#	#	#	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
128	36	1	32463	19.58	99	217	168	93	0	349	408	205
129	37	1	35775	20.68	290	139	260	100	0	942	224	157
130	38	1	34450	16.58	110	104	124	118	0	873	163	122
131	39	1	36438	19.12	106	198	303	421	0	902	458	309
132	40	1	33126	18.56	200	121	125	180	0	673	133	67

Table 18. Semiautomatic 155-mm artillery loader/assist device results, M483/900 mils/SAL 1

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
DATE: JAN 7, 1951			VEHICLE TYPE: M109A3			TUBE TYPE: M284			PROJ MODEL: M483		
SHEET #: 18			VEH SER#: 1813			TUBE SER#: 782			RAM QE: 900 mils		
SEATING ACCELERATION											
EXTRA SEATING			TRANSV.			VERTICAL			LONGITUDE		
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS
#	#	#	(LBS)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
133	41	1	31800	15.30	165	159	149	260	0	488	177
134	42	1	33788	15.50	111	99	229	198	0	614	204
135	43	1	32463	18.09	109	79	100	138	0	942	139
136	44	1	32463	19.06	282	116	74	80	0	919	306
137	45	1	34450	18.96	254	186	155	105	0	925	173
AFTER SEATING ACCELERATION											

Table 19. Semiautomatic 155-mm artillery loader/assist device results, M107/264 mils/SAL 2

FOREIGN COMPARATIVE TESTING SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICE RESULT (WHEEL)																					
DATE: JUN 24, 1981		VEHICLE TYPE: M108A3		TUBE TYPE: M284		TUBE SER# 782		PROJ MODEL: M107		PROJ OE: 264 mils											
SHEET # 10		LOADER SER#: UNKNOWN																			
BEFORE SEATING ACCELERATION																					
SEATING ACCELERATION																					
EXTRA WEIGHT		TRANSM.		VERTICAL		TRANSM.		VERTICAL		TRANSM.											
PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS	NEG										
(LB)	(LBS)	(FT/SEC)	(IN/SEC)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)										
138	40	1	41738	27.04	811	811	842	802	264	171	668										
139	47	1	42480	22.89	805	801	841	787	439	307	665										
140	49	1	47039	26.29	804	804	844	470	261	306	666										
141	49	1	48712	30.12	1362	1036	1127	801	392	343	472										
142	50	1	42400	17.98	700	879	1328	920	219	179	466										
143	51	1	42400	29.88	809	1239	1220	1120	211	224	643										
144	52	1	42400	24.76	800	714	870	820	122	147	869										
145	52	1	48713	19.97	1020	1232	1238	1300	307	374	814										
146	54	1	47700	27.88	817	801	804	879	141	117	421										
147	55	1	46000	20.08	787	672	667	1162	100	171	1006										

BEFORE SEATING ACCELERATION											
AFTER SEATING ACCELERATION											
EXTRA WEIGHT		TRANSM.		LONGITUDE		TRANSM.		LONGITUDE		TRANSM.	
PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS	NEG
(LB)	(LBS)	(FT/SEC)	(IN/SEC)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)
138	40	1	41738	27.04	811	811	842	801	264	171	668
139	47	1	42480	22.89	805	801	841	787	439	307	665
140	49	1	47039	26.29	804	804	844	470	261	306	666
141	49	1	48712	30.12	1362	1036	1127	801	392	343	472
142	50	1	42400	17.98	700	879	1328	920	219	179	466
143	51	1	42400	29.88	809	1239	1220	1120	211	224	643
144	52	1	42400	24.76	800	714	870	820	122	147	869
145	52	1	48713	19.97	1020	1232	1238	1300	307	374	814
146	54	1	47700	27.88	817	801	804	879	141	117	421
147	55	1	46000	20.08	787	672	667	1162	100	171	1006

BEFORE SEATING ACCELERATION											
AFTER SEATING ACCELERATION											
EXTRA WEIGHT		TRANSM.		LONGITUDE		TRANSM.		LONGITUDE		TRANSM.	
PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS	NEG
(LB)	(LBS)	(FT/SEC)	(IN/SEC)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)
138	40	1	41738	27.04	811	811	842	801	264	171	668
139	47	1	42480	22.89	805	801	841	787	439	307	665
140	49	1	47039	26.29	804	804	844	470	261	306	666
141	49	1	48712	30.12	1362	1036	1127	801	392	343	472
142	50	1	42400	17.98	700	879	1328	920	219	179	466
143	51	1	42400	29.88	809	1239	1220	1120	211	224	643
144	52	1	42400	24.76	800	714	870	820	122	147	869
145	52	1	48713	19.97	1020	1232	1238	1300	307	374	814
146	54	1	47700	27.88	817	801	804	879	141	117	421
147	55	1	46000	20.08	787	672	667	1162	100	171	1006

Table 20. Semiautomatic 155-mm artillery loader/assault device results, M107/0 mils/SAL 2

TAPE RECORDER WAS NOT RUNNING, THEREFORE NO DATA WAS OBTAINED

Table 21. Semiautomatic 155-mm artillery loader/assist device results, M107/600 mils/SAL 2

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155-mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
TEST DATA			TEST EQUIPMENT			TEST CONDITIONS			TEST RESULTS		
DATE: JUN 24, 1961	VEHICLE TYPE: M109A3	TUBE TYPE: M284	PROJ MODEL: M107	LOADER TYPE: SAL 2	RAM OF: 600 mils	LOADER SERV: UNKNOWN	RAM OF: 600 mils	LOADER SERV: UNKNOWN	RAM OF: 600 mils	LOADER SERV: UNKNOWN	RAM OF: 600 mils
SHEET #: 21	VEH SER#: 1013	TUBE SER#: 782	PROJ SER#: 1013	LOADER SERV: UNKNOWN	RAM OF: 600 mils	LOADER SERV: UNKNOWN	RAM OF: 600 mils	LOADER SERV: UNKNOWN	RAM OF: 600 mils	LOADER SERV: UNKNOWN	RAM OF: 600 mils
BEFORE SEATING ACCELERATION											
EXTRA	SEATING	VERTICAL	TRANSM.	VERTICAL	TRANSM.	VERTICAL	TRANSM.	VERTICAL	TRANSM.	VERTICAL	TRANSM.
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS
#	#	#	#	(LB)	(ft/sec)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
163	61	26.61	46000	775	927	576	282	330	508	426	300
165	62	2	30000	20.17	1004	842	644	204	238	269	318
166	63	1	30025	22.10	684	322	405	371	141	107	801
167	64	1	10075	9.80	412	557	428	376	122	147	893
168	65	1	47038	23.13	881	563	1411	400	638	564	470
AFTER SEATING ACCELERATION											
EXTRA	SEATING	VERTICAL	TRANSM.	VERTICAL	TRANSM.	VERTICAL	TRANSM.	VERTICAL	TRANSM.	VERTICAL	TRANSM.
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS
#	#	#	#	(LB)	(ft/sec)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
163	61	1	46000	775	927	576	282	330	508	426	300
165	62	2	30000	20.17	1004	842	644	204	238	269	318
166	63	1	30025	22.10	684	322	405	371	141	107	801
167	64	1	10075	9.80	412	557	428	376	122	147	893
168	65	1	47038	23.13	881	563	1411	400	638	564	470

Table 22. Semiautomatic 155-mm artillery loader/assist device results, M107/1000 mils/SAL 2

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET														
DATE: JUN 24, 1981			VEHICLE TYPE: M100A3			TUBE TYPE: M284			PROJ MODEL: M107			LOADER TYPE: SAL 2		
SHEET # : 22			VEH SER# : 1813			TUBE SER# : 782			RAM QE: 1000 mils			LOADER SER# : UNKNOWN		
BEFORE SEATING ACCELERATION														
EXTRA	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG
#	#	#	#	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
159	66	1	39750	20.91	321	371	346	669	94	70	792	445	371	644
160	67	1	41758	18.99	508	387	451	560	86	110	363	290	601	0
161	68	1	26970	11.28	459	218	476	200	122	146	532	557	529	601
162	69	1	39750	19.69	433	458	347	594	141	117	433	582	594	0
163	70	1	33126	20.40	267	633	313	513	330	232	412	1259	669	614

Table 23. Semiautomatic 155-mm artillery loader/assist device results, M483/264 mils/SAL 2

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICE RESULT SHEET													
DATE: JUN 24, 1961			TUBE TYPE: M284			PROJ MODEL: M483			LOADER TYPE: SAL 2				
VEHICLE TYPE: M106A1			TUBE SER#: 782			RAM OE: 204 mils			LOADER SER#: UNKNOWN				
SHEET #: 23													
BEFORE SEATING ACCELERATION					AFTER SEATING ACCELERATION								
EXTRA FORCE		SEATING VELOCITY		VERTICAL		TRANSV.		VERTICAL		TRANSV.		LONGITUDE	
SAMP	PROJ	RAM	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG
#	#	(LBS)	(FT/SEC)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)
164	46	1	67638	31.60	416	601	470	545	260	188	204	223	223
165	47	1	67638	32.10	1077	469	520	371	340	236	205	810	440
166	49	1	65080	30.08	808	1270	701	827	832	264	303	601	520
167	49	1	68976	28.79	404	376	565	446	227	204	267	420	421
168	50	1	61613	32.07	1040	620	470	688	446	445	173	272	223
169	61	1	58983	31.00	567	436	590	761	367	302	169	145	576
170	62	1	68250	31.45	307	343	820	804	409	489	122	122	458
171	63	1	58860	28.74	386	421	684	371	234	361	297	844	124
172	64	1	68913	26.73	254	302	276	245	186	327	302	420	376
173	65	1	68860	23.68	367	284	349	223	182	135	220	284	223

* Output Clipped (maximum output of Accelerometer obtained)
 Projectiles #46-53 have thick bases
 Projectiles #54-55 have normal bases

Table 24. Semiautomatic 155-mm artillery loader/assist device results, M483/0 mils/SAL 2

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
DATE: JUN 24, 1991			VEHICLE TYPE: M109A3			PROJ MODEL: M483			LOADER TYPE: SAL 2		
SHEET #: 24			VEH SER#: 1813			TUBE SER#: 762			RAM QE: 0 mils		
BEFORE SEATING ACCELERATION											
SAMP	PROJ	RAM	FORCE	VELOCITY	EXTRA TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.
#	#	#	#	(FT/SEC)	POS	NEG	POS	NEG	POS	NEG	POS
				(LBS)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
174	56	1	02276	44.17	347	322	421	390	117	141	782
175	67	1	03600	35.35	412	436	604	413	164	206	242
176	68	1	31.04	489	367	347	421	363	318	499	318
177	69	1	05589	21.25	868	409	607	334	480	280	664
178	60	1	63600	32.80	242	194	639	483	159	282	194

AFTER SEATING ACCELERATION											
SAMP	PROJ	RAM	FORCE	VELOCITY	EXTRA TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE	TRANSV.
#	#	#	#	(FT/SEC)	POS	NEG	POS	NEG	POS	NEG	POS
				(LBS)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
174	56	1	02276	44.17	347	322	421	390	117	141	782
175	67	1	03600	35.35	412	436	604	413	164	206	242
176	68	1	31.04	489	367	347	421	363	318	499	318
177	69	1	05589	21.25	868	409	607	334	480	280	664
178	60	1	63600	32.80	242	194	639	483	159	282	194

* Output Clipped (maximum output of Accelerometer obtained)
Projectiles #56-58 have thick bases
Projectiles #59-60 have normal bases

Table 25. Semiautomatic 155-mm artillery loader/assist device results, M483/600 mils/SAL 2

POSSUM COMPARATIVE TESTING: SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICE RESULT SHEET																						
DATE: JUN 24, 1961		TUBE TYPE: M284		PROJ MODEL: M483		LOADER TYPE: SAL 2		RAM OF: 600 mils		LOADER SERV. UNKNOWN		RAM OF: 600 mils		LOADER SERV. UNKNOWN								
VEHICLE TYPE: M108A3		VEH SERV: 1813		VEH SERV: 782		VEH SERV: 782		VEH SERV: 782		VEH SERV: 782		VEH SERV: 782		VEH SERV: 782								
SHEET # : 26																						
EXTRA SEATING		SEATING		TRANSV.		VERTICAL		TRANSV.		VERTICAL		TRANSV.		VERTICAL								
SEAT	RAM	VELOCITY	FORCE	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG							
SAMP	PROJ	(ft/sec)	(lb/s)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)							
170	61	1	56360	26.34	416	283	384	256	227	159	220	288	632	453	0	1678	318	343	260	358	2805	2859
180	62	1	57638	29.53	582	384	607	557	223	249	324	384	309	0	1658	334	369	331	409	2778	2846	
181	63	1	58078	31.08	208	133	851	826	267	278	278	76	0	1677	361	309	200	200	3121	1369		
182	64	1	42400	26.00	607	433	520	782	361	492	384	681	617	782	0	1078	285	235	124	98	879	678
183	65	1	47700	21.88	308	845	421	421	277	182	365	502	180	380	0	882	134	267	180	223	1203	1180

Table 26. Semiautomatic 155-mm artillery loader/assist device results, M483/1000 mile/SAL 2

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 105 mm ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
DATE: JUN 24, 1981		VEHICLE TYPE: M109A2		TIME TYPE: M284		PROJ. MODEL: M483		LOADER TYPE: SAL 2			
SHEET # : 29		VBI SER# : 1613		TIME SER# : 702		RAM DE: 1000 mile		LOADER SER# UNKNOWN			
BEFORE SEATING ACCELERATION											
EXTRA	SEATING	TRANSY.	VERTICAL	LONGITUDE	TRAVEL.	VERTICAL	LONGITUDE	TRANSY.	VERTICAL	TRANSY.	LONGITUDE
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS
#	#	#	(LB)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
184	66	1	41078	22.48	363	315	870	374	208	232	121
185	67	1	48050	22.65	514	220	322	272	227	343	172
186	68	1	44399	26.70	364	265	198	272	209	170	161
187	69	1	36775	20.53	208	89	127	100	171	122	102
188	70	1	31900	16.78	61	37	75	25	68	91	232

AFTER SEATING ACCELERATION											
EXTRA	SEATING	TRANSY.	VERTICAL	LONGITUDE	TRAVEL.	VERTICAL	LONGITUDE	TRANSY.	VERTICAL	TRANSY.	LONGITUDE
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS
#	#	#	(LB)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
184	66	1	41078	22.48	363	315	870	374	208	232	121
185	67	1	48050	22.65	514	220	322	272	227	343	172
186	68	1	44399	26.70	364	265	198	272	209	170	161
187	69	1	36775	20.53	208	89	127	100	171	122	102
188	70	1	31900	16.78	61	37	75	25	68	91	232

* Output Clipped (maximum output of Accelerometer obtained)

Projectiles #66-68 have thick bases
Projectiles #69-70 have normal bases

Table 27. Semiautomatic 155-mm artillery loader/assist device results. M549/264 mits/SAL 2

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 165 MM ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET

DATE: JUN 24, 1961

VEHICULAR: M108A3

TUNE TYPE: M284

LOADER TYPE: SAL 2

PROJ MODEL: M648

SHEET # 27

RAM QD: 264 MM

TUNE QD: 762

LOADER SERV: UNKNOWN

SAMPLE: 1001

PROJECTILE: M648

TRANSMISSION: 762

VEHICLE: M108A3

VEHICULAR: M284

LOADER TYPE: SAL 2

PROJ MODEL: M648

BEFORE SEATING ACCELERATION

EXTRA
SEATING

TRANSM.

VEHICULAR

VERTICAL

LONGITUDE

TRANSM.

TRANSV.

VERTICAL

TRANSM.

TRANSV.

LONGITUDE</div

Table 28. Semiautomatic 155-mm artillery loader/assist device results, M549/0 mils/SAL 2

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICES RESULT SHEET											
DATE: JUN 24, 1991			VEHICLE TYPE: M108A3			TUBE TYPE: M284			PROJ MODEL: M649		
SHEET #: 28			VEH SER#: 1613			TUBE SER#: 782			RAM QE: 0 mils		
BEFORE SEATING ACCELERATION											
EXTRA SEATING	TRANSV.	VERTICAL.	TRANSV.	VERTICAL.	LONGITUDE	TRANSV.	VERTICAL.	TRANSV.	LONGITUDE	TRANSV.	VERTICAL.
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS
#	#	#	(LBS)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
199	56	1	45050	26.03	.001	.400	.338	.000	.204	.343	.392
200	57	1	41076	21.29	.269	.245	.458	.235	.318	.212	.246
201	58	1	39750	24.22	.817	.346	.433	.878	.187	.281	.545
202	59	1	36776	16.98	.763	.908	.914	.714	.220	.367	.109
203	60	1	25338	12.86	.861	.416	.669	.900	.227	.204	.147

AFTER SEATING ACCELERATION											
EXTRA SEATING	TRANSV.	VERTICAL.	TRANSV.	VERTICAL.	LONGITUDE	TRANSV.	VERTICAL.	TRANSV.	LONGITUDE	TRANSV.	VERTICAL.
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS
#	#	#	(LBS)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
199	56	1	45050	26.03	.001	.400	.338	.000	.204	.343	.392
200	57	1	41076	21.29	.269	.245	.458	.235	.318	.212	.246
201	58	1	39750	24.22	.817	.346	.433	.878	.187	.281	.545
202	59	1	36776	16.98	.763	.908	.914	.714	.220	.367	.109
203	60	1	25338	12.86	.861	.416	.669	.900	.227	.204	.147

Table 29. Semiautomatic 155-mm artillery loader/assist device results, M549/600 mils/SAL 2

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICE RESULT SHEET												
DATE: JUN 24, 1981		VEHICLE TYPE: M108A3		TUBE TYPE: M204		PROJ MODEL: M549		LOADER TYPE: SAL 2		LOADER SER#: UNKNOWN		
SHEET #: 29		VEH SER#: 1813		TUBE SER#: 782		RAM OF: 600 mils						
BEFORE SEATING ACCELERATION												
EXTRA SAMPLE	SEATING PROJ	TRANSV. RAM	VERTICAL FORCE	VELOCITY	LONGITUDE POS	LONGITUDE NEG	TRANSV. POS	TRANSV. NEG	VERTICAL POS	VERTICAL NEG	LONGITUDE POS	LONGITUDE NEG
SAMP	PROJ	RAM	FORCE	VELOCITY	(ft/sec)	(ft/sec)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
#, #	(LBS)	(LBS)	(LBS)	(LBS)	(ft/sec)	(ft/sec)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)
204	61	1	410/8	23.48	743	664	1102	1473	320	305	371	767
206	62	1	38775	18.39	551	605	688	760	204	343	430	216
208	63	1	40413	18.40	387	269	280	631	159	182	367	269
207	64	1	21200	11.18	2080	3144	1708	3144	687	2840	223	198
209	65	1	38775	18.31	438	363	338	208	309	208	466	218

* Output Clipped (maximum output of Accelerometer obtained)

Table 30. Semiautomatic 155-mm artillery loader/assist device results, M549/1000 mils/SAL 2

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICE RESULTS SHEET																					
DATE: JUN 24, 1981		TUBE TYPE: M1284		PROJ MODEL: M549		LOADER TYPE: SAL 2															
SHEET #: 30		VEHICLE TYPE: M109A3		TUBE SER#: 1813		RAM DE: 1000 mils		LOADER SER#: UNKNOWN													
BEATING ACCELERATION																					
EXTRA BEATING		TRANSM.		VERTICAL		LONGITUDE		TRANSM.		VERTICAL											
CLAMP PROJ. RAM FORCE		POS NEG		POS NEG		POS NEG		POS NEG		POS NEG											
# # #		(ft/sec)		(g's)		(g's)		(g's)		(g's)											
208 66		1 281.75		13.75		342 465		205 667		183 126											
210 67		1 304.75		15.38		471 603		708 334		184 117											
211 68		1 371.00		21.73		303 376		614 438		308 428											
212 69		1 630.0		6.14		343 603		440 747		147 170											
213 70		1 21200		12.92		845 248		285 369		187 211											
AFTER BEATING ACCELERATION																					
EXTRA BEATING		TRANSM.		VERTICAL		LONGITUDE		TRANSM.		VERTICAL											
CLAMP PROJ. RAM FORCE		POS NEG		POS NEG		POS NEG		POS NEG		POS NEG											
# # #		(ft/sec)		(g's)		(g's)		(g's)		(g's)											
210 67		1 304.75		15.38		471 603		184 117		347 311											
211 68		1 371.00		21.73		303 376		614 438		308 428											
212 69		1 630.0		6.14		343 603		440 747		147 170											
213 70		1 21200		12.92		845 248		285 369		187 211											
CLIPPING																					
EXTRA BEATING		TRANSM.		VERTICAL		LONGITUDE		TRANSM.		VERTICAL											
CLAMP PROJ. RAM FORCE		POS NEG		POS NEG		POS NEG		POS NEG		POS NEG											
# # #		(ft/sec)		(g's)		(g's)		(g's)		(g's)											
210 67		1 304.75		15.38		471 603		184 117		347 311											
211 68		1 371.00		21.73		303 376		614 438		308 428											
212 69		1 630.0		6.14		343 603		440 747		147 170											
213 70		1 21200		12.92		845 248		285 369		187 211											

* Output Clipped (maximum output of Accelerometer obtained)

Table 31. Semiautomatic 155-mm artillery loader/assist device results, M1C7/600 mils/SAL 3

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICE, RESULT SHEET																				
DATE: OCT 2, 1981			VEHICLE TYPE: M106A3			TUBE TYPE: M82A4			PROJ MODEL: M107											
SHEET # 31			VEH S/N: 1013			TUBE S/N: 782			RANGE OF: 600 mils											
BEATING ACCELERATION																				
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Table 32. Semiautomatic 155-mm artillery loader/assist device results, M107/264 mils/SAL 3

FORWARD COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICE RESULT SHEET																													
DATE: OCT 2, 1961		VEHICLE TYPE: M106A3		TUBE TYPE: M294		PROJ MODEL: M107		LOADER TYPE: SAL 3																					
SHEET #: 32		VEH SER#: 1813		TUBE SER#: 782		RAM OF: 264 mils		LOADER SER#: UNKNOWN																					
BEFORE SEATING ACCELERATION																													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16														
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG													
#	#	#	(LBS)	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)													
219	92	1	38426	24.53	379	1040	310	804	170	281	1040	845	681	804	0	1010	477	385	882	633	1306	806							
220	83	1	34460	22.87	483	886	1176	607	152	248	384	582	433	288	0	878	881	608	280	236	801	367							
221	84	1	28468	23.85	1210	798	878	1362	798	453	626	632	778	326	0	843	339	383	451	325	806	646							
222	85	1	38426	23.21	1444	832	1225	1497	374	374	612	580	309	453	0	905	490	382	483	483	879	236							
223	86	1	41078	23.86	284	361	1262	1603	416	391	361	641	328	429	0	1028	472	378	801	479	636	367							
224	87	1	36113	23.44	269	269	786	286	160	113	514	486	483	409	0	1060	441	318	507	829	1082	1336							
225	88	1	39790	24.82	668	891	470	421	178	189	173	420	449	0	1183	249	188	272	297	1745	832								
226	89	1	37763	22.70	1048	1283	1001	701	292	257	1098	484	280	781	0	807	145	490	881	225	1238	483							
227	90	1	41078	20.96	636	636	488	409	182	182	490	638	682	681	0	863	419	639	308	359	1204	860							
228	91	1	41078	24.18	484	605	420	461	233	209	186	186	526	476	0	1201	218	200	278	1878	1212								

Table 33. Semiautomatic 155-mm artillery loader/assist device results, M107/0 mils/SAL 3

Table 34. Semiautomatic 155-mm artillery loader/assist device results, M107/750 mils/SAL 3

PONERON COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSTNT DEVICES RESULT SHEET

TEST NUMBER	VEHICLE TYPE	TUBE TYPE	PROJ MODEL	SEATING ACCELERATION												AFTER SEATING ACCELERATION															
				BEFORE SEATING ACCELERATION				DURING SEATING				AFTER SEATING				BEFORE SEATING ACCELERATION				DURING SEATING				AFTER SEATING							
EXTRA	SEATING	TRANSV.	VERTICAL	LONGITUDE				TRANSM.				VERTICAL				LONGITUDE				TRANSM.				VERTICAL				LONGITUDE			
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	
#	#	#	#	(FT/SEC)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)		
234	107	1	29160	15.78	361	200	237	238	150	135	545	545	612	740	0	863	278	642	863	214	861	330									
235	108	1	36113	19.39	365	232	236	236	126	125	851	850	850	730	0	828	331	848	868	210	433	458	1008	210	810	103					
236	109	1	37763	22.78	650	650	433	878	128	182	408	408	582	210	0	948	380	210	433	458	1008	410									
237	110	1	36776	21.77	931	1128	964	914	267	267	447	820	398	262	0	1018	360	361	213	368	1212	851									
238	111	1	39788	18.18	483	501	658	364	171	147	800	863	532	708	0	861	502	623	384	236	606	498									

Table 35. Semiautomatic 155-mm artillery loader/assist device results, M483/0 mils/SAL 3

PROJECTILE COMPARATIVE TESTING: SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICE RESULT SHEET																				
DATE: OCT 2, 1961			VEHICLE TYPE: M108A2			TUBE TYPE: M48A4			PROJ. MODEL: M483											
GUNNERS: 6 : 36			VEH. SERV.: 1813			TUBE SERV.: 762			RAM DE: 0 mils											
LOADER TYPE: SAL 3			LOADER TYPE: UNKNOWN			LOADER TYPE: UNKNOWN			LOADER TYPE: UNKNOWN											
BEATING ACCELERATION																				
BEFORE BEATING ACCELERATION																				
EXTRA BEATING			VERTICAL			TRANSV.			VERTICAL											
SAMP. NO.			POS.			POS.			POS.											
PROJ. NO.			NEG.			NEG.			NEG.											
PROJ. NO.			POS.			POS.			POS.											
PROJ. NO.			NEG.			NEG.			NEG.											
PROJ. NO.			POS.			POS.			POS.											
PROJ. NO.			NEG.			NEG.			NEG.											
PROJ. NO.			POS.			POS.			POS.											
PROJ. NO.			NEG.			NEG.			NEG.											
PROJ. NO.			POS.			POS.			POS.											
PROJ. NO.			NEG.			NEG.			NEG.											
PROJ. NO.			POS.			POS.			POS.											
PROJ. NO.			NEG.			NEG.			NEG.											
PROJ. NO.			POS.			POS.			POS.											
PROJ. NO.			NEG.			NEG.			NEG.											
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PROJ. NO.			NEG.			NEG.			NEG.											
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PROJ. NO.			POS.			POS.			POS.											
PROJ. NO.			NEG.			NEG.			NEG.											
PROJ. NO.			POS.			POS.			POS.											
PROJ. NO.			NEG.			NEG.			NEG.											
PROJ. NO.			POS.			POS.			POS.											
PROJ. NO.			NEG.			NEG.			NEG.											
PROJ. NO.			POS.			POS.			POS.</td											

Table 36. Semiautomatic 155-mm artillery loader/assist device results, M483/264 mils/SAL 3

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICE RESULT SHEET																				
DATE: OCT 2, 1981			VEHICLE TYPE: M106A3			TUNE TYPE: M284			PROJ MODEL: M483											
SHEET # : 38			VEH SER#: 1813			TUNE SER#: 782			RAM CR: 264 mils											
LOADER TYPE: SAL 3																				
LOADER SER#: UNKNOWN																				
AFTER SEATING ACCELERATION																				
BEFORE SEATING ACCELERATION																				
EXTRA SEATING			TRANSP.			LONGITUDE			TRANSP.											
SAMP PROJ RAM FORCE			VERTICAL			TRANSP.			VERTICAL											
# (LBs)			POS NEG			POS NEG			POS NEG											
(FT/SEC)			(g's)			(g's)			(g's)											
244	76	1	51013	23.00	98	188	287	300	117	184	248									
245	77	1	48713	21.24	97	121	230	488	186	145	145									
246	78	1	63063	27.11	136	380	845	421	102	149	404									
247	78	1	50350	27.37	284	453	486	500	187	378	235									
248	80	1	44360	26.18	739	495	263	213	263	270	328									
249	81	1	47700	26.18	270	220	140	240	40	113	172									
250	82	1	46660	27.86	631	360	140	287	368	268	181									
251	9	2	53063	27.86	400	263	313	338	97	149	231									
252	10	2	46363	24.12	260	220	240	272	113	91	186									
253	11	2	81675	20.81	448	388	188	188	70	486	817									

* Output Clipped (maximum output of Accelerometer obtained)

Projectiles #76-77 have normal bases
Projectiles #78-82, 9-11 have thick bases

Table 37. Semiautomatic 155-mm artillery loader/assist device results, M483/600 mils/SAL 3

FORM 3A COMPARATIVE TESTING: SEMIAUTOMATIC 105 mm ARTILLERY LOAD/ARMAMENT DEVICE RESULT SHEET

DATE: OCT 2, 1961		VEHICLE TYPE: M106A3		TUBE TYPE: M284		PROJ MODEL: M463		LOADER TYPE: GAL 3														
SHEET # : 37		VHM SN#P: 1013		TUBE SN#P: 702		FAM CS: 800 min		LOADER SN#P: UNKNOWN														
BEFORE BEATING ACCELERATION																						
GAMP	PROJ	RPM	VELOCITY	VERTICAL	LONGITUDE	TRANSM.	VERTICAL	BEATING ACCELERATION														
								POW	NEQ	POB	NEQ	POB	NEQ	POB	NEQ	POB	NEQ					
(LB)	(FT/SEC)	(G)	(G)	(G)	(G)	(G)	(G)	(G)	(G)	(G)												
284	83	1	44300	20.80	278	361	73	86	230	264	250	260	0	801	167	182	180	260	1207	870		
284	84	1	42400	17.81	233	261	267	46	67	404	232	306	297	0	830	208	350	267	240	1222	1187	
284	85	1	43000	26.74	100	101	324	907	117	141	807	433	296	832	0	1540	285	308	607	463	2240	2014
287	12	2	46278	26.20	81	84	413	439	72	89	400	300	613	830	0	1643	303	313	330	2606	2426	2010
288	13	2	46021	23.10	233	308	274	294	137	140	164	180	239	808	0	1318	266	288	161	867	2030	1910

* Output Clipped (maximum output of Accelerometer obtained)

Projectiles #83-84, 86, 87 have normal bases

Projectiles #85, 88, 12-14, 16 have thick bases

Table 38. Semiautomatic 155-mm artillery loader/assist device results, M483/750 mils/SAL 3

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICE RESULT SHEET																										
DATE: OCT 2, 1981		VEHICLE TYPE: M109A3		TUBE TYPE: M294		PROJ MODEL: M483		LOADER TYPE: SAL 3		TUBE DE: 750 mils		RAN DE: 750 mils		LOADER SERV: UNKNOWN												
SHEET #: 30		VEH SERV: 1813		TUBE SERV: 702																						
BEATING ACCELERATION																										
BEFORE BEATING ACCELERATION																										
EXTRA		BEATING		TRANSV.		VERTICAL		LONGITUDE		TRANSV.		VERTICAL		LONGITUDE												
SAMP	PROJ	RAM	FORCE	VELOCITY	POB	NEO	POB	NEO	POB	NEO	POB	NEO	POB	NEO	POB	NEO										
#	#	#	(LBS)	(FT/SEC)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)	(G's)										
269	86	1	39088	17.61	453	188	307	237	117	94	188	260	283	237	0	773	181	260	184	330	837	500				
280	87	1	39425	18.71	134	157	463	639	232	209	231	496	183	113	0	1040	279	374	163	163	1872	2400				
281	88	1	40378	18.17	309	385	398	272	138	91	360	267	222	371	0	1180	351	239	248	180	2282	1887				
282	14	2	43725	23.04	173	249	173	198	47	47	198	347	371	149	0	1420	272	297	248	180	2300	2000				
283	15	2	41075	22.33	249	173	260	235	73	73	248	173	206	161	0	1161	223	124	210	186	2274	1400				

Table 39. Semiautomatic 155-mm artillery loader/assist device results, M549/264 mils/SAL 3

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICE RESULTS SHEET																													
DATE: OCT 2, 1961		VEHICLE TYPE: M100A3		TUBE TYPE: M284		PROJ MODE: M449		LOADER TYPE: SAL 3		TUBE MM: 762		RAM GE: 264 mils		LOADER MFG: UNKNOWN															
SHEET # : 38		VEH S/N: 1813																											
BEFORE BEATING ACCELERATION																													
AFTER BEATING ACCELERATION																													
EXTRA		BEATING		TRANSV.		VERTICAL		LONGITUDE		TRANSV.		VERTICAL		LONGITUDE															
GAMP	PROJ	RAM	FORCE	VELOCITY	POD	NED	POD	NED	POD	NED	POD	NED	POD	NED	POD	NED													
#	#	(LB)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)													
264	71	1	36778	18.00	331	482	470	360	102	154	160	232	223	124	0	824	160	159	207	420	566	351							
265	72	1	36778	23.84	364	468	360	409	80	166	236	463	453	186	0	908	260	482	186	334	874	641							
266	73	1	37100	22.92	362	278	212	268	87	123	207	277	356	183	0	736	279	180	237	286	960	417							
267	74	1	31138	17.80	331	427	469	601	171	239	160	232	235	209	0	801	234	232	161	186	469	163							
268	76	1	37100	23.10	805	807	236	101	308	376	236	236	260	210	0	867	200	334	308	198	736	618							
269	76	1	40413	21.72	254	361	430	630	166	233	279	361	356	263	0	786	231	870	463	463	736	316							
270	77	1	42400	20.00	503	427	309	219	80	106	331	305	260	206	0	788	231	870	463	463	736	316							
271	79	1	37763	20.01	801	978	468	239	306	422	186	364	236	186	0	726	210	186	236	236	837	462							
272	79	1	48713	24.86	170	217	195	180	46	74	170	166	263	282	0	868	281	183	206	282	860	780							
273	80	1	48680	19.80	503	624	334	369	137	189	827	320	433	161	0	748	478	266	433	266	704	521							

Table 40. Semiautomatic 155-mm artillery loader/assist device results, M549/600 mils/SAL 3

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICE RESULT SHEET																											
DATE: OCT 2, 1961		VEHICLE TYPE: M106A3		TUBE TYPE: M284		PROJ MODEL: M648		LOADER TYPE: SAL 3		LOADER SER#: UNKNOWN																	
SHEET # : 40		VEH SER#: 1013		TUBE SER#: 782		RAM CP: 600 mils																					
BEFORE SEATING ACCELERATION																											
AFTER SEATING ACCELERATION																											
SAMP	PROJ	RAM	FORCE	VELOCITY	EXTRA SEATING	SEATING	TRANV.	VERTICAL	TRANV.	VERTICAL	TRANV.	VERTICAL	TRANV.	VERTICAL	LONGITUDE												
							POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG											
							(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)	(ft/sec)											
274	81	1	41076	21.93	309	369	260	503	240	223	210	632	109	12	0	902	100	205	459	364	1263	1264					
275	82	1	43033	21.48	303	376	226	401	367	280	868	230	381	160	0	1028	100	162	225	275	801	800					
276	83	1	45263	20.89	199	269	453	285	68	91	270	284	285	534	0	784	307	307	280	384	839	1031					
277	84	1	42400	20.37	309	364	236	109	340	410	309	210	87	37	0	716	334	682	408	208	921	827					
278	85	1	42400	20.00	845	472	664	864	187	187	423	463	203	0	780	182	187	213	338	703	305						

Table 41. Semiautomatic 155-mm artillery loader/assist device results, M549/750 mils/SAL 3

PORTION COMPARATIVE TESTING: SEMIAUTOMATIC 155 mm ARTILLERY LOADER/ASSIST DEVICE RESULTS SHEET																						
DATE: OCT 2, 1981		VEHICLE TYPE: M109A3		TUBE TYPE: M284		PROJ MODEL: M840		LOADER TYPE: SAL 3		RAM DE: 750 mils		LOADER SER# UNKNOWN										
SHEET # : 41		VEH SER# : 1013		TUBE SER# : 702																		
BEFORE SEATING ACCELERATION																						
SAMPLE	PROJ	RAM	FORCE	VELOCITY	EXTRA	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	TRANSV.	LONGITUDE									
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEO	POS	NEO	POS	NEO	POS	NEO	POS									
			(LBS)	(FT/SEC)	(G)	(G)	(G)	(G)	(G)	(G)	(G)	(G)	(G)									
278	86	1	40000	10.62	221	200	350	300	351	300	37	500	632	0	737	122	104	400	439	924	374	
280	87	1	36776	10.10	532	562	364	503	53	117	211	180	208	130	0	878	384	324	300	130	666	326
281	88	1	43726	20.09	104	247	463	739	244	197	291	314	413	330	0	900	184	217	300	429	929	666
282	89	1	42400	10.48	100	183	210	200	114	80	106	363	210	200	0	728	282	320	230	200	666	400
283	90	1	38425	20.41	223	173	235	300	47	70	297	322	161	256	0	843	322	246	200	200	666	200

Table 42. Semiautomatic 155-mm artillery loader/assist device results, M549/0 mills/SAL 3

FIREARM COMPARATIVE TESTING: SEMIAUTOMATIC 155 MM ARTILLERY LOADER/ASSIST DEVICE RESULT SHEET																						
DATE: OCT 2, 1991		VEHICLE TYPE: M109A3		TUBE TYPE: M284		PROJ MODEL: M848		LOADER TYPE: SAL 3		RAM DE: 0 mils		LOADER GENP: UNKNOWN										
SHEET #: 42		VEH BREV: 1613		TUBE SERV: 762																		
BEFORE SEATING ACCELERATION																						
EXTRA	SEATING	TRANSV.	VERTICAL	LONGITUDE	TRANSP.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	TRANSV.	VERTICAL	LONGITUDE	TRANSV.	VERTICAL	LONGITUDE							
SAMP	PROJ	RAM	FORCE	VELOCITY	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG	POS	NEG						
#	#	#	#	(ft/sec)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)	(g's)						
284	91	1	30760	22.78	859	767	426	751	269	190	520	250	851	326	0	1176	208	303	125	176	608	769
285	92	1	40413	23.72	294	639	267	347	91	60	260	260	322	267	0	895	171	200	272	198	601	363
286	93	1	48713	26.84	173	207	371	620	120	106	322	371	347	421	0	948	421	300	363	446	925	651
287	94	1	48713	22.56	307	403	236	344	92	113	208	482	632	368	0	1021	420	403	384	356	1340	650
288	95	1	40000	26.00	235	309	190	100	50	100	334	408	248	223	0	901	408	298	223	347	730	551

APPENDIX A
HAND AND HYDRAULIC RAMS

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

LONGITUDINAL ACCELERATION

600.0 DATE - 9/17/90
SAMPLE# - 10
400.0 RAM QE - 264 mils
200.0

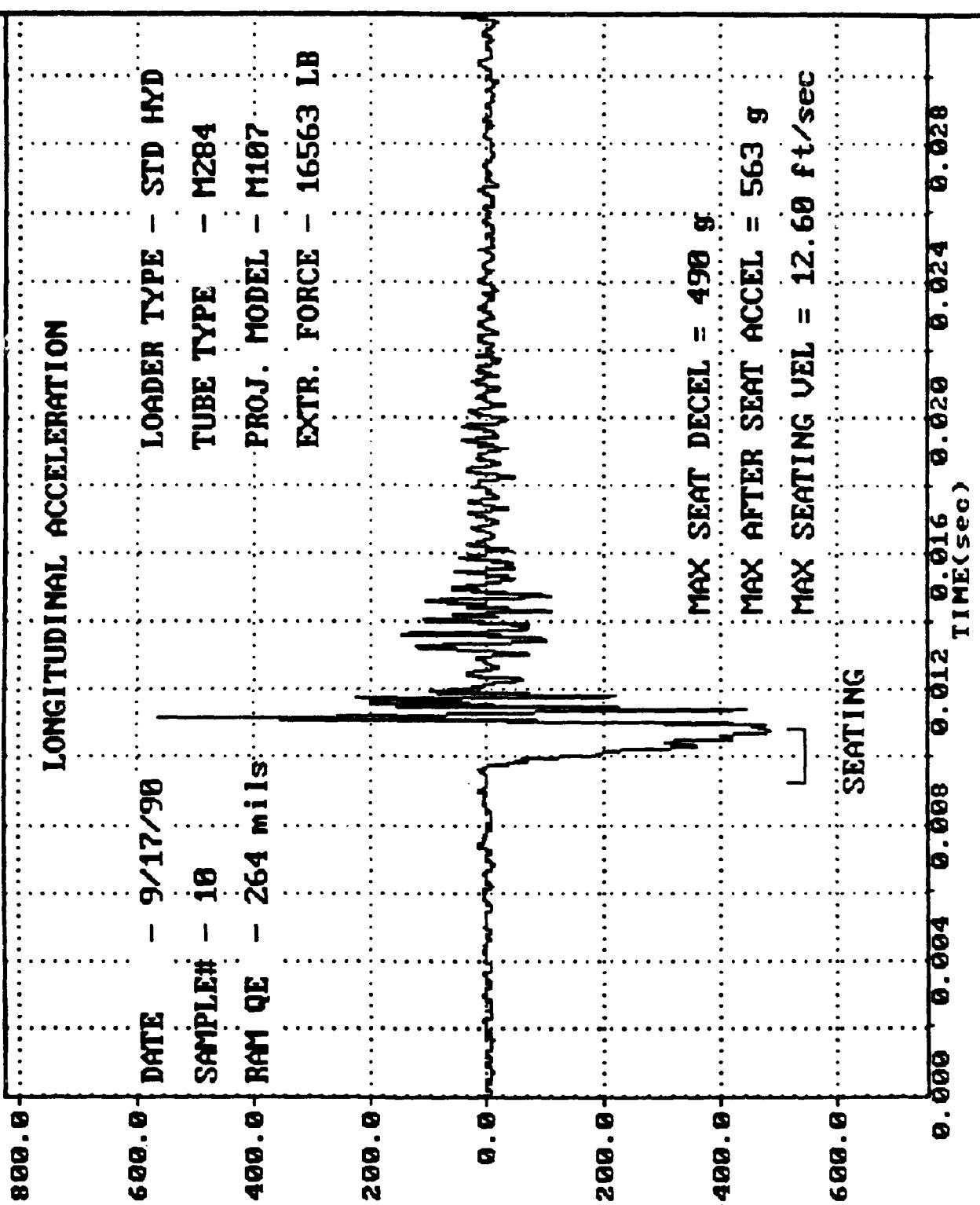
LOADER TYPE - STD HYD
TUBE TYPE - M284
PROJ. MODEL - M107
EXTR. FORCE - 16563 LB

ACCEL g

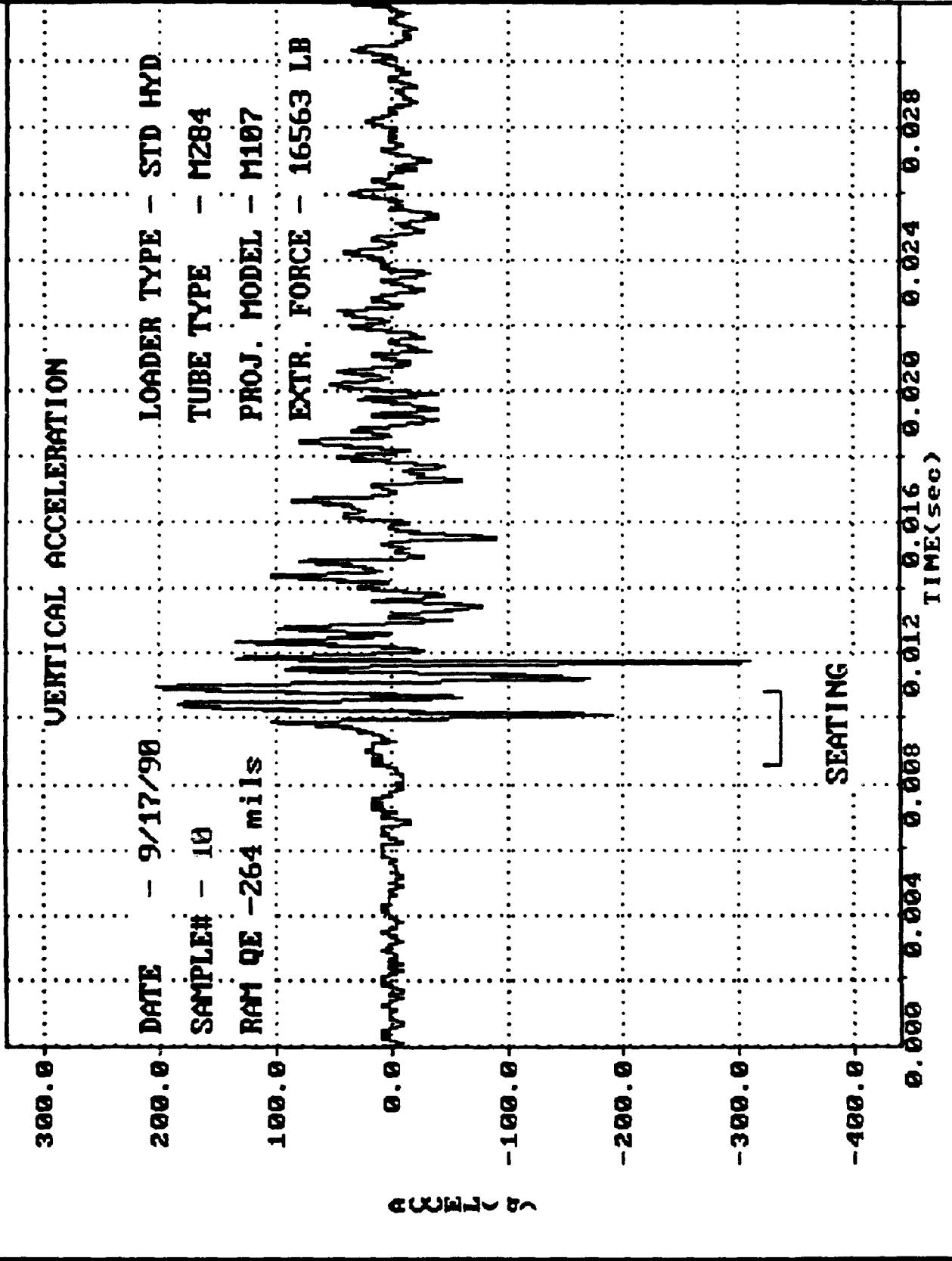
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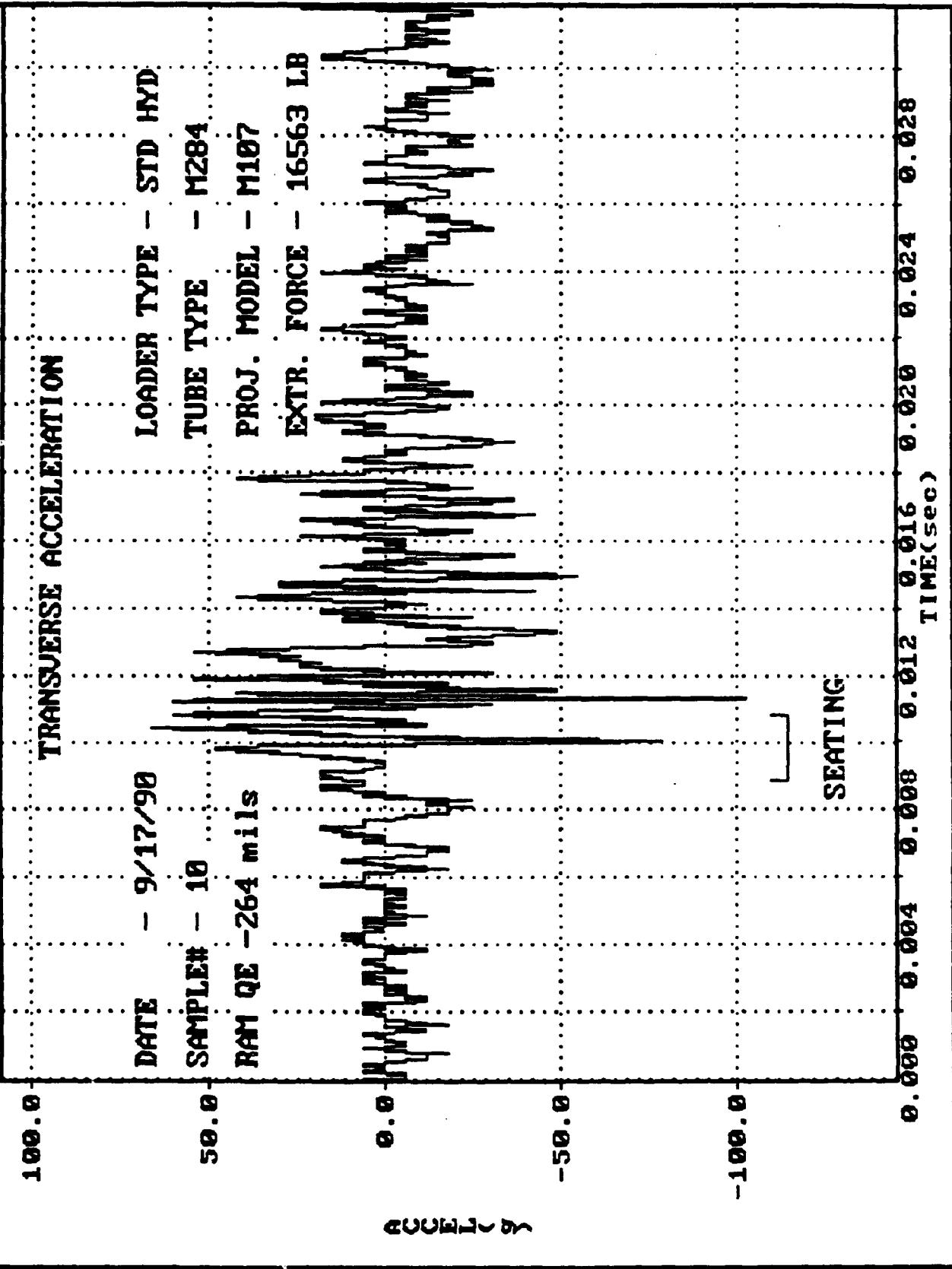
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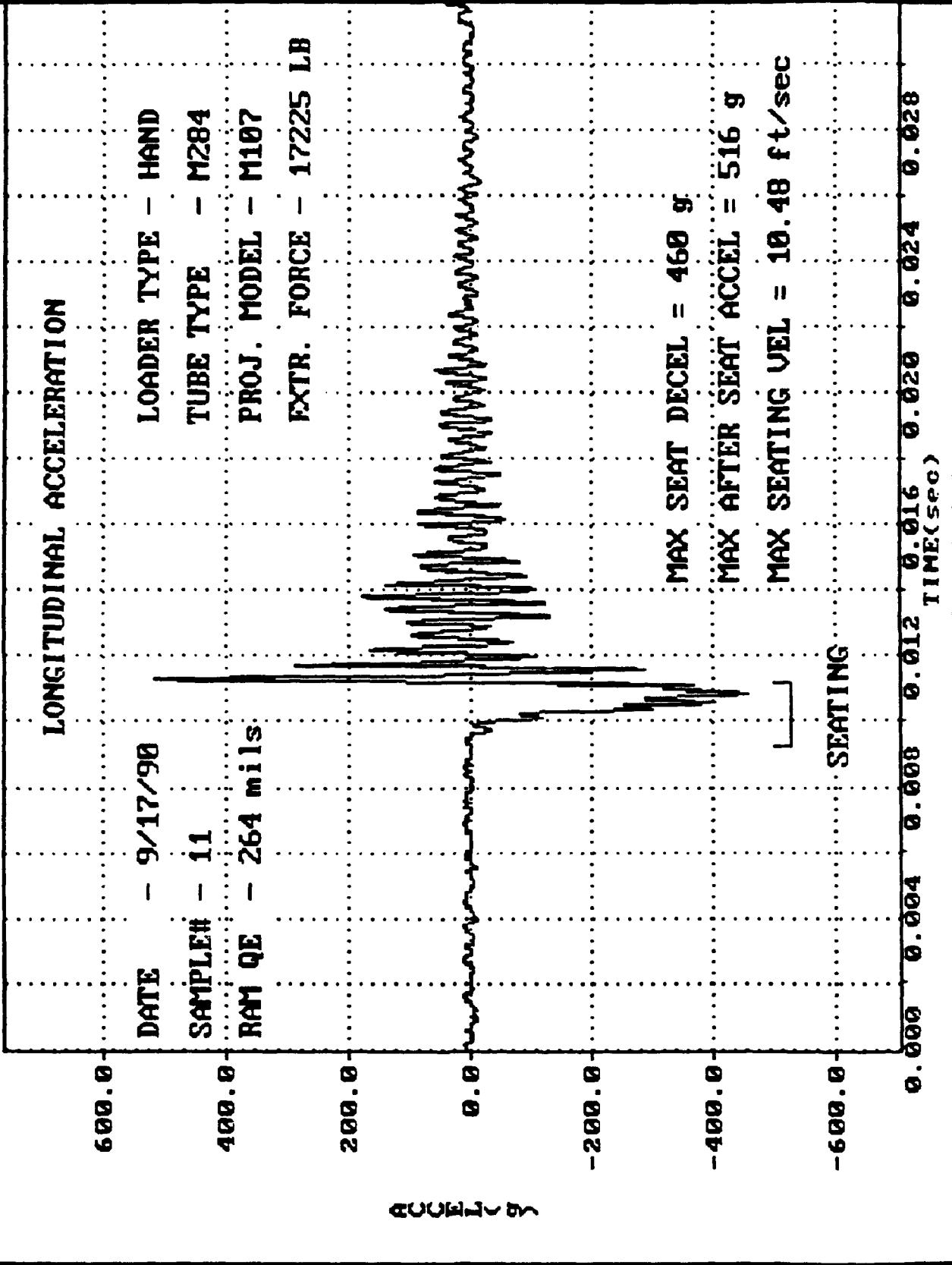
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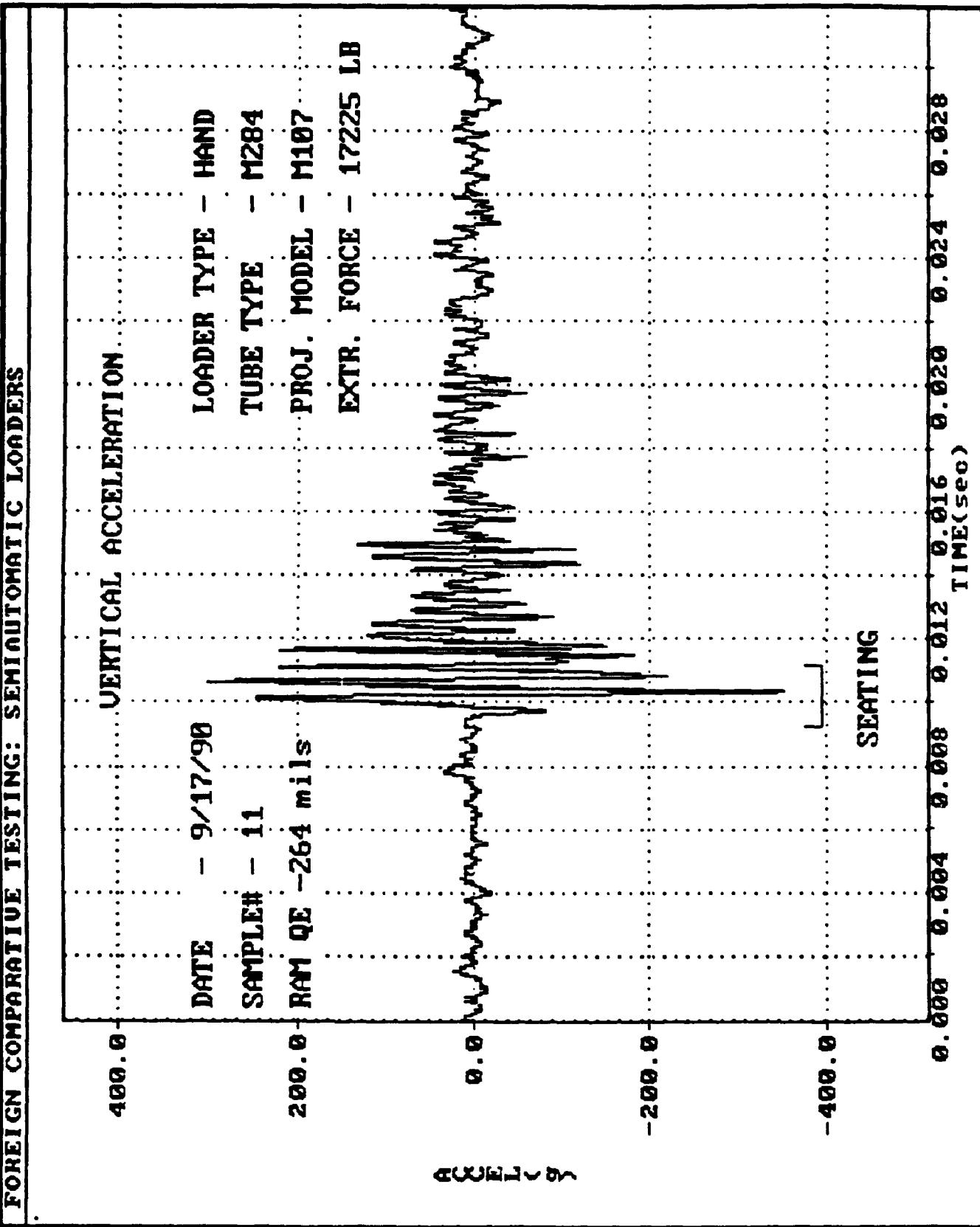
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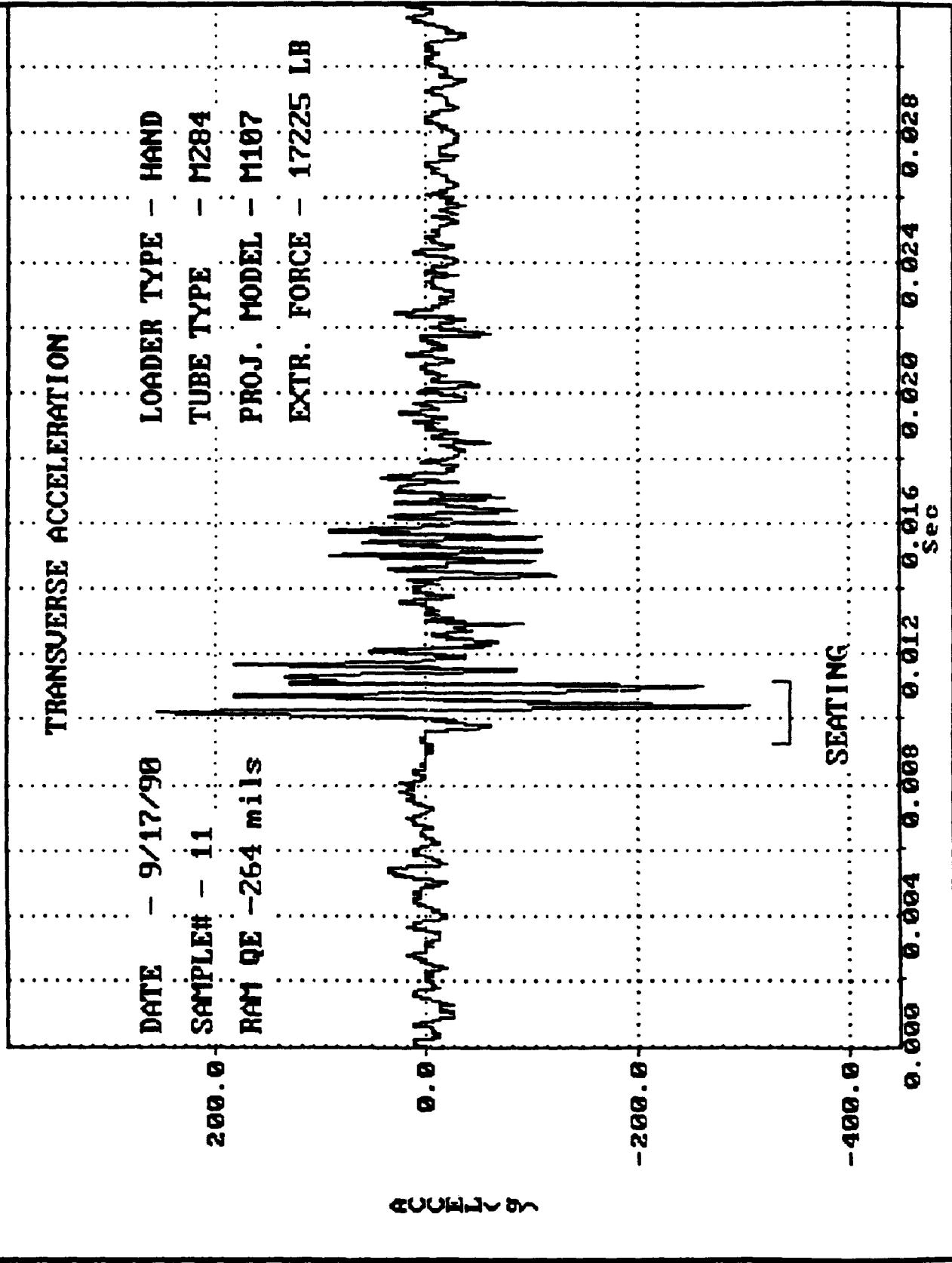
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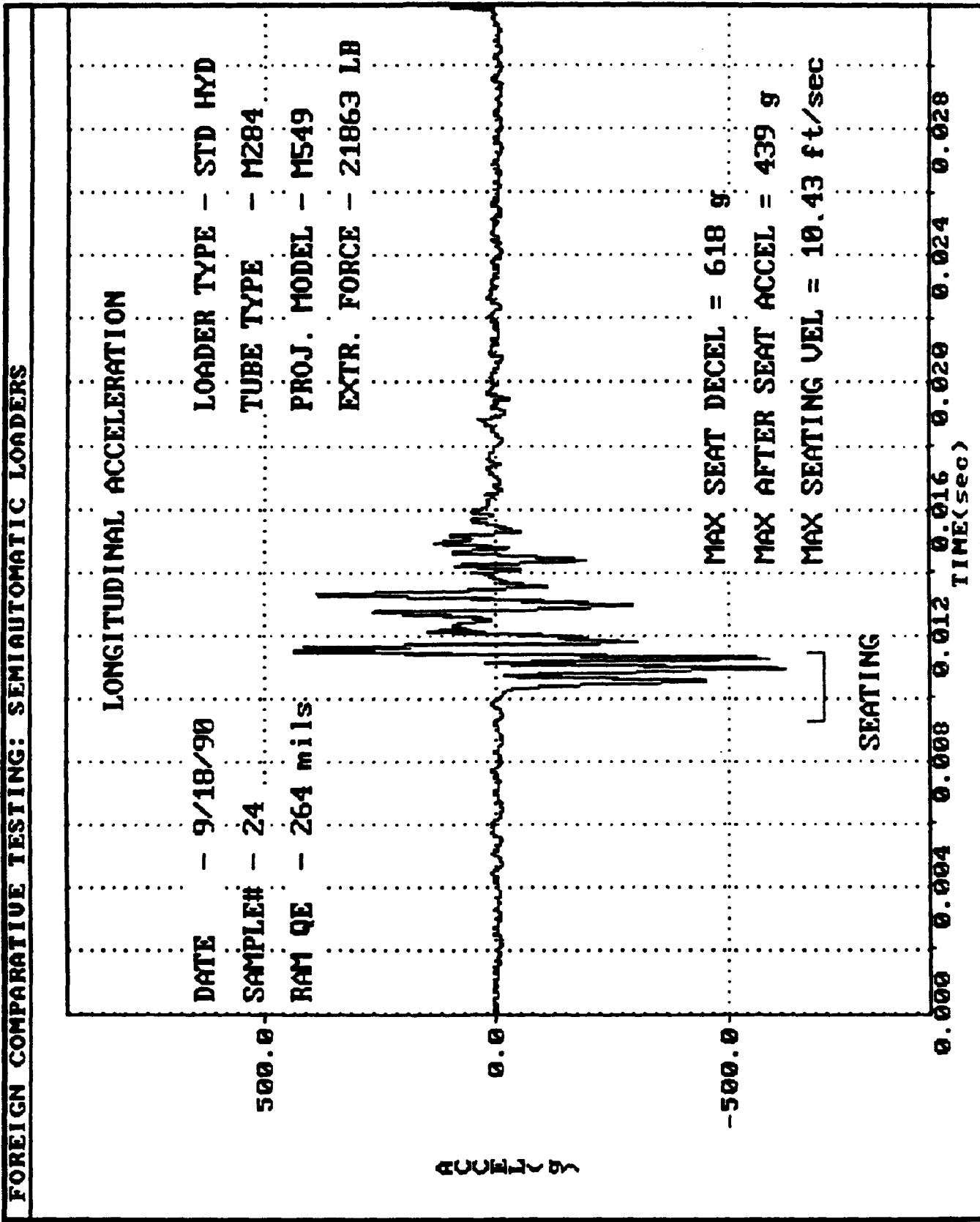
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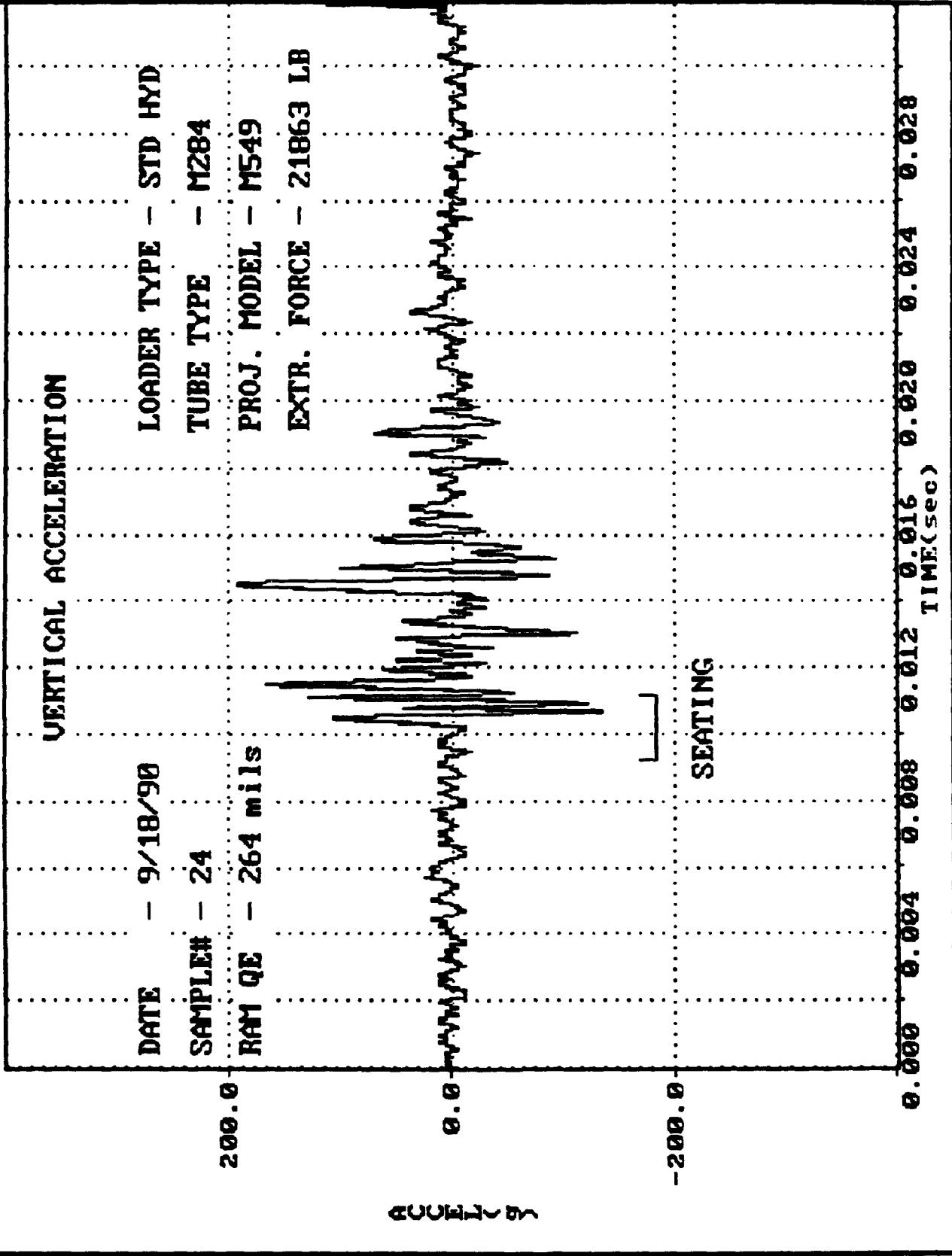
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



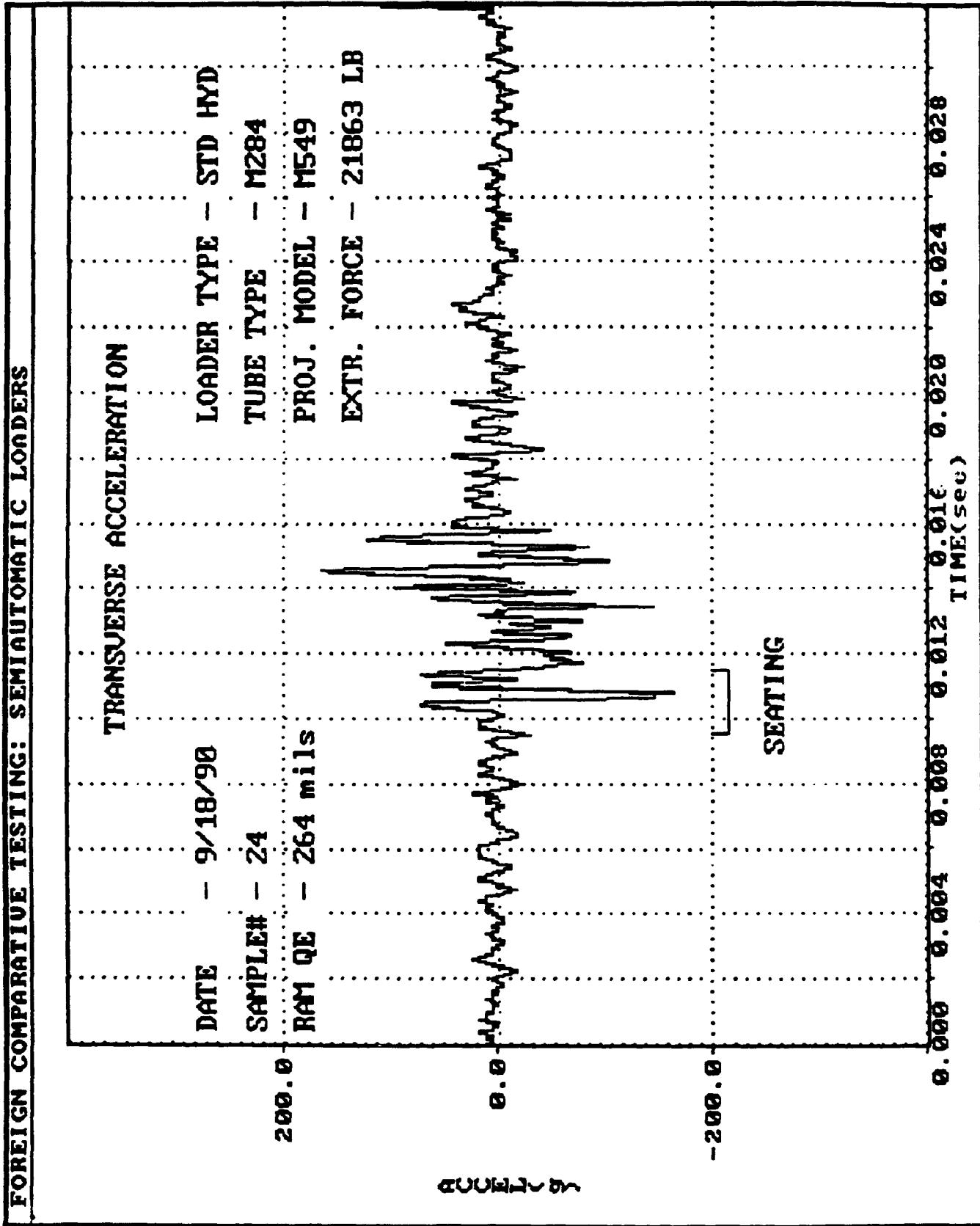
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



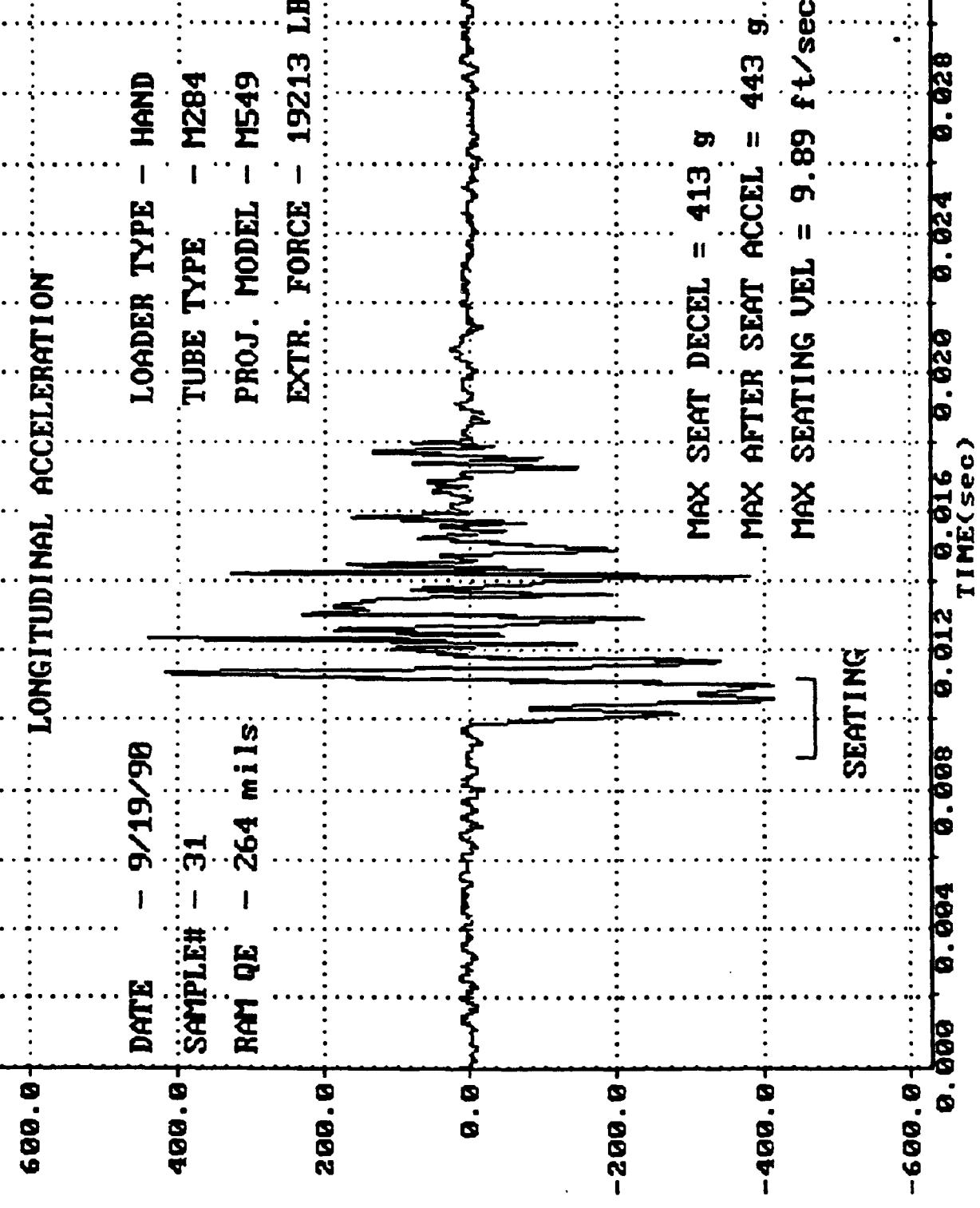
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



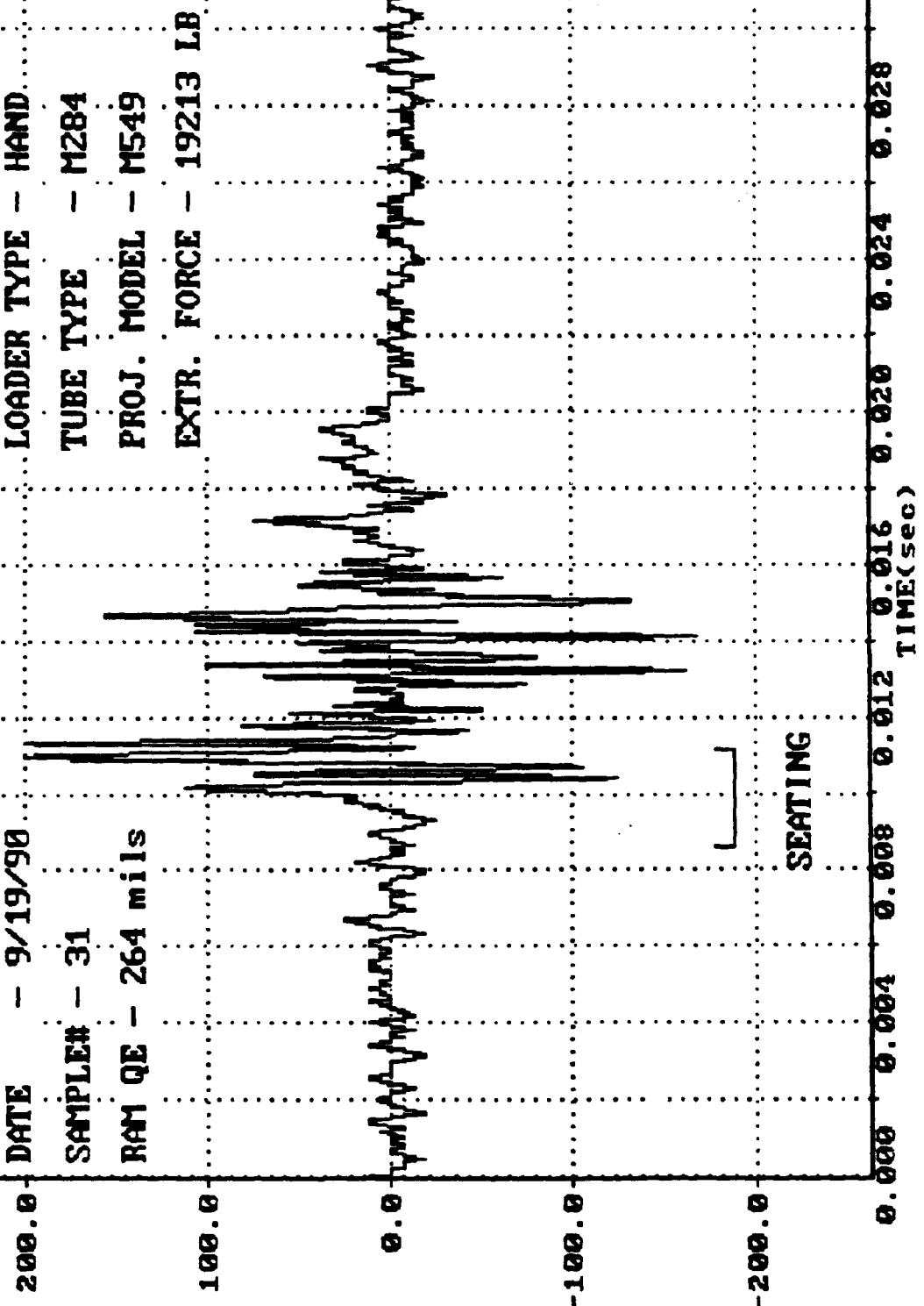
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



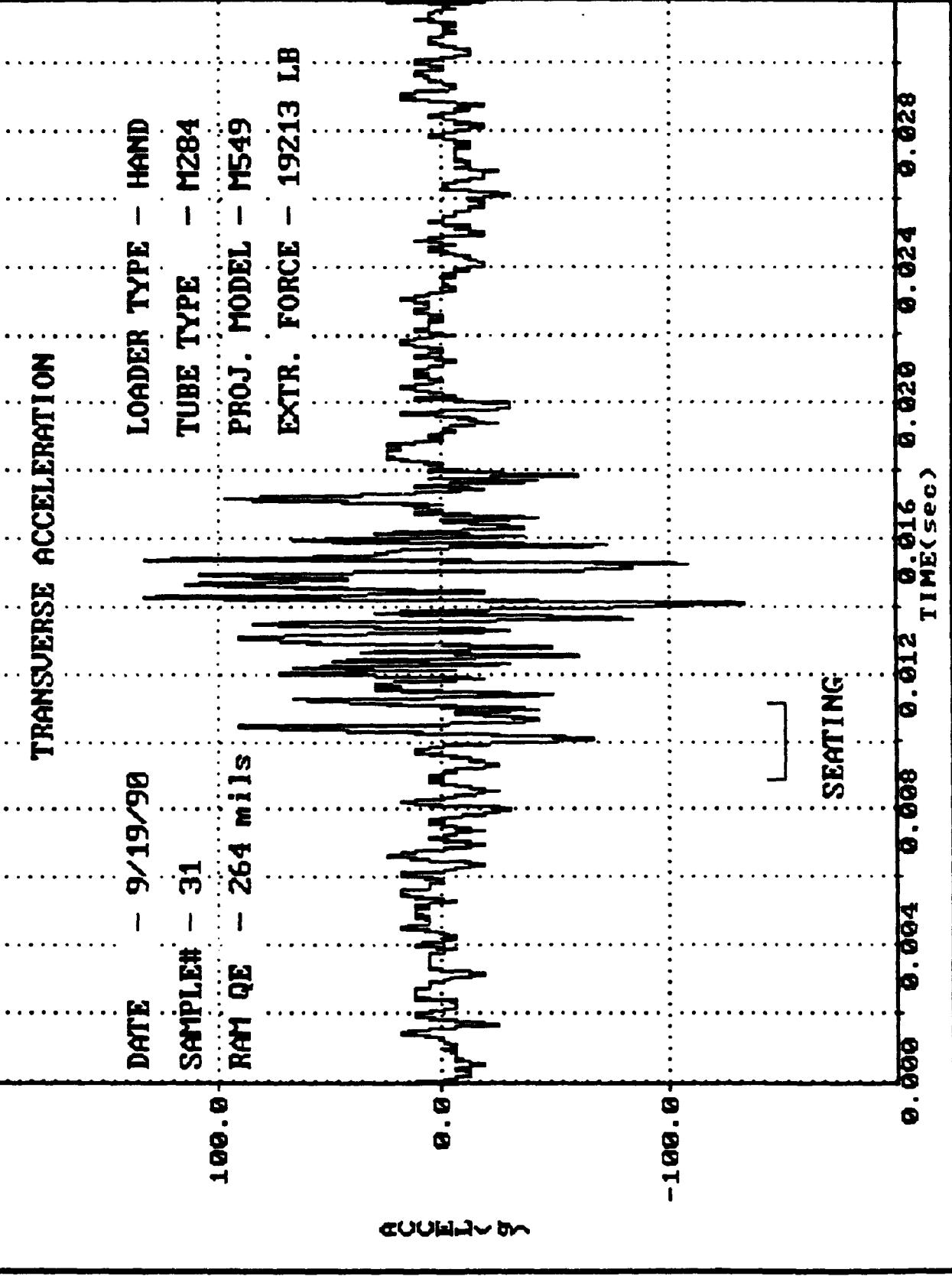
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



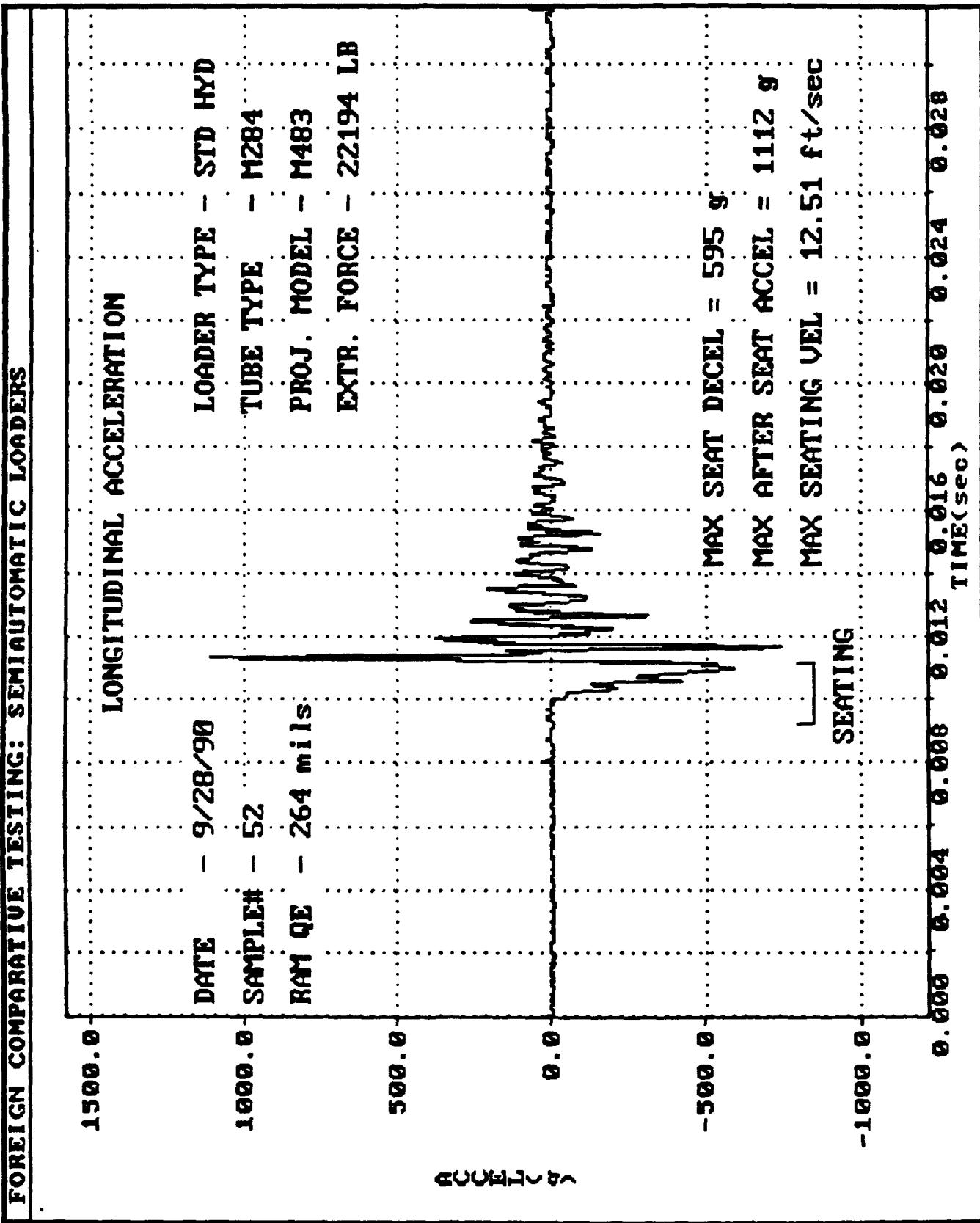
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



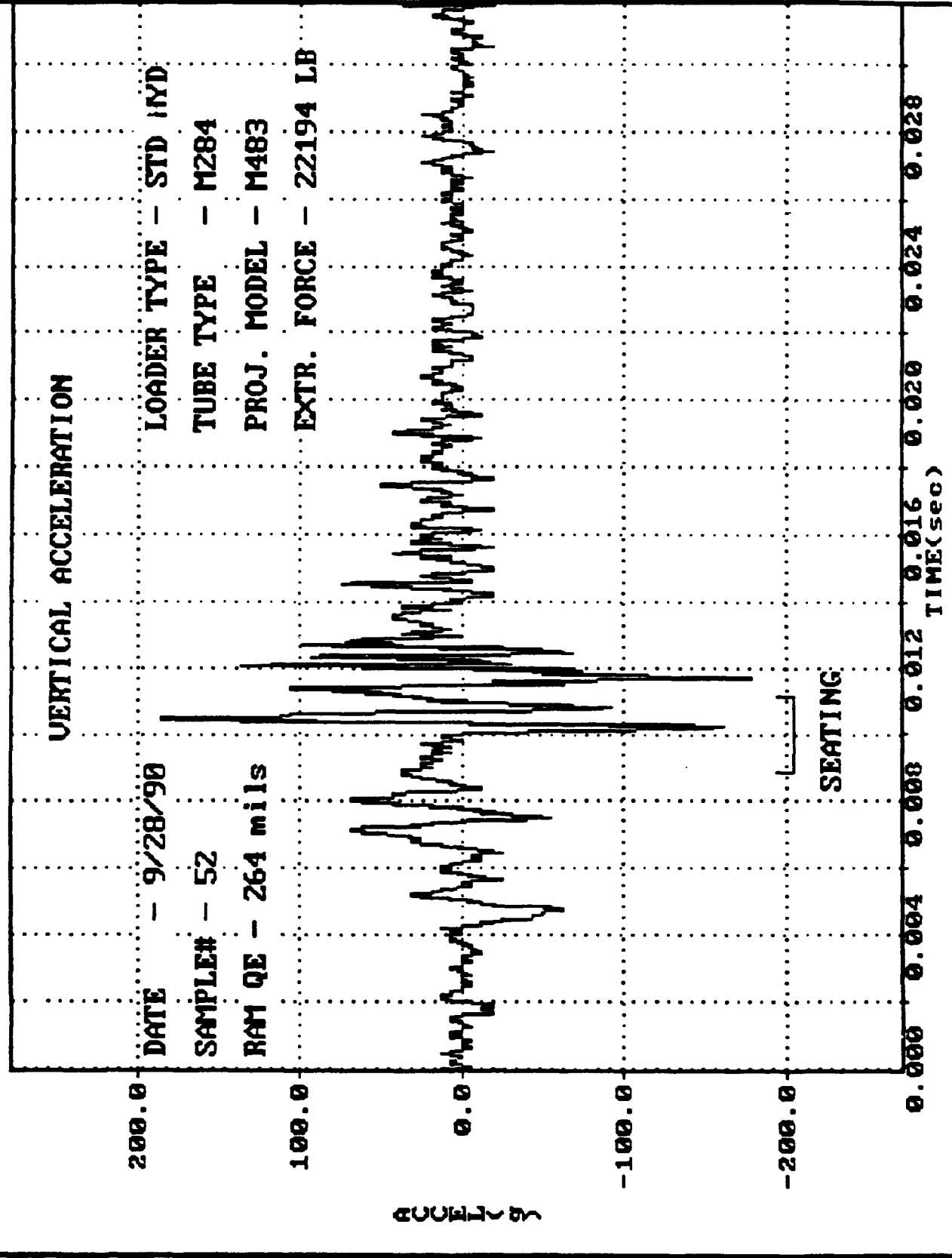
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



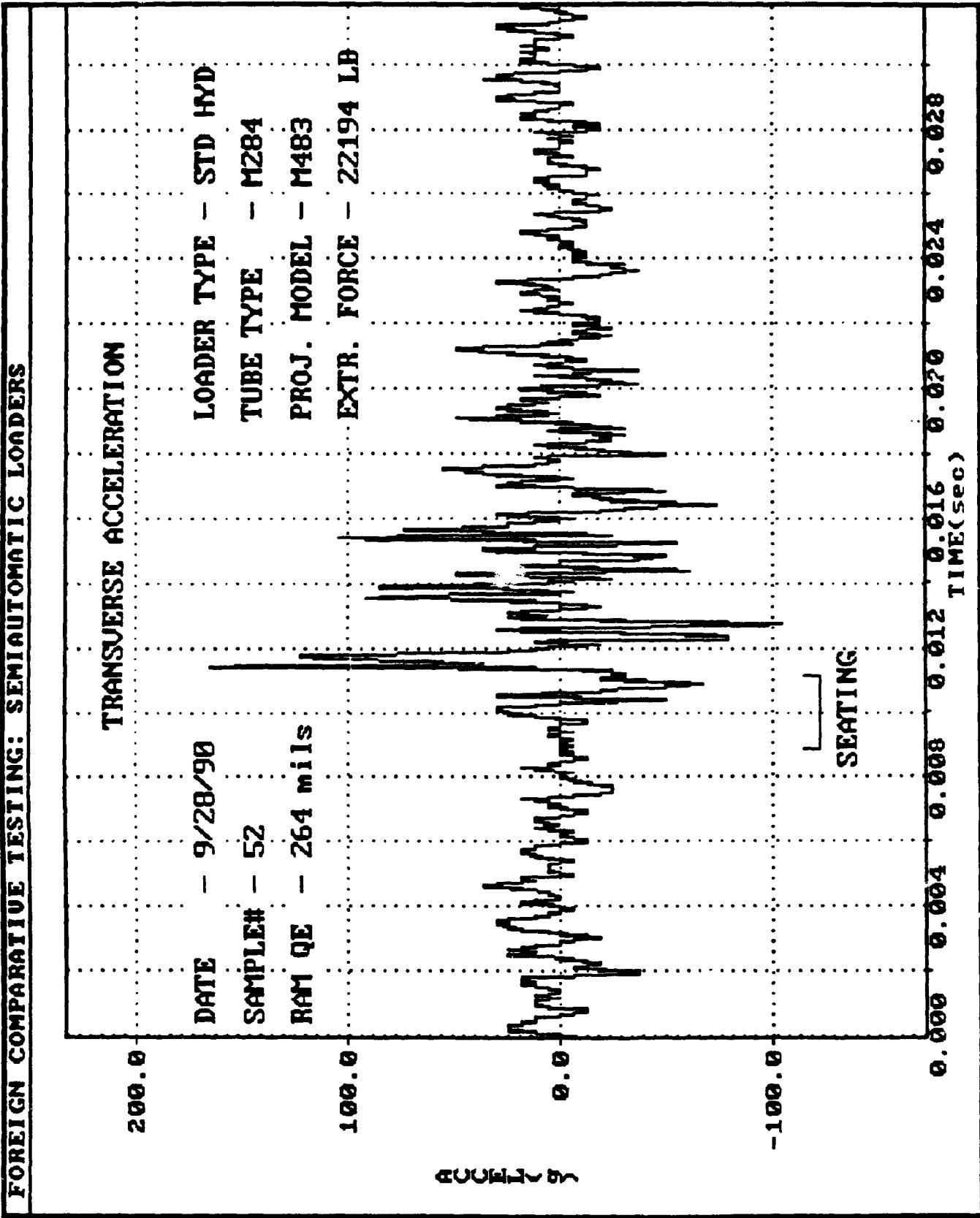
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



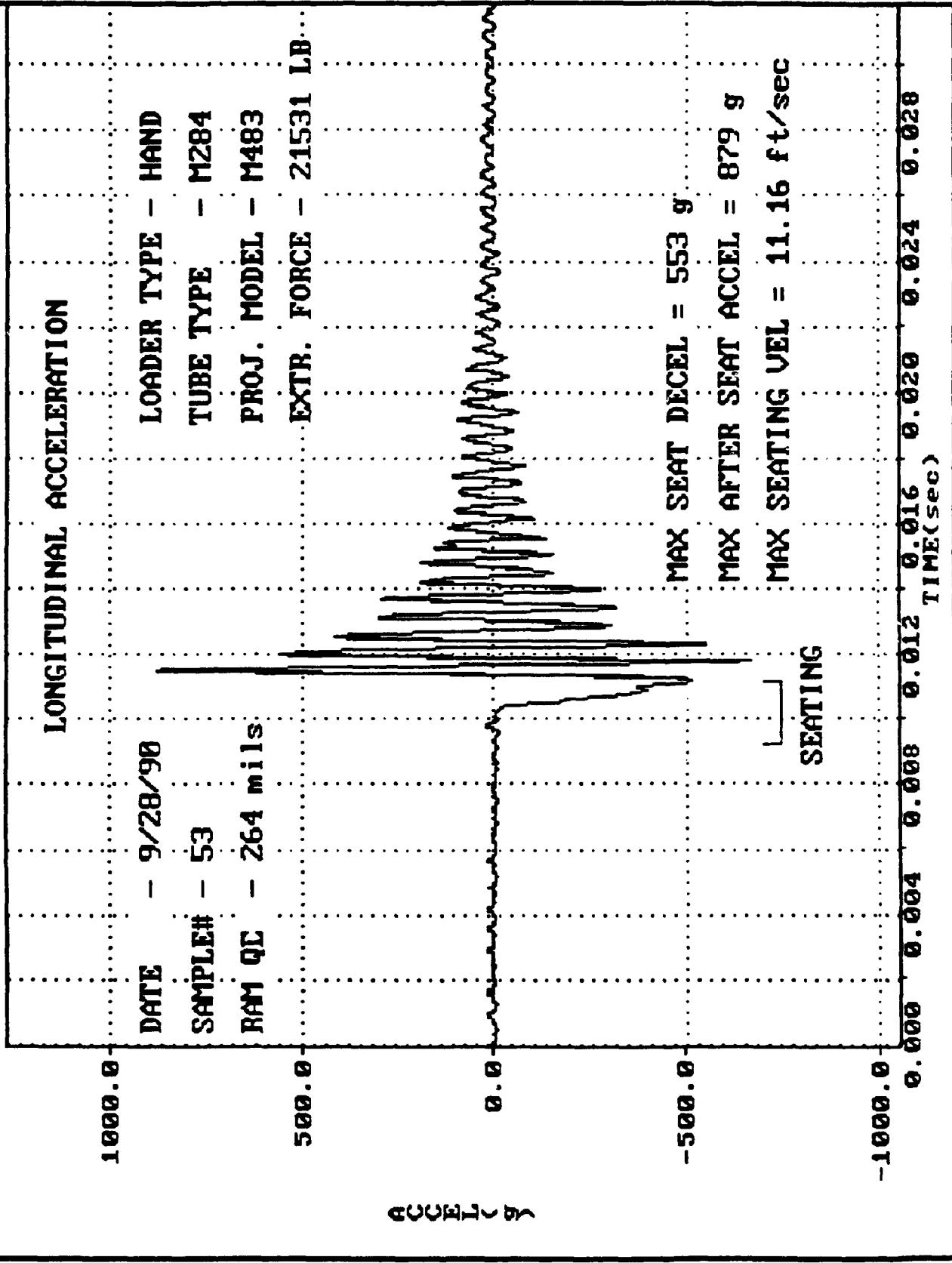
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



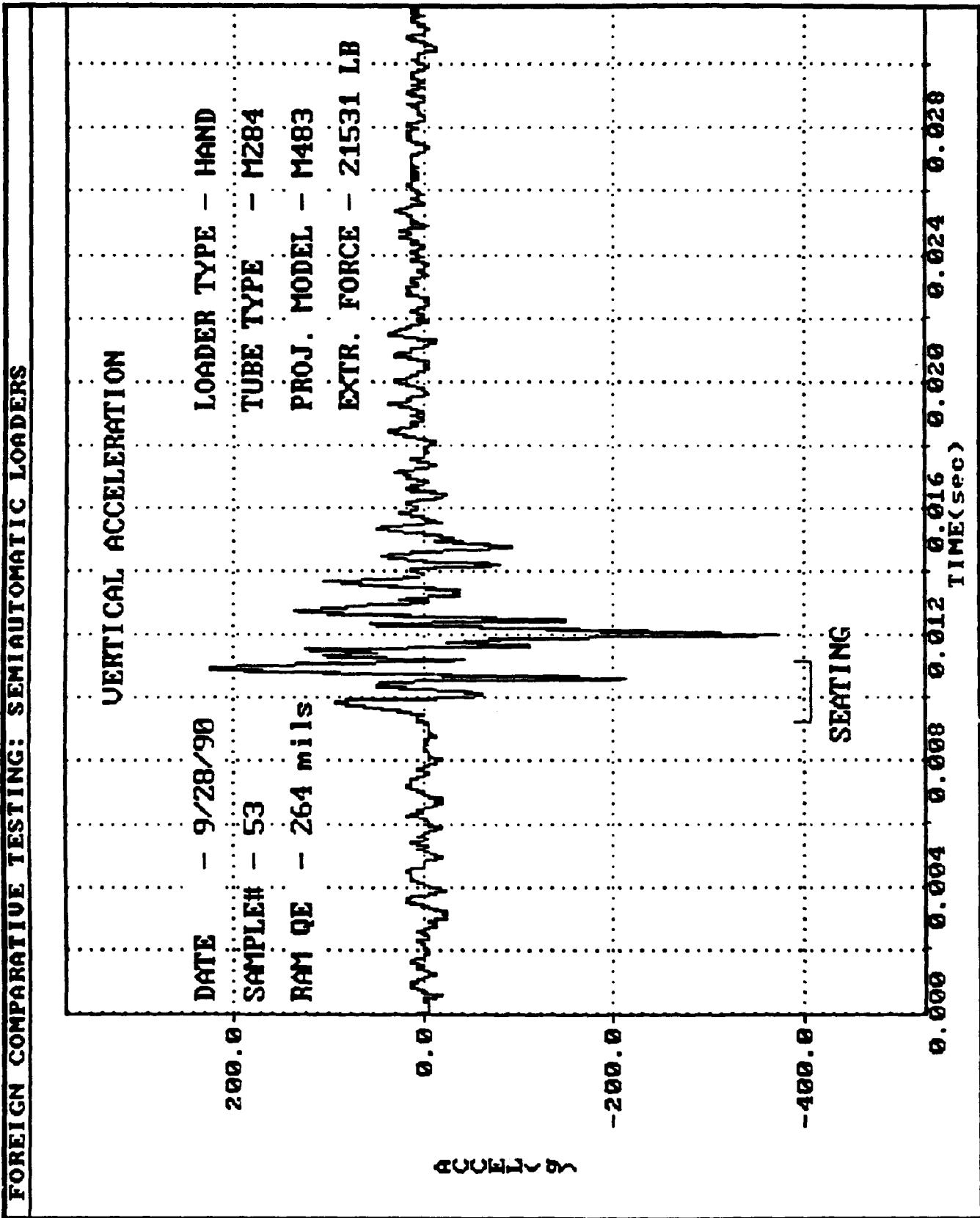
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



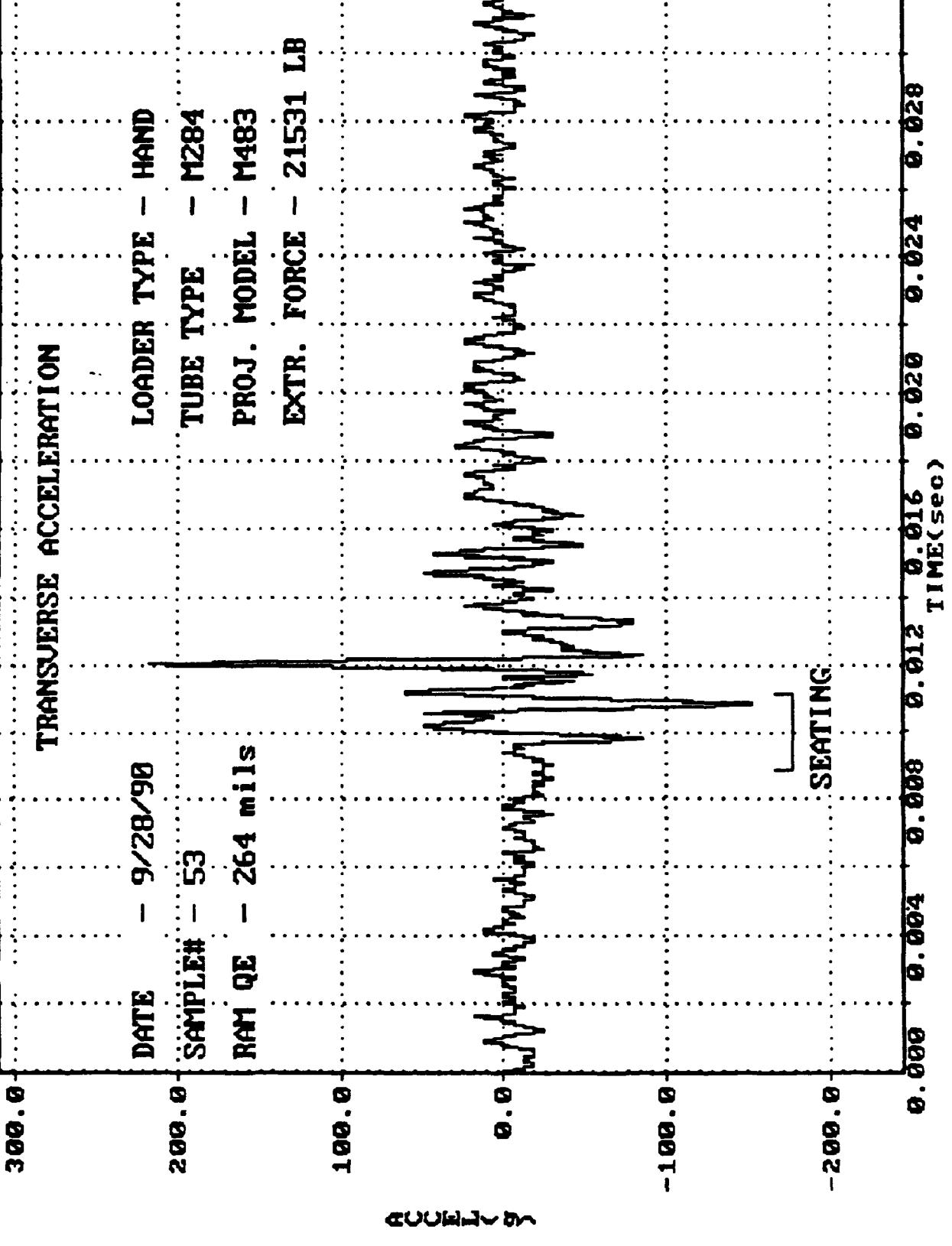
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

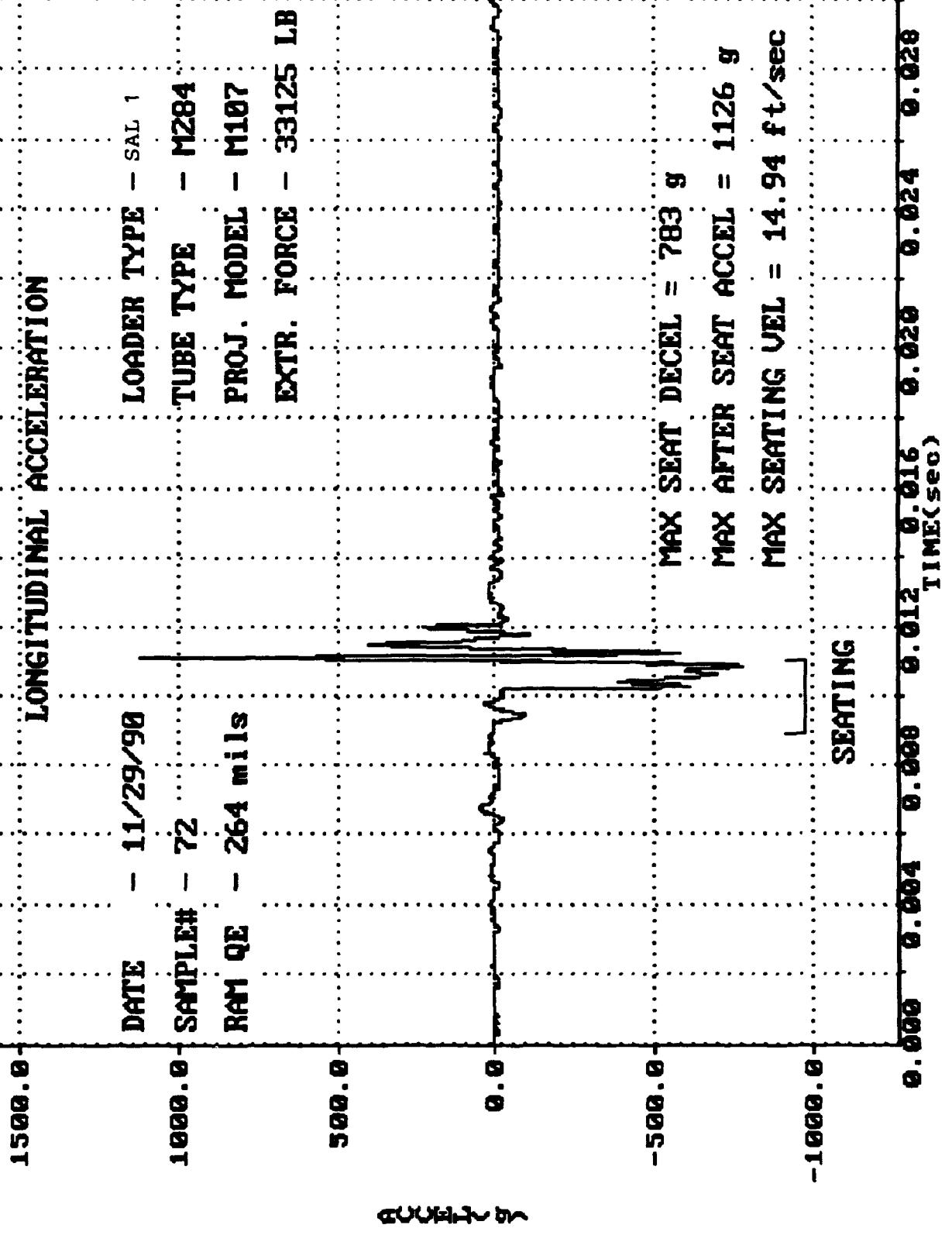


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

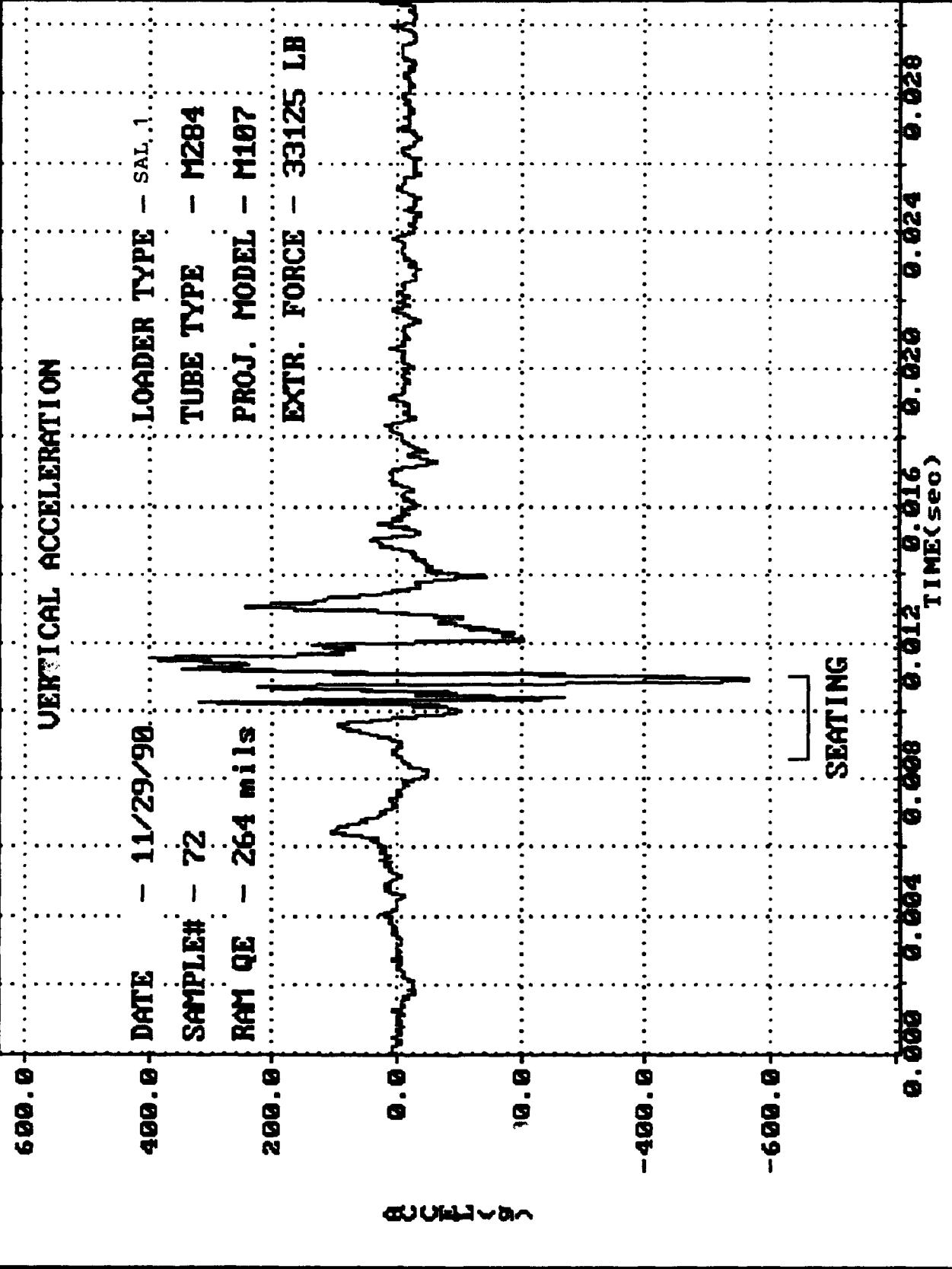


APPENDIX B
WF RAMS

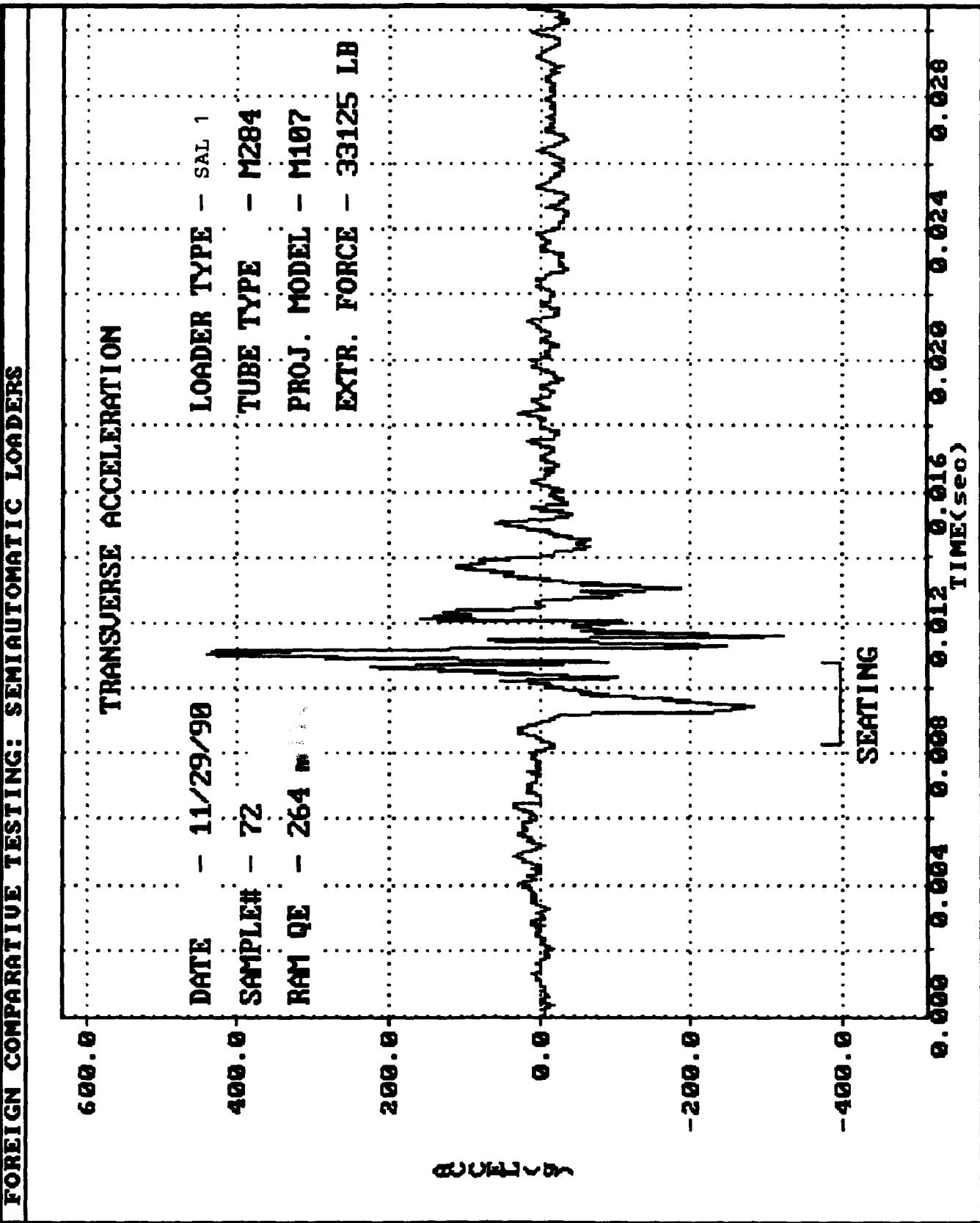
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

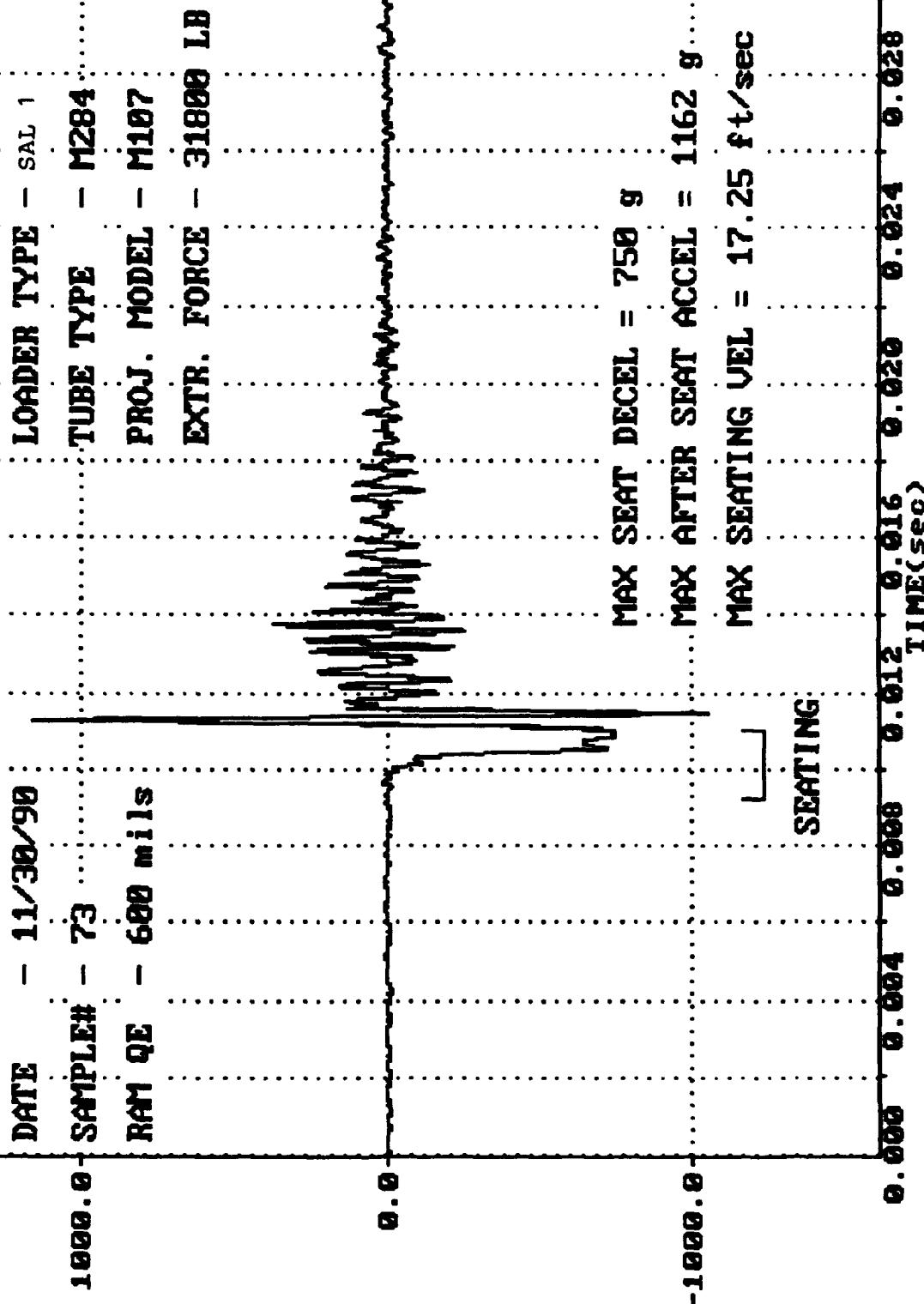


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



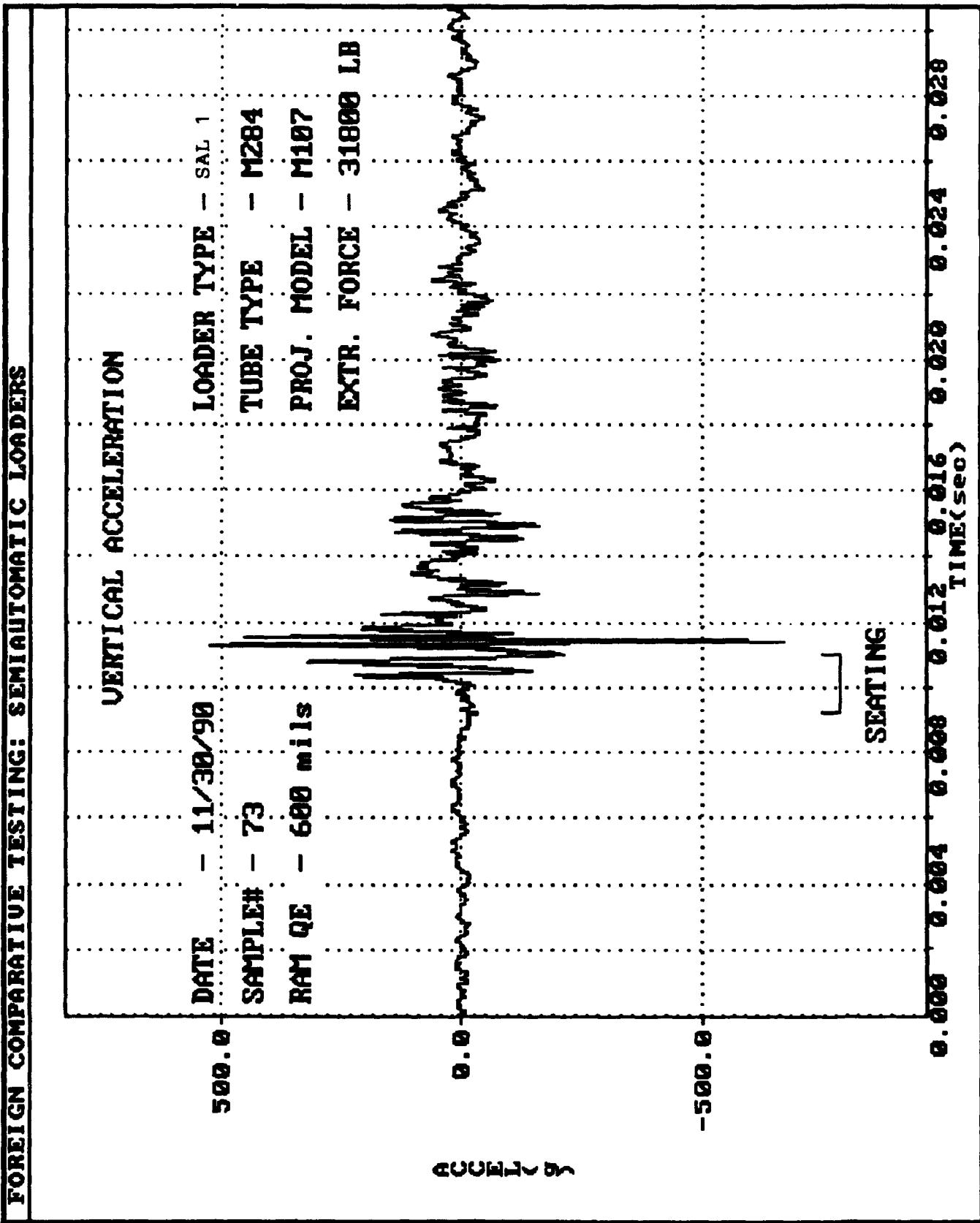
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

LONGITUDINAL ACCELERATION



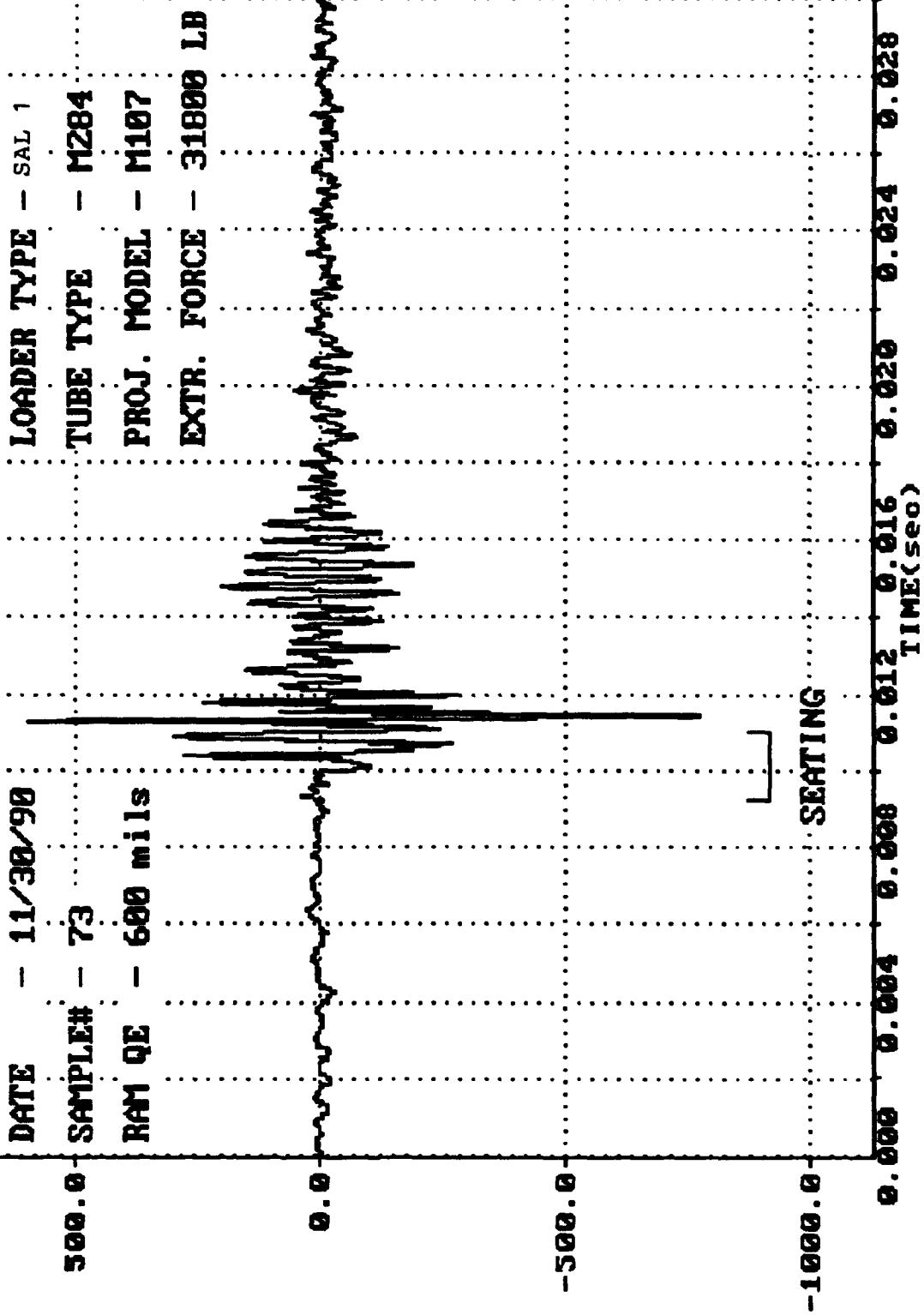
ACUTE-L

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

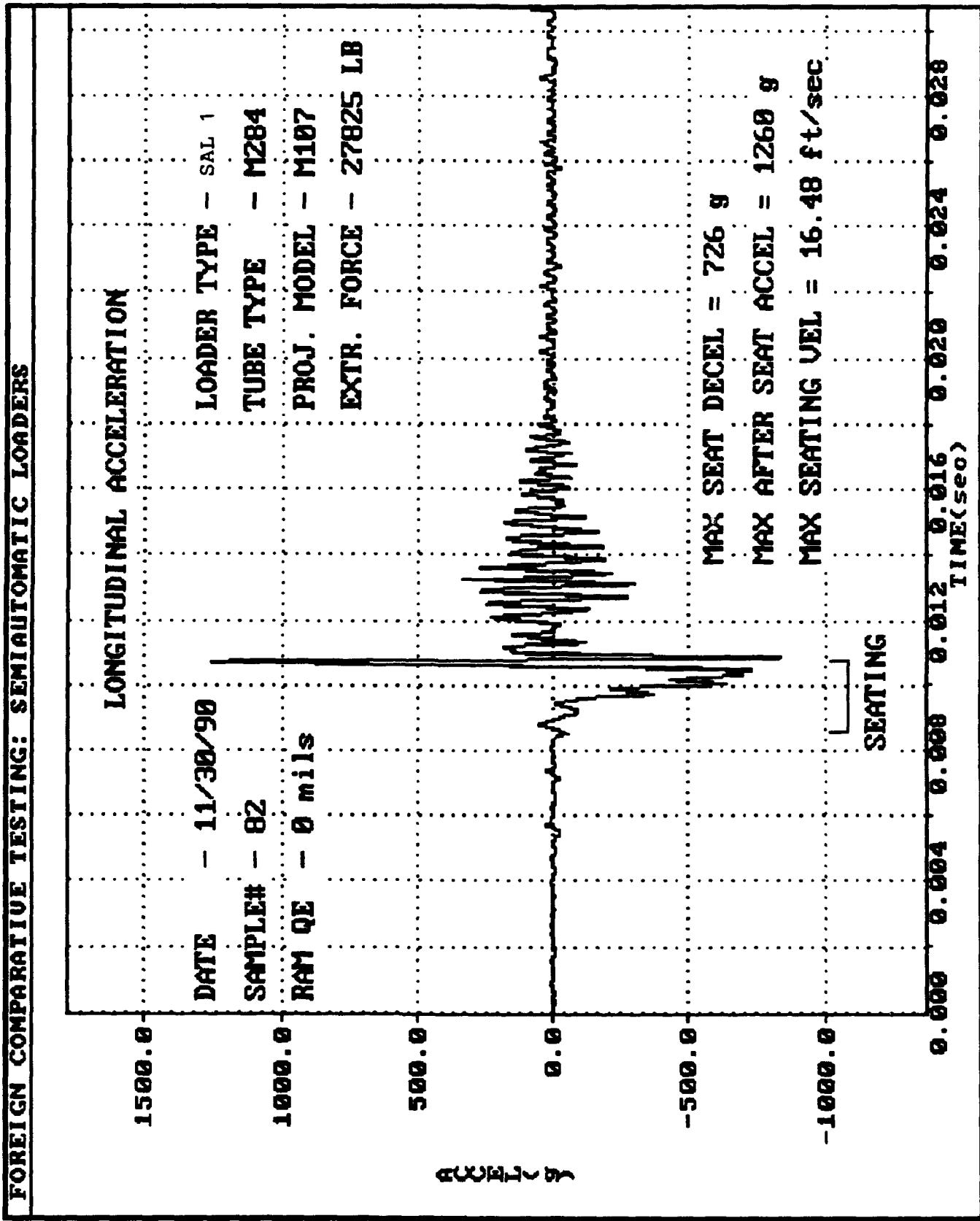


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

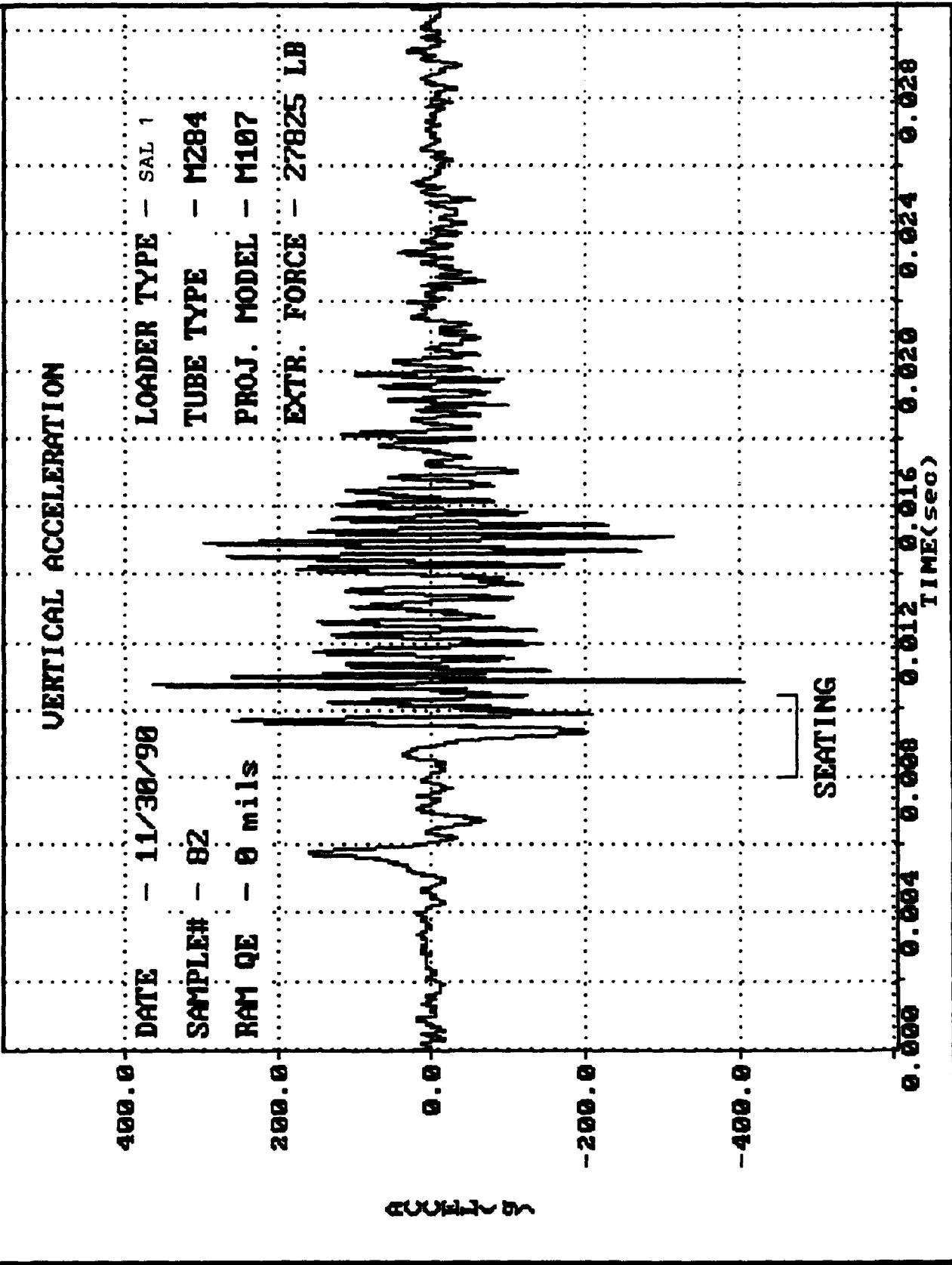
TRANSVERSE ACCELERATION



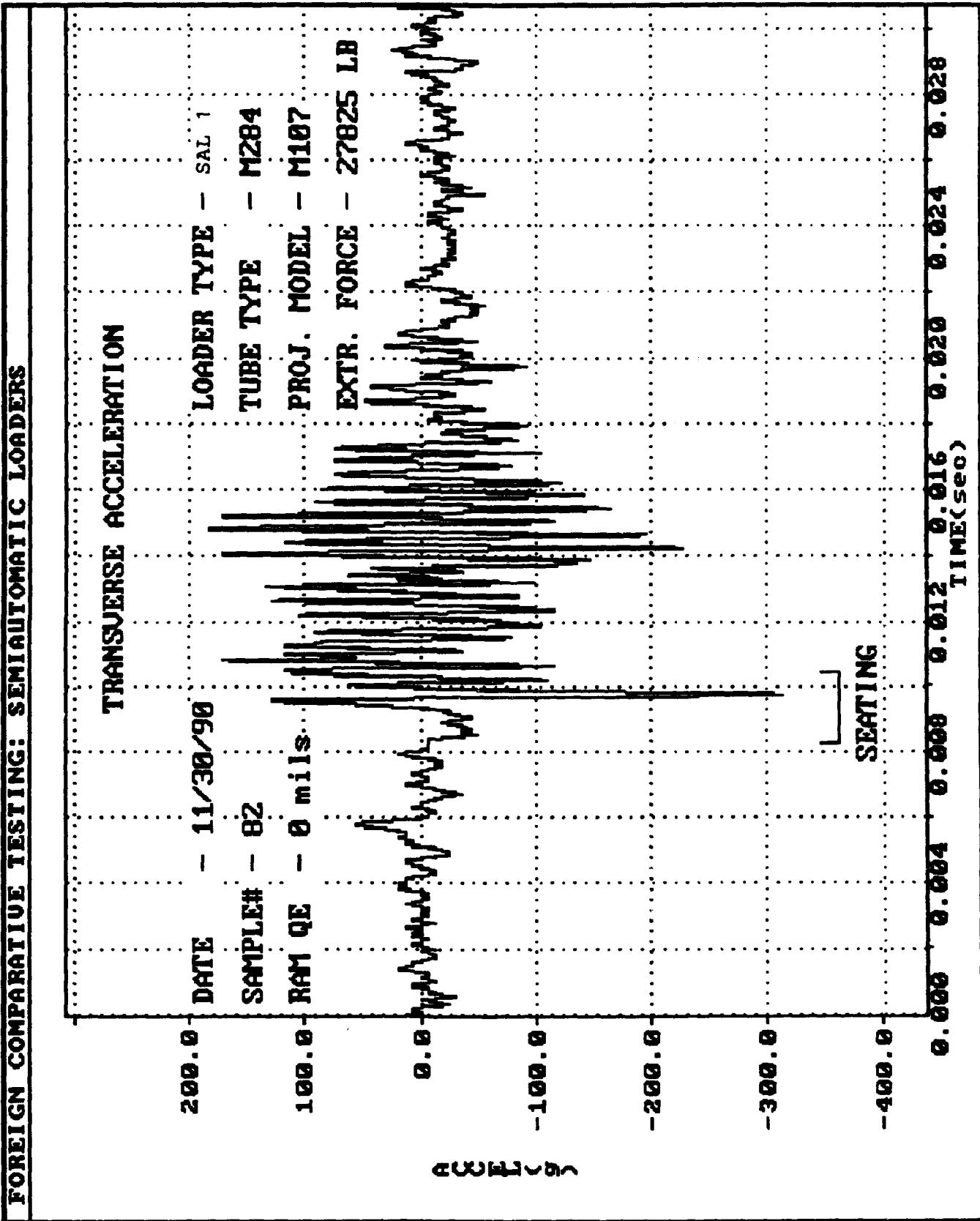
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



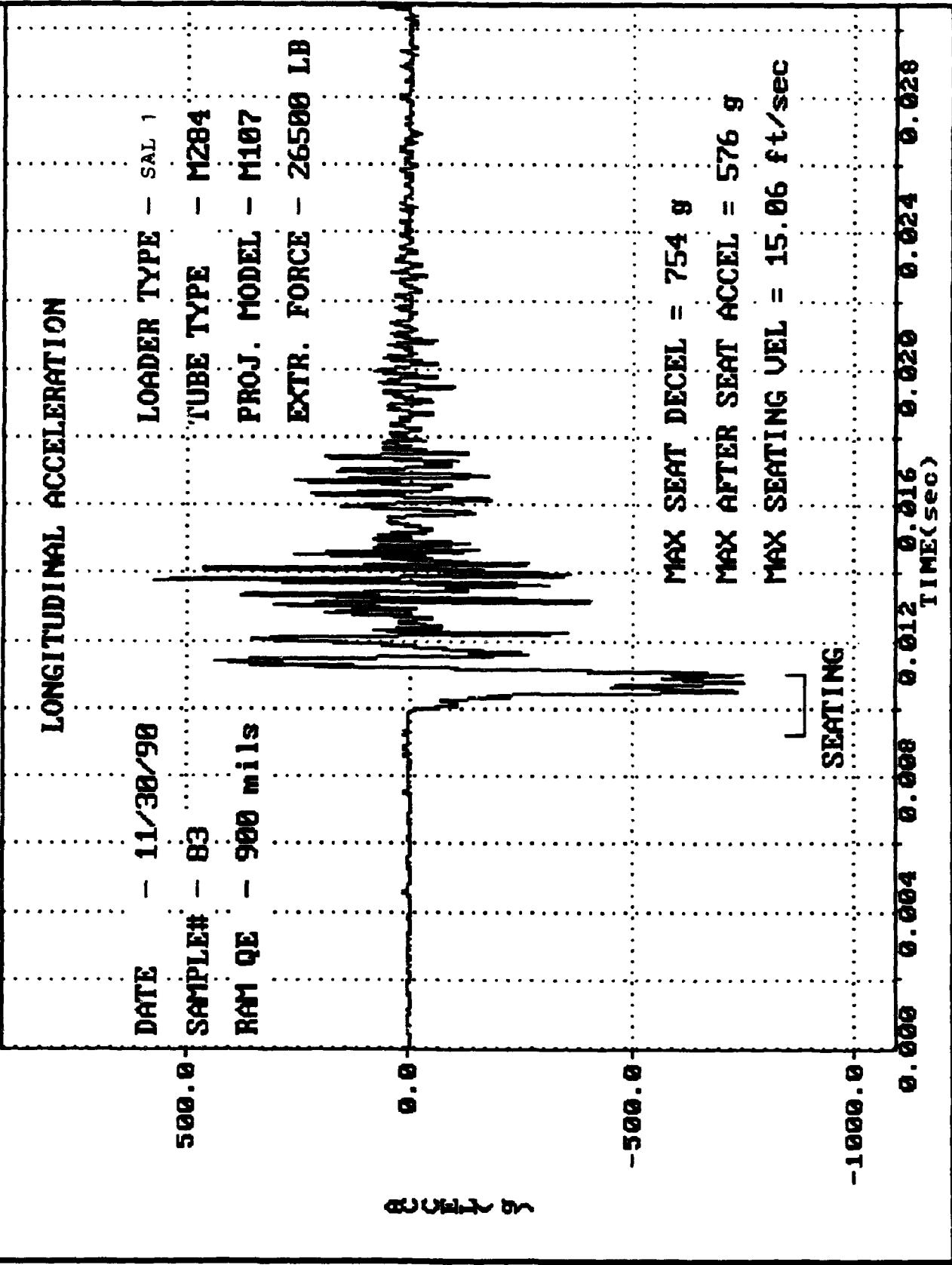
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



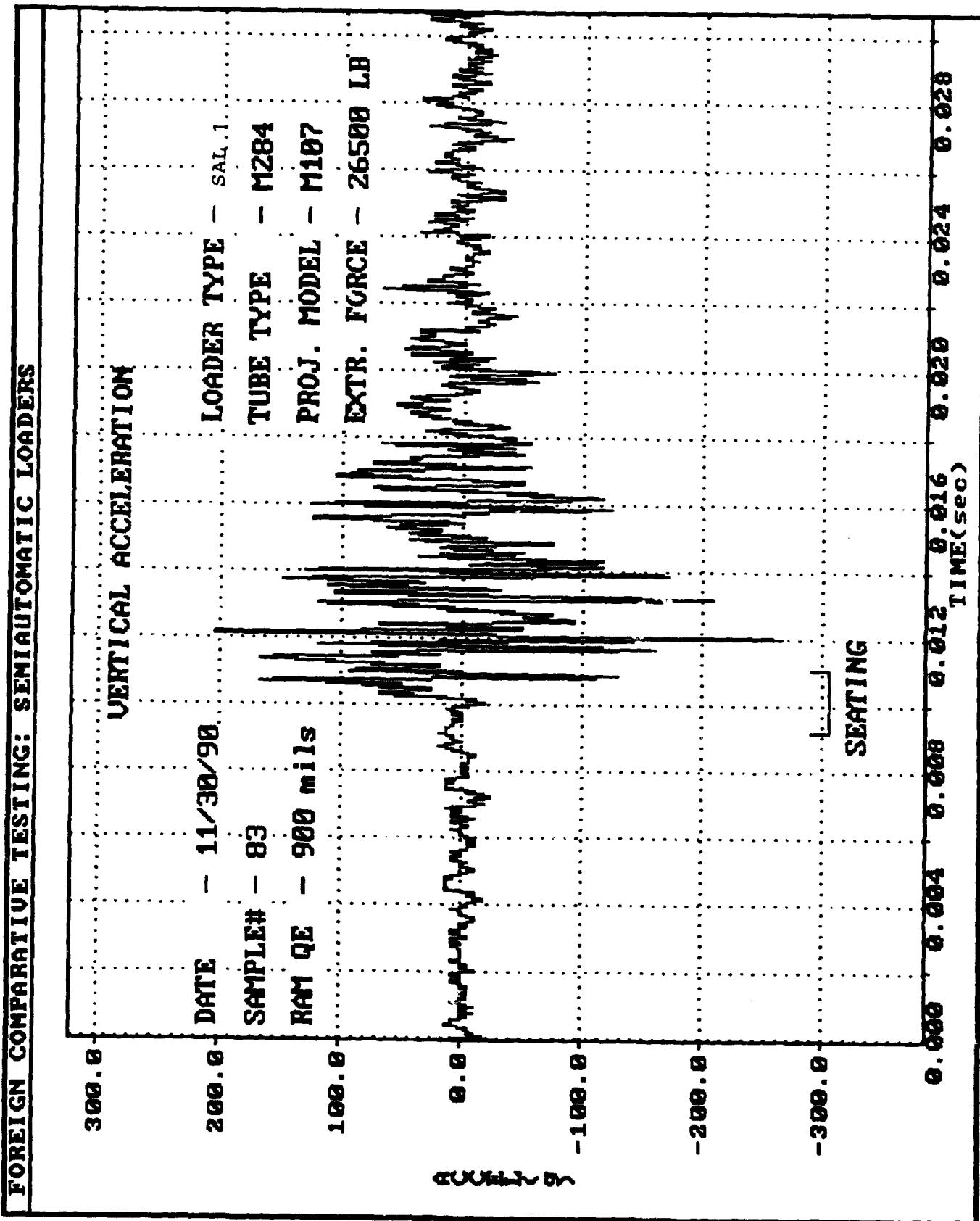
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

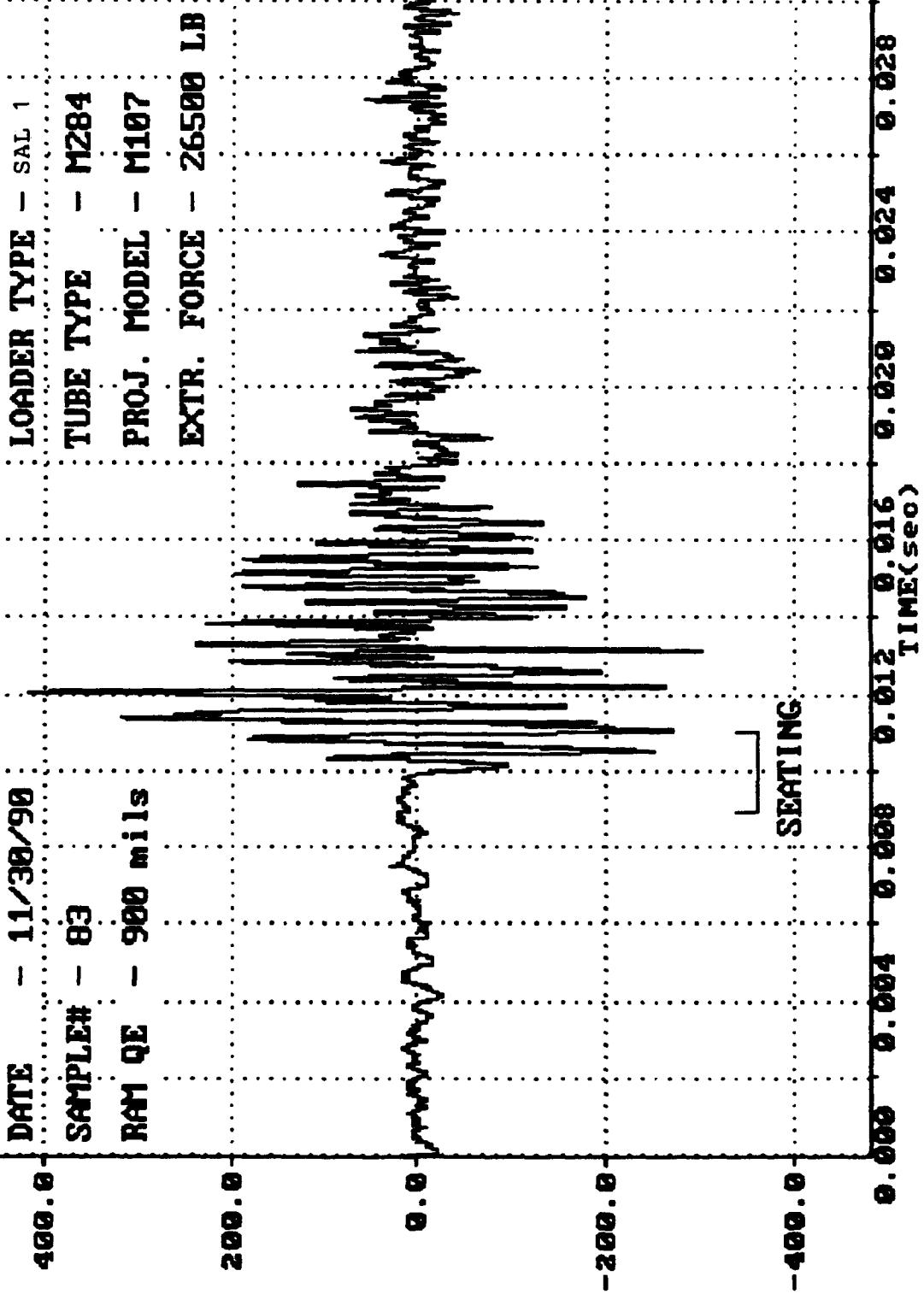


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

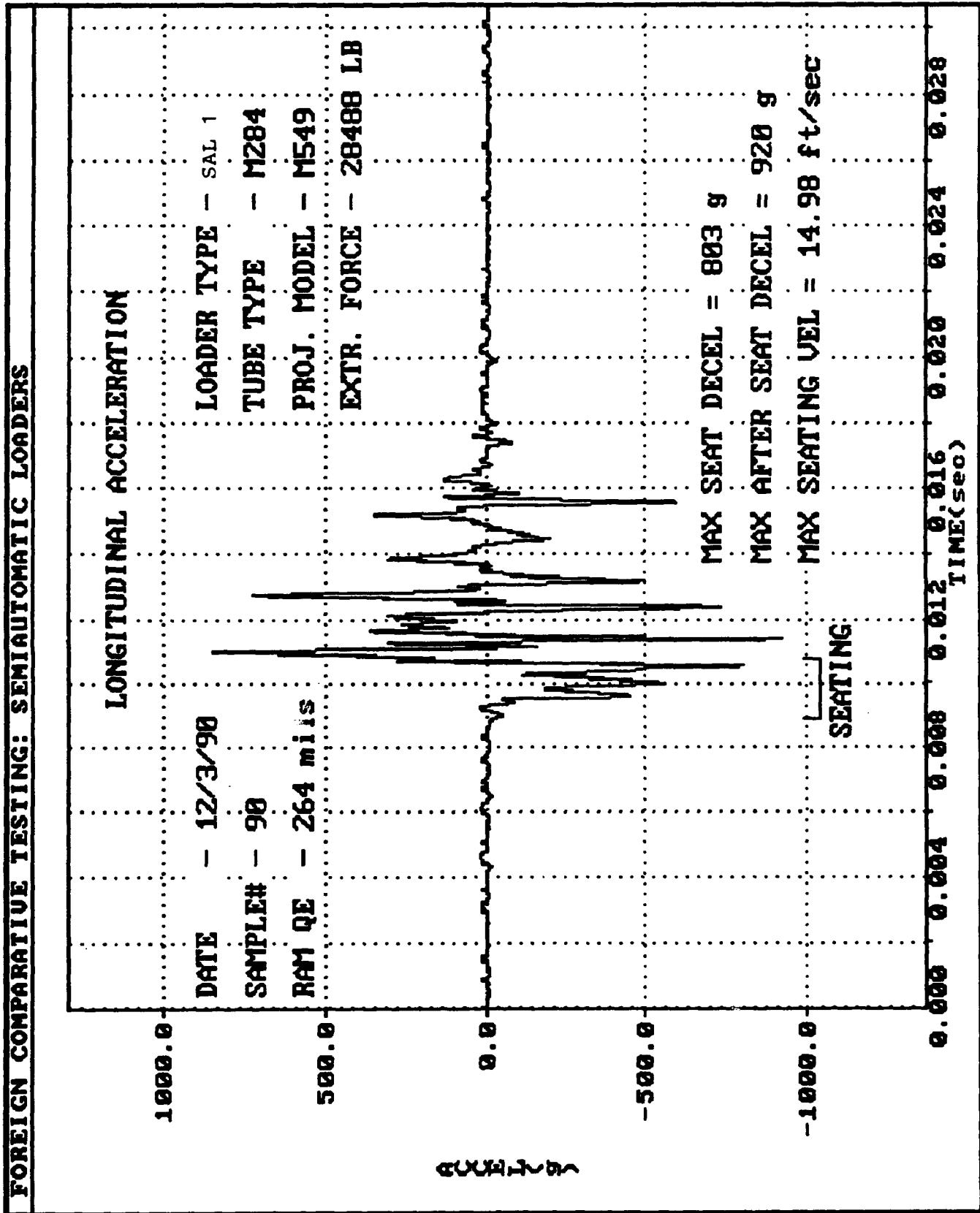


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

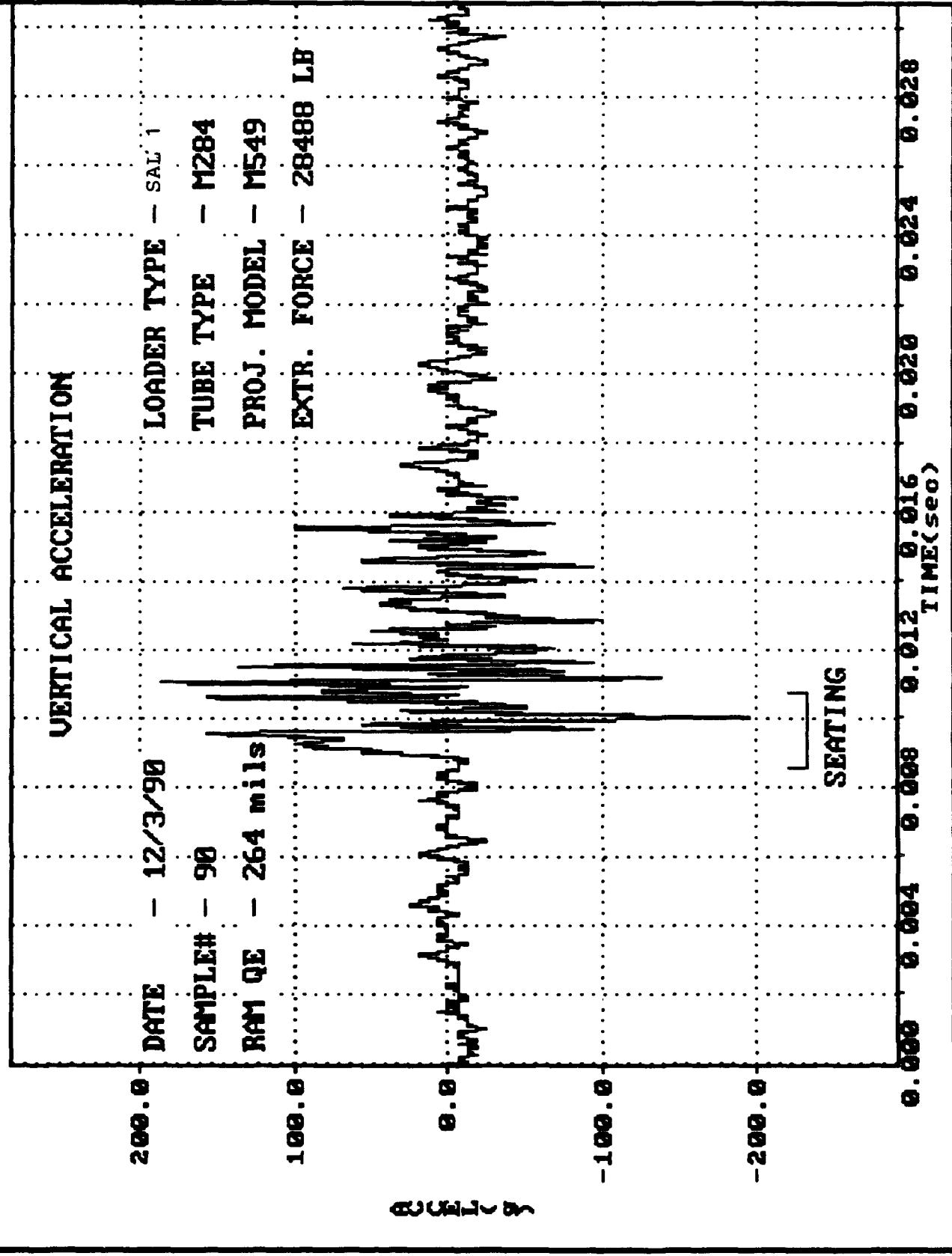
TRANSVERSE ACCELERATION



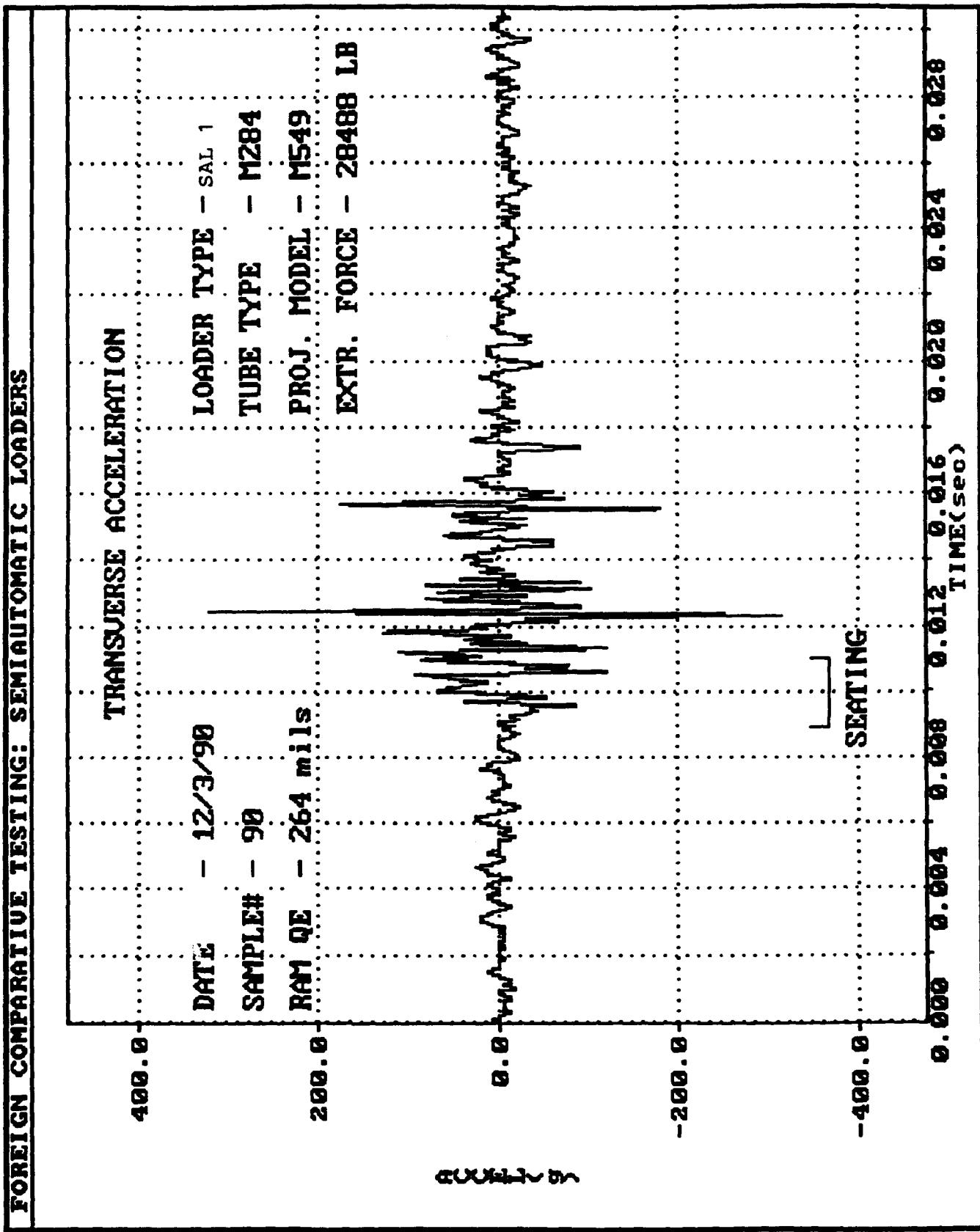
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

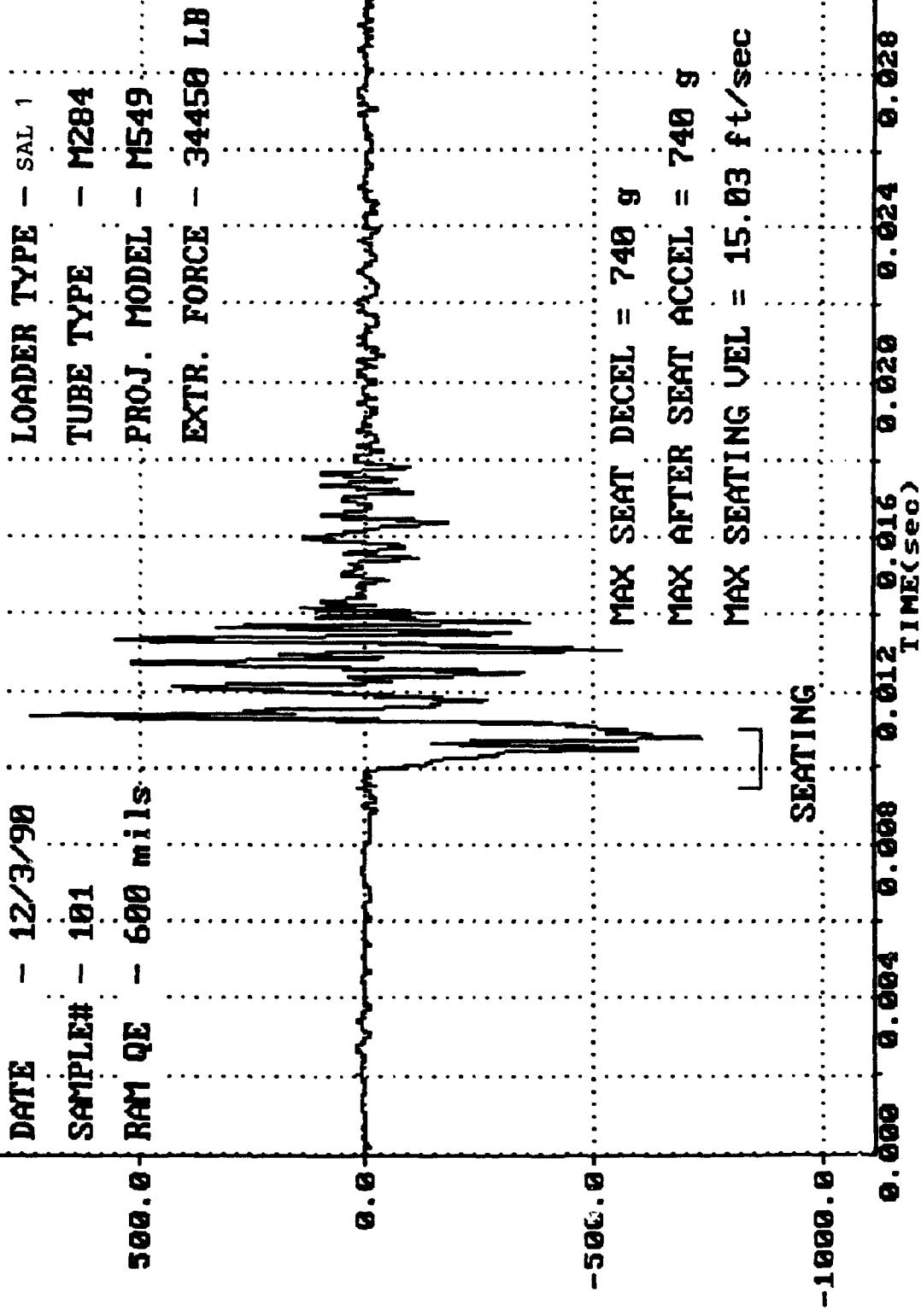


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

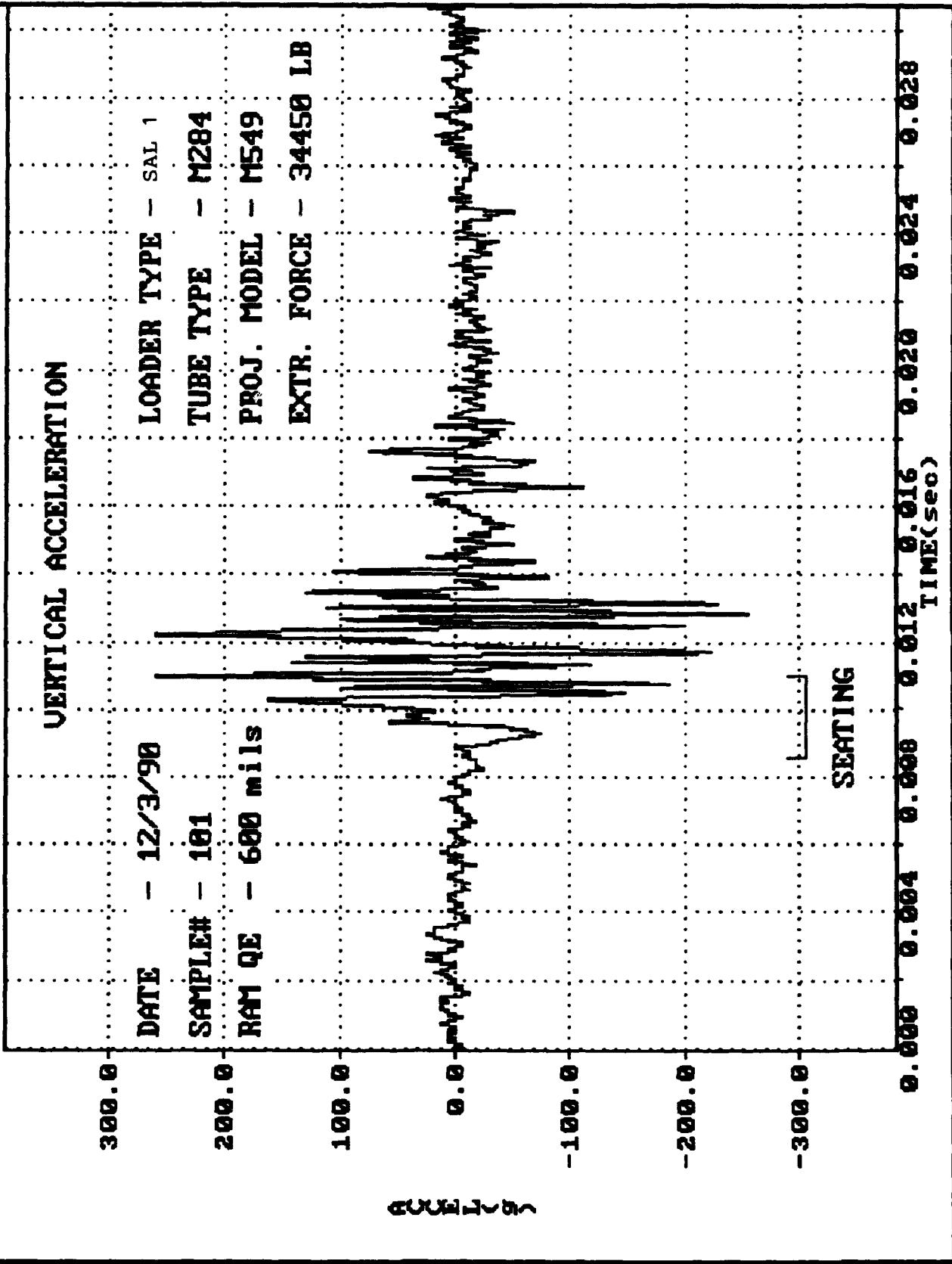


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

LONGITUDINAL ACCELERATION

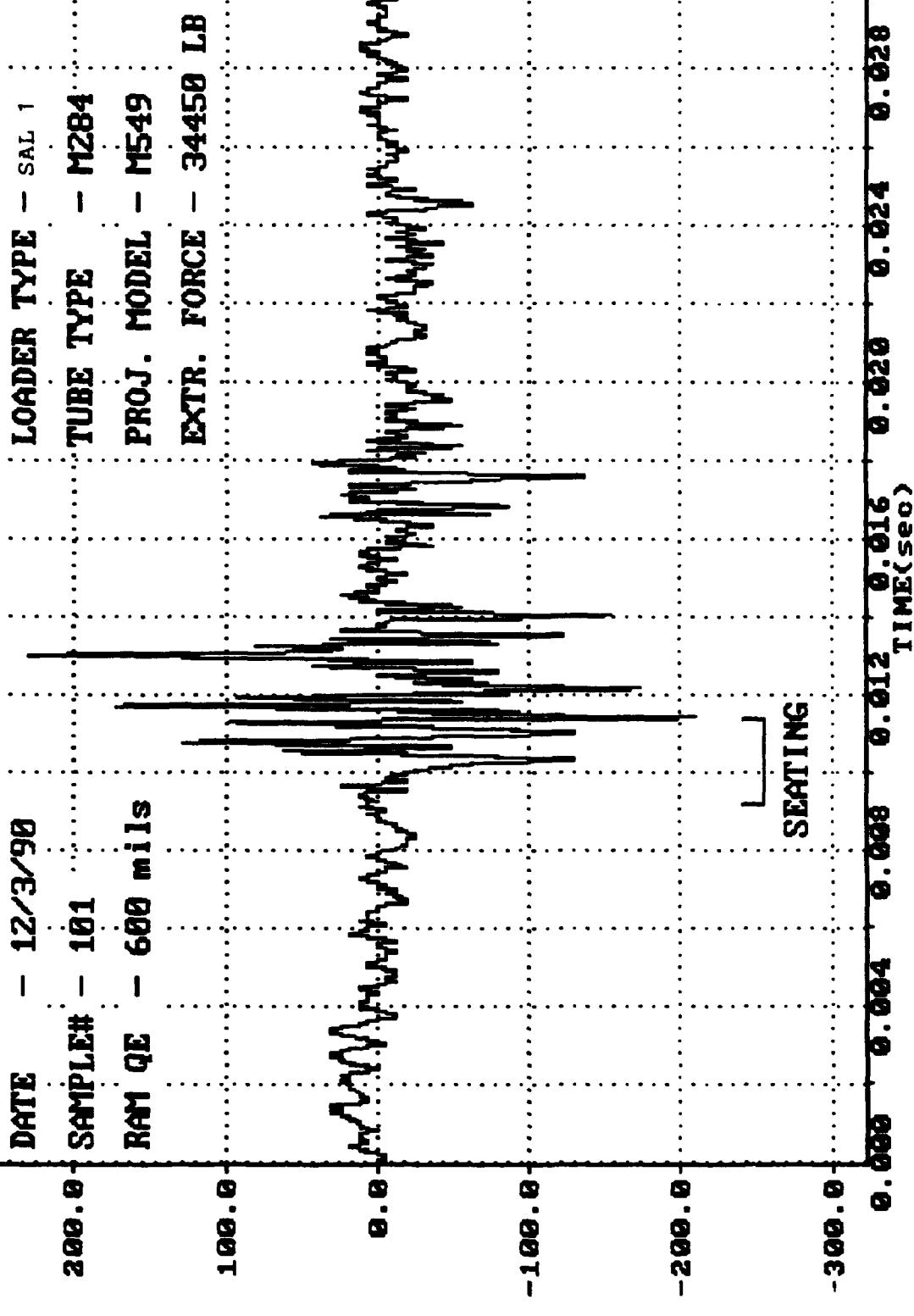


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

LONGITUDINAL ACCELERATION

DATE - 12/4/90 LOADER TYPE - SAL 1
SAMPLE# - 104 TUBE TYPE - M284
REF QE - 900 mils PROJ. MODEL - M549
EXTR. FORCE - 30475 LB

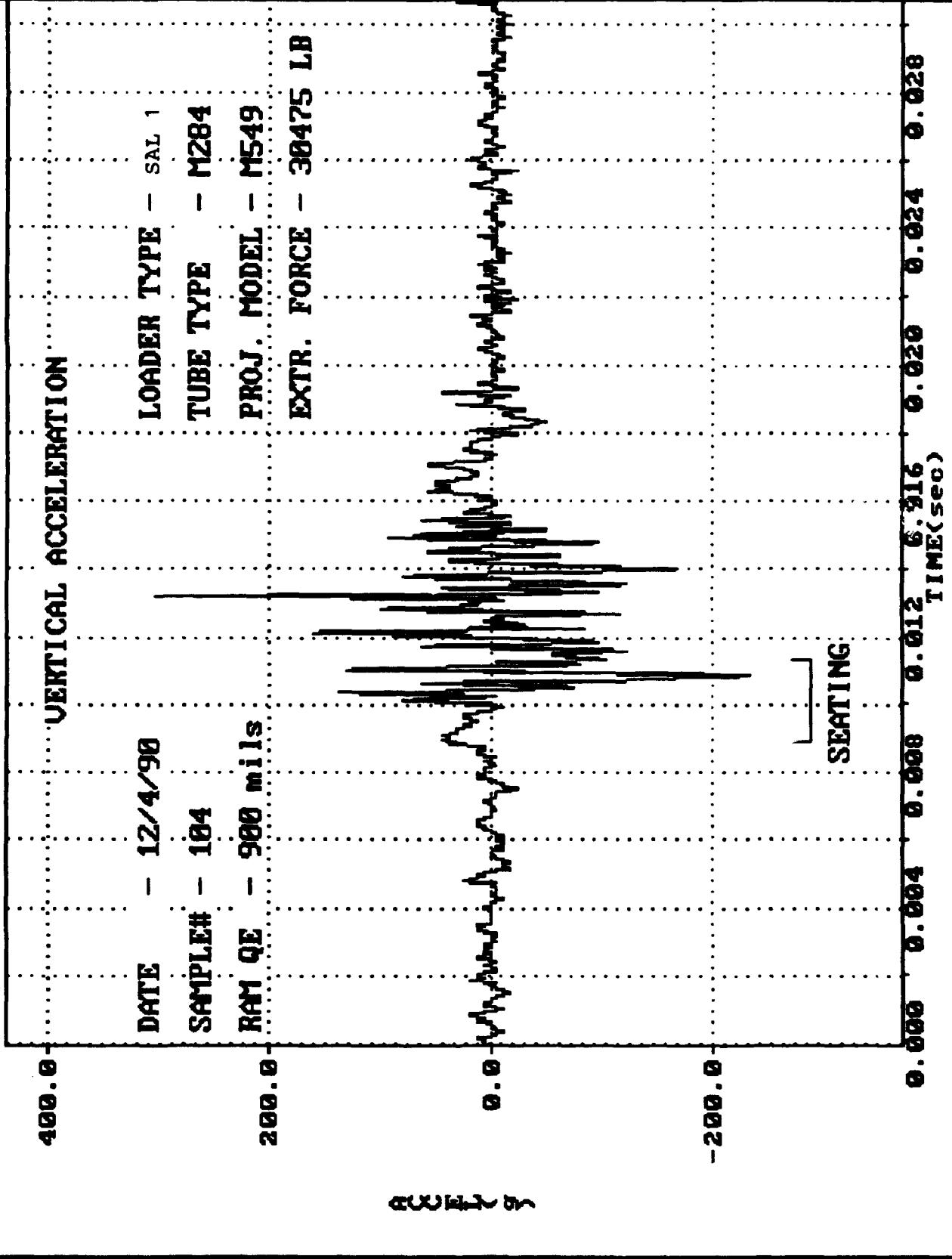
ACCELERATION

MAX SEAT DECEL = 670 g
MAX AFTER SEAT ACCEL = 651 g
MAX SEATING UEL = 13.88 ft/sec
TIME(sec)

SEATING

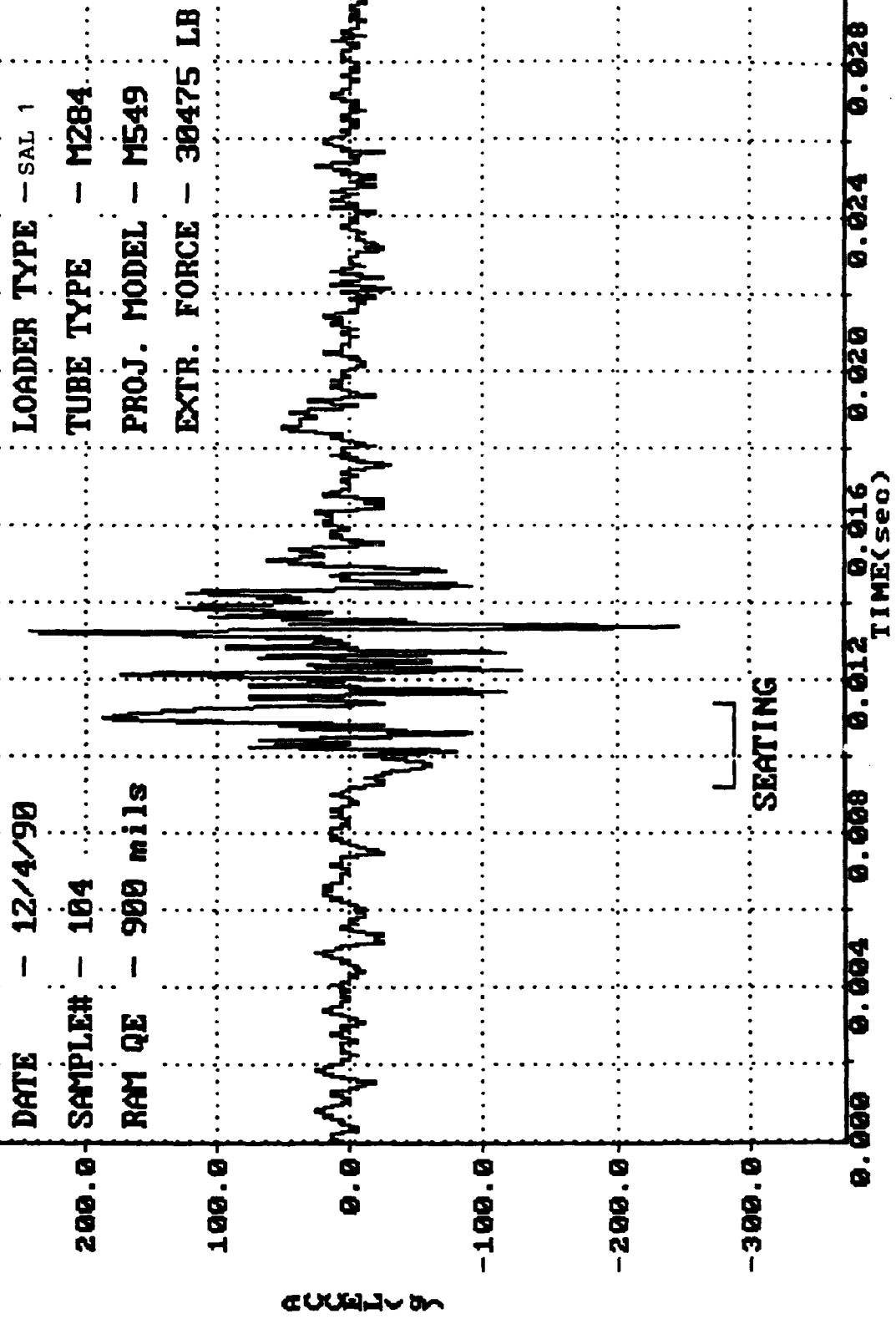
0.000 0.004 0.008 0.012 0.016 0.020 0.024 0.028

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



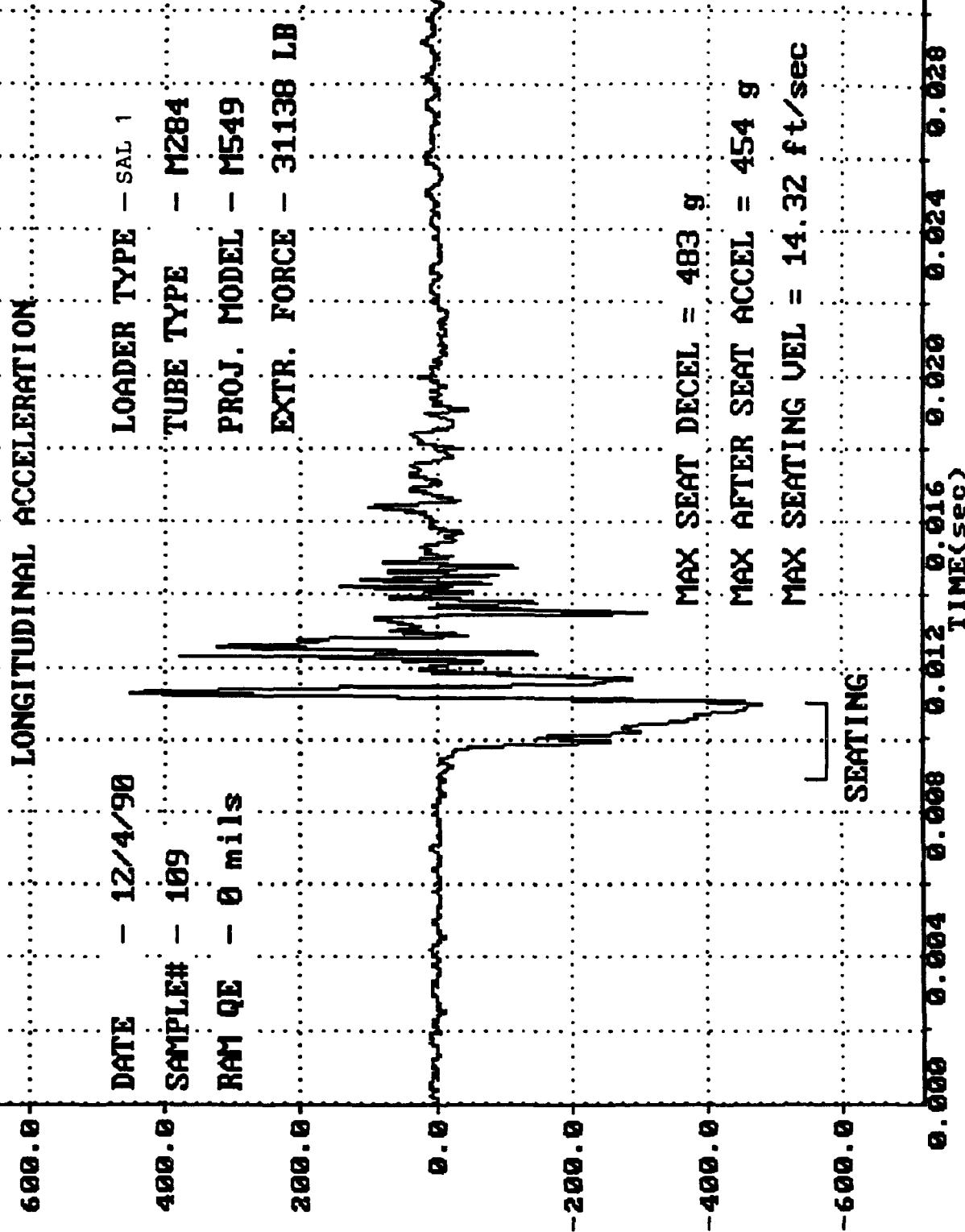
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION

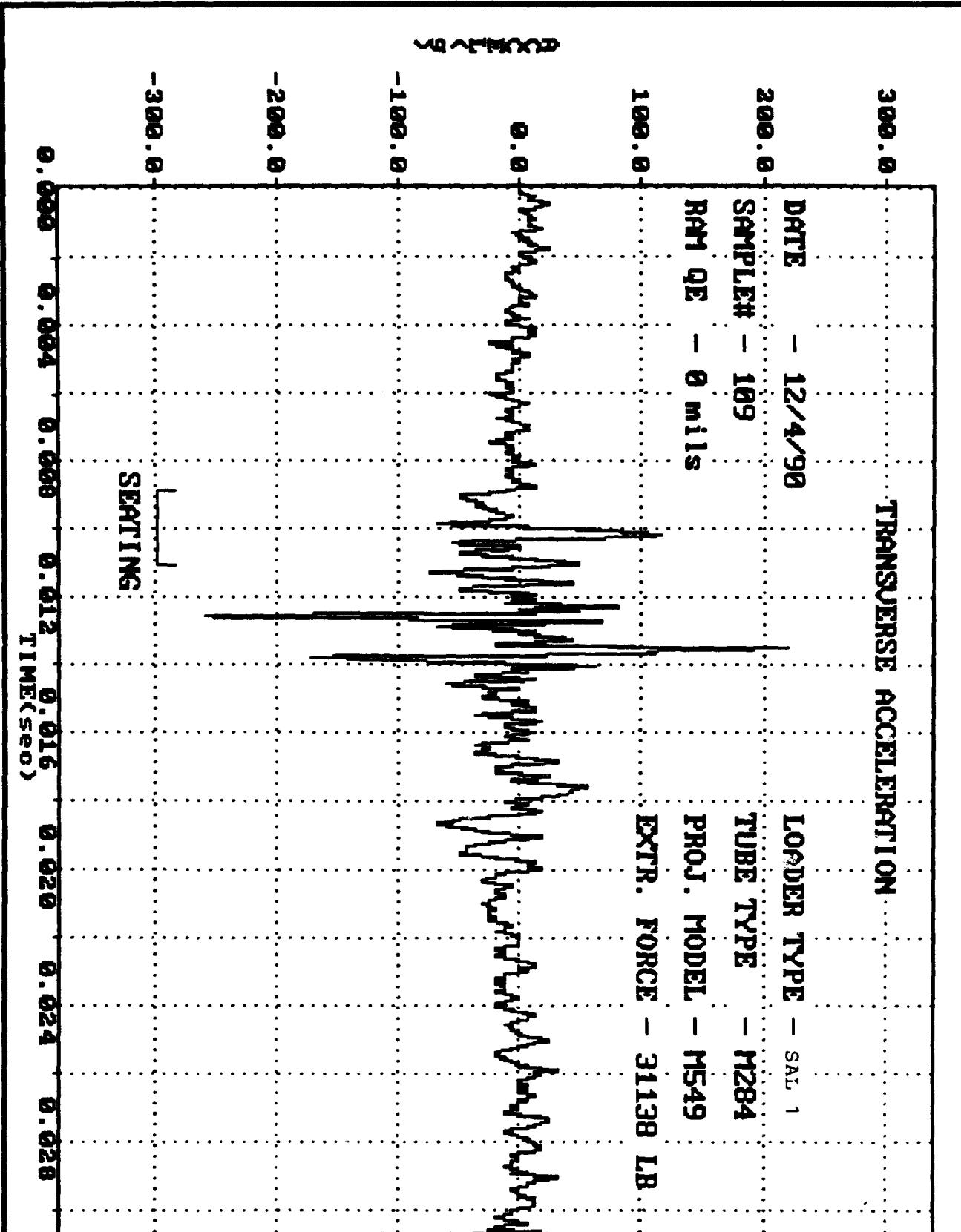


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

LONGITUDINAL ACCELERATION



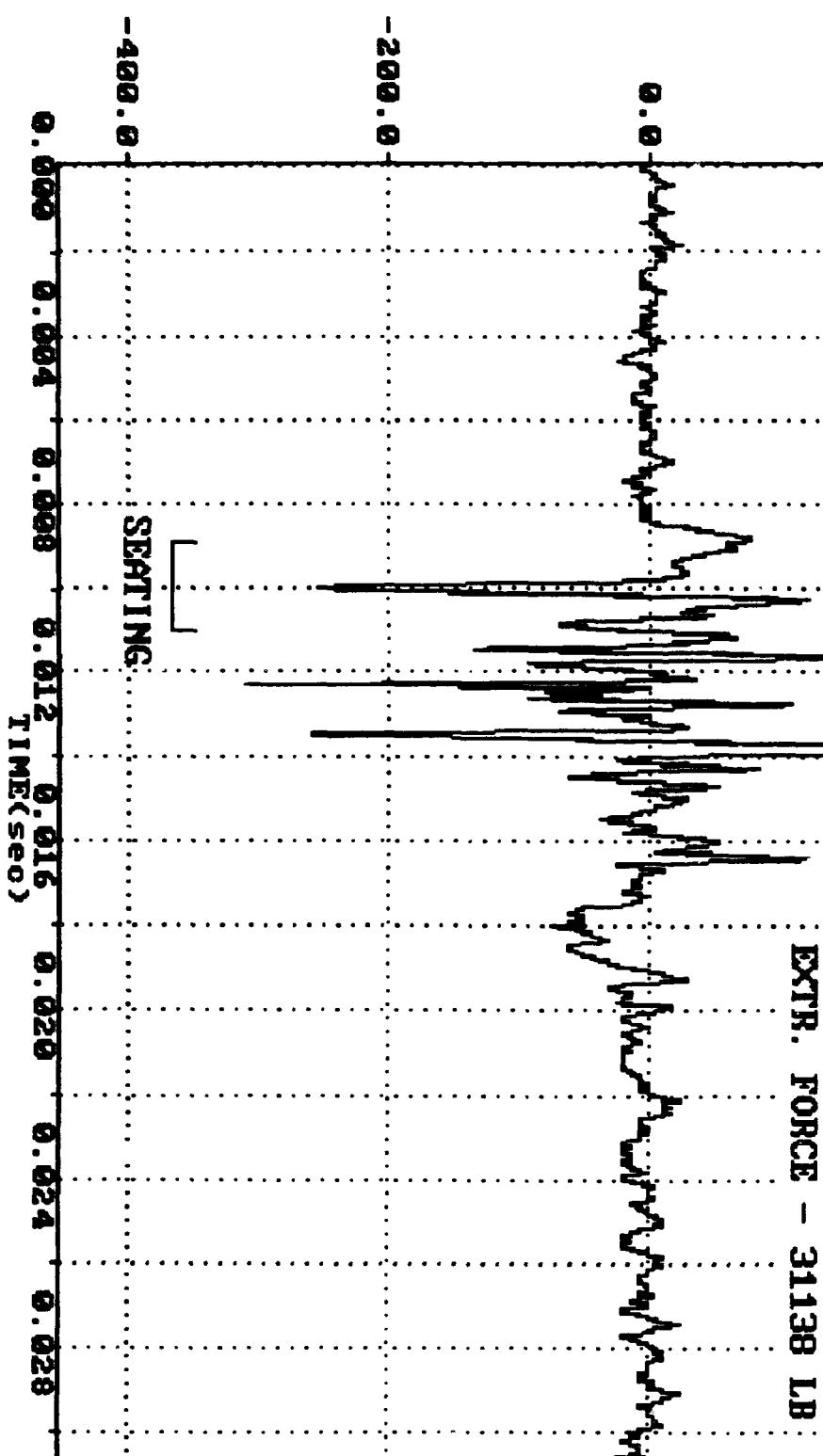
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



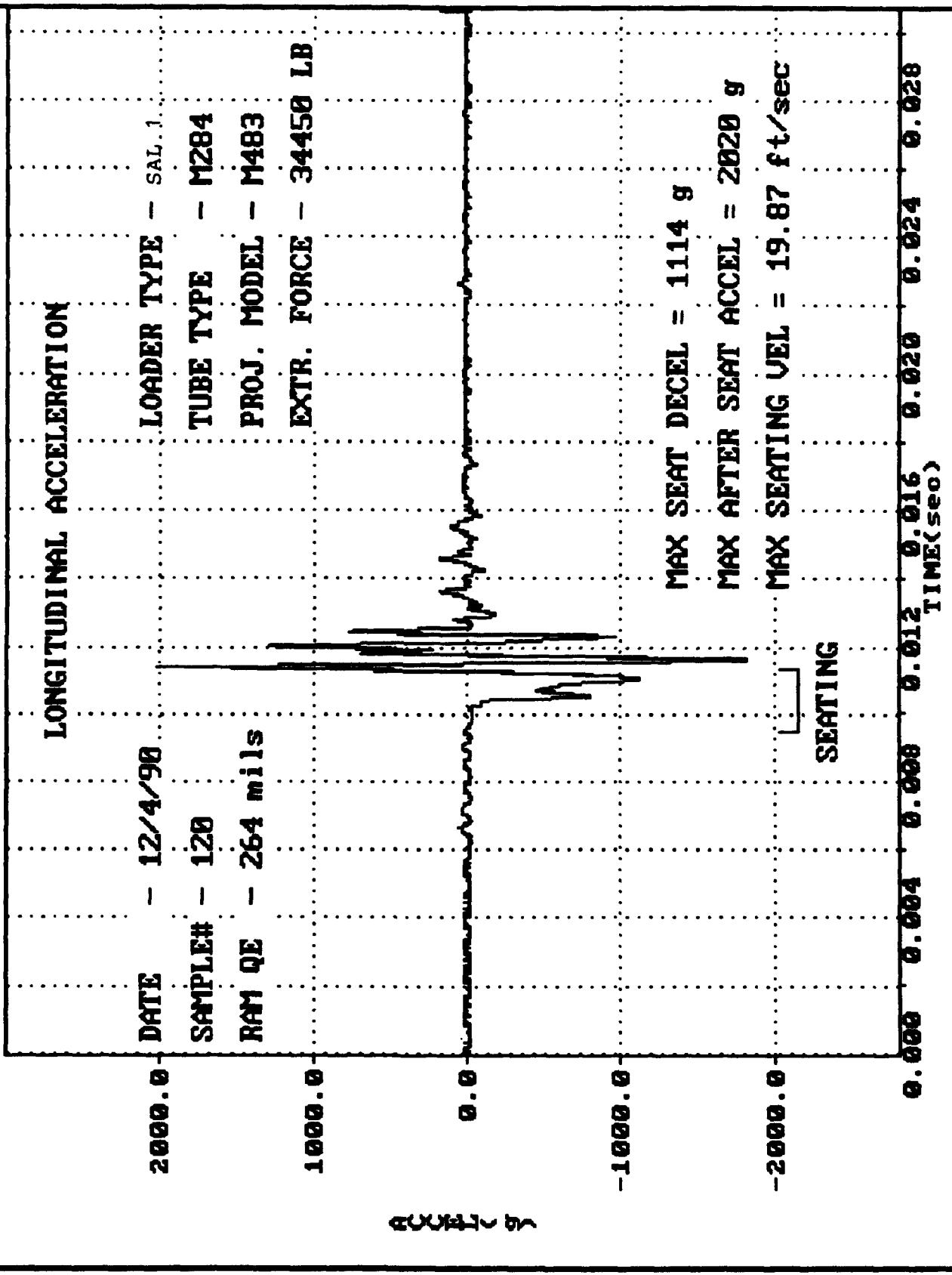
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

VERTICAL ACCELERATION

DATE - 12/4/90
SAMPLE# - 109
RAM QE - 0 mils
LOADER TYPE - SAL 1
TUBE TYPE - M284
PROJ. MODEL - M549
EXTR. FORCE - 31138 LB

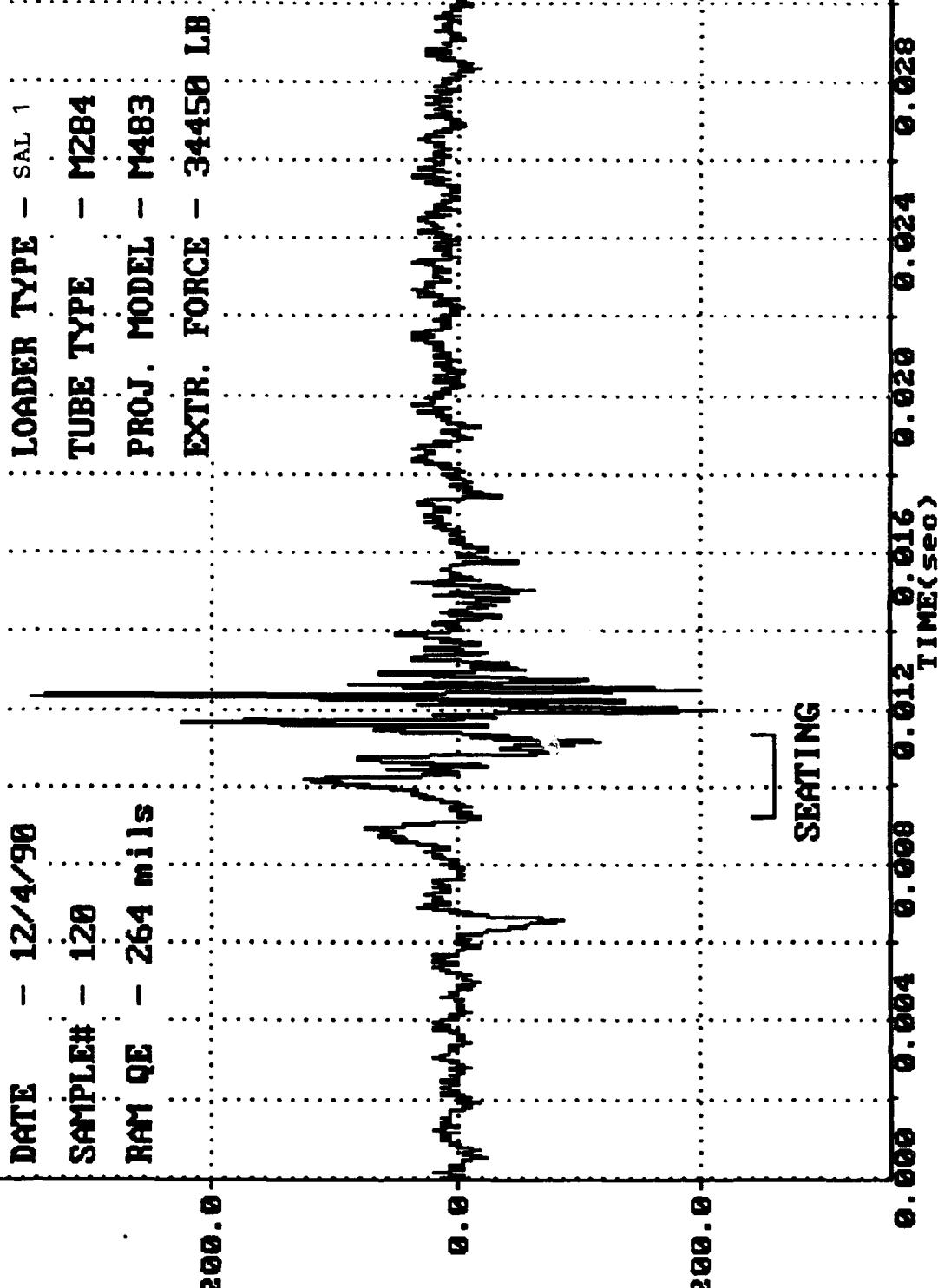


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

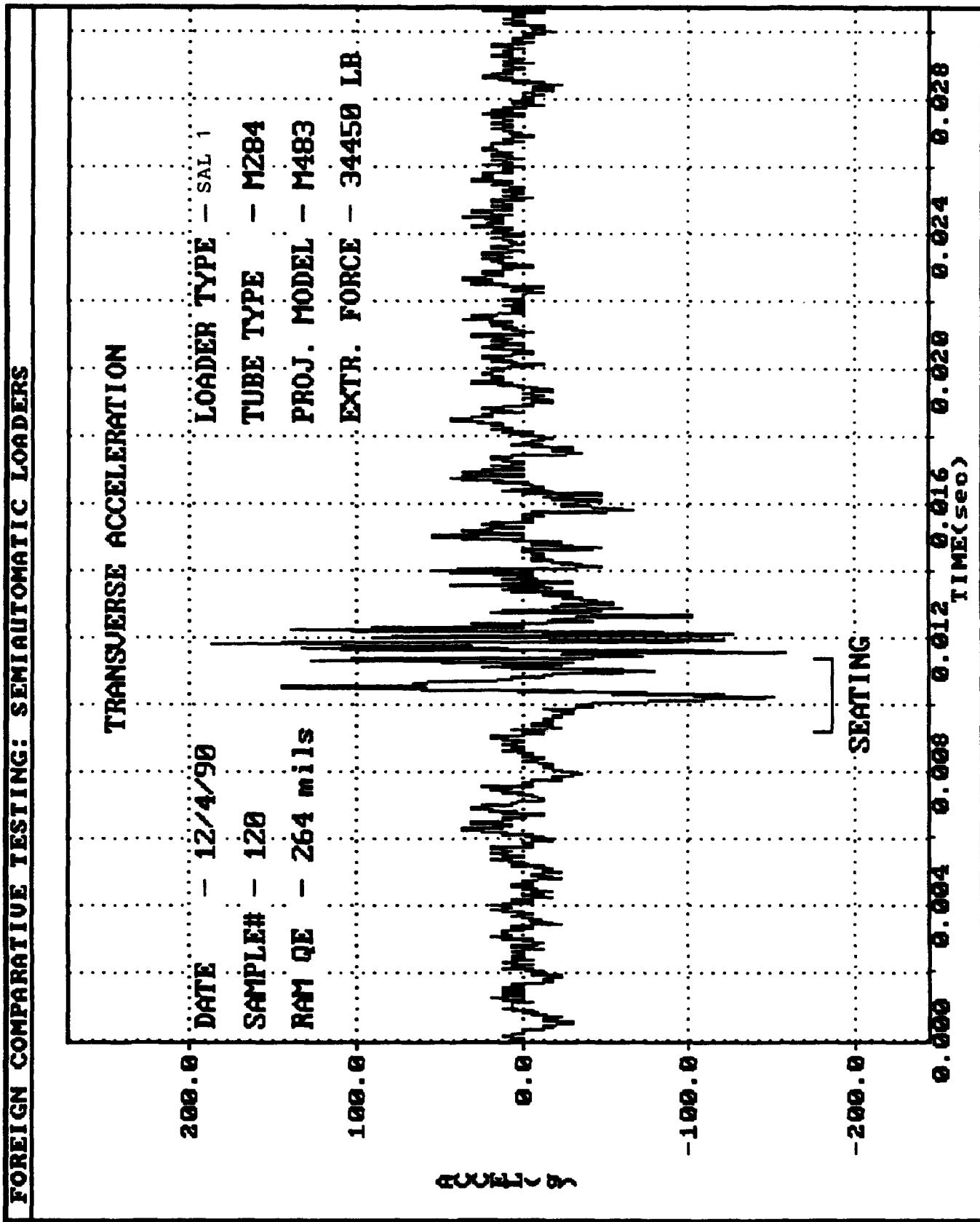


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

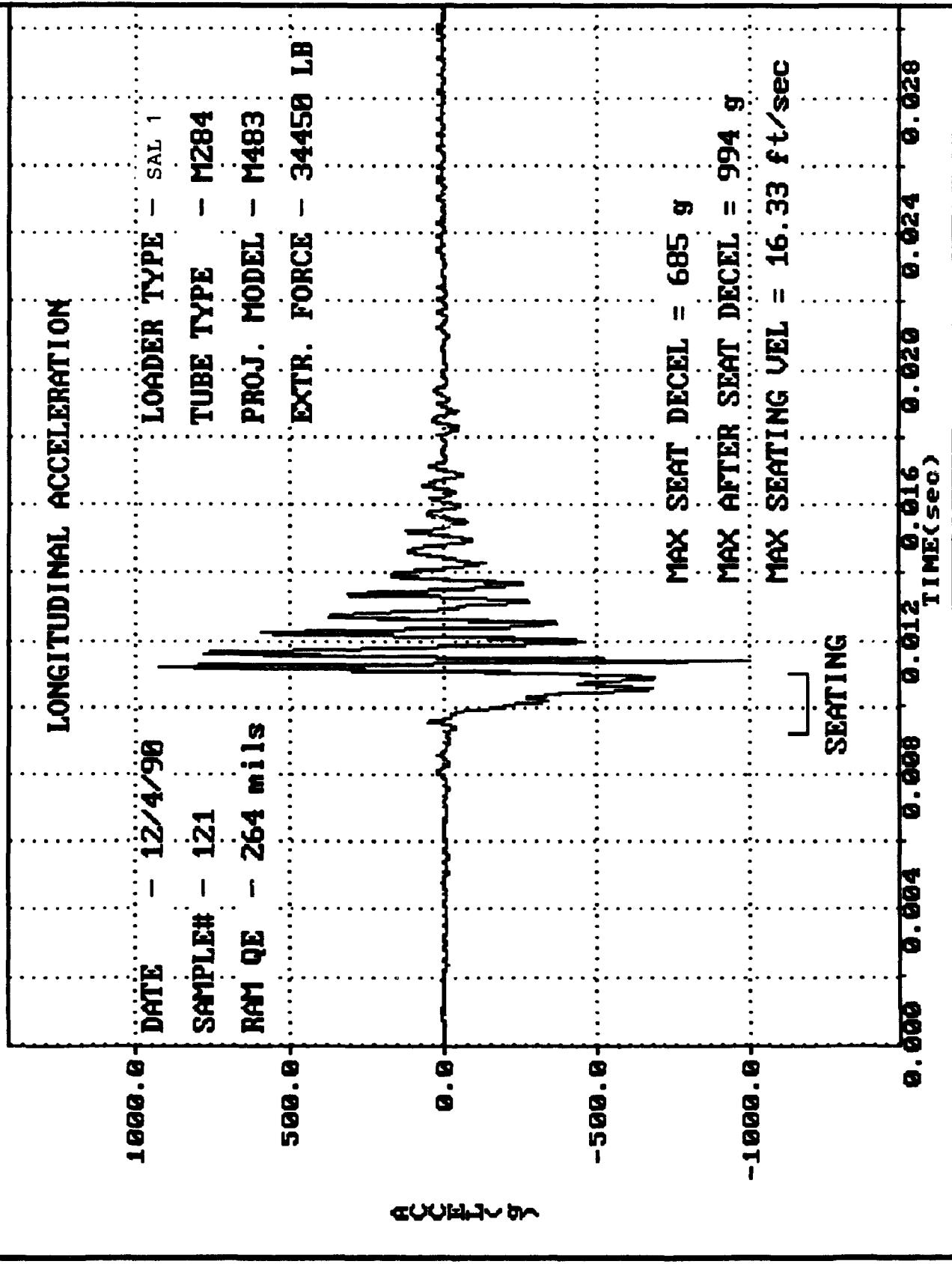
VERTICAL ACCELERATION



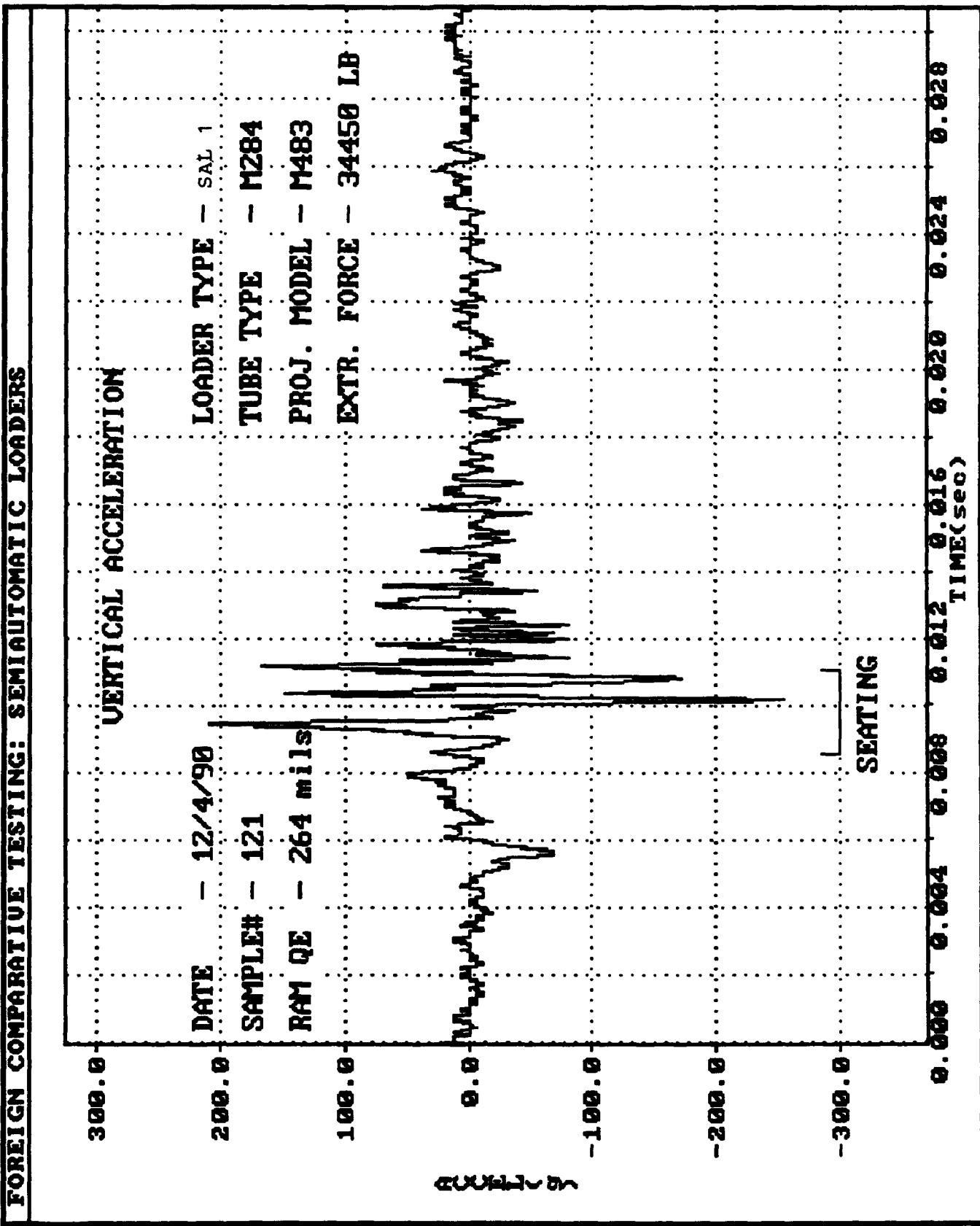
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

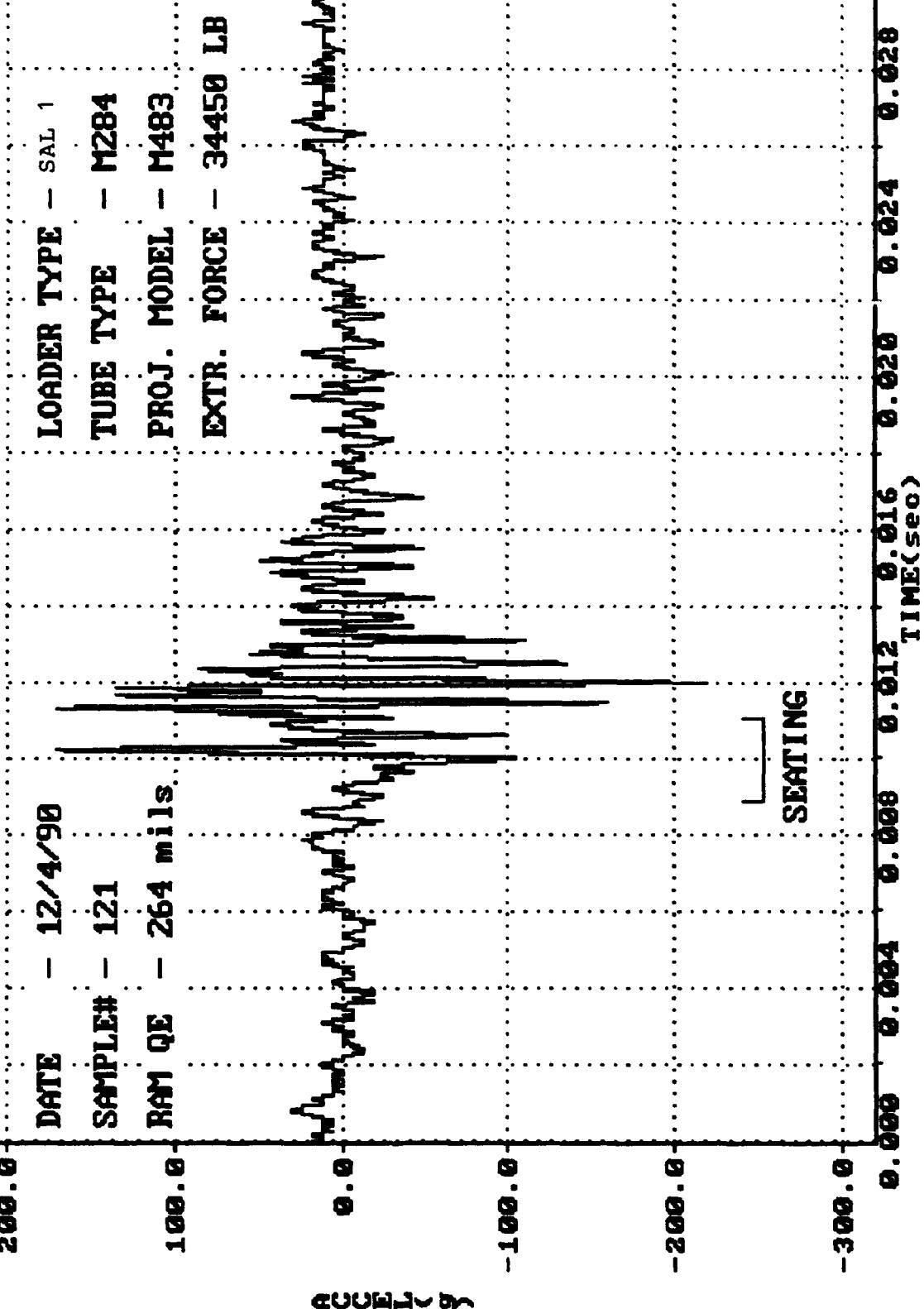


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

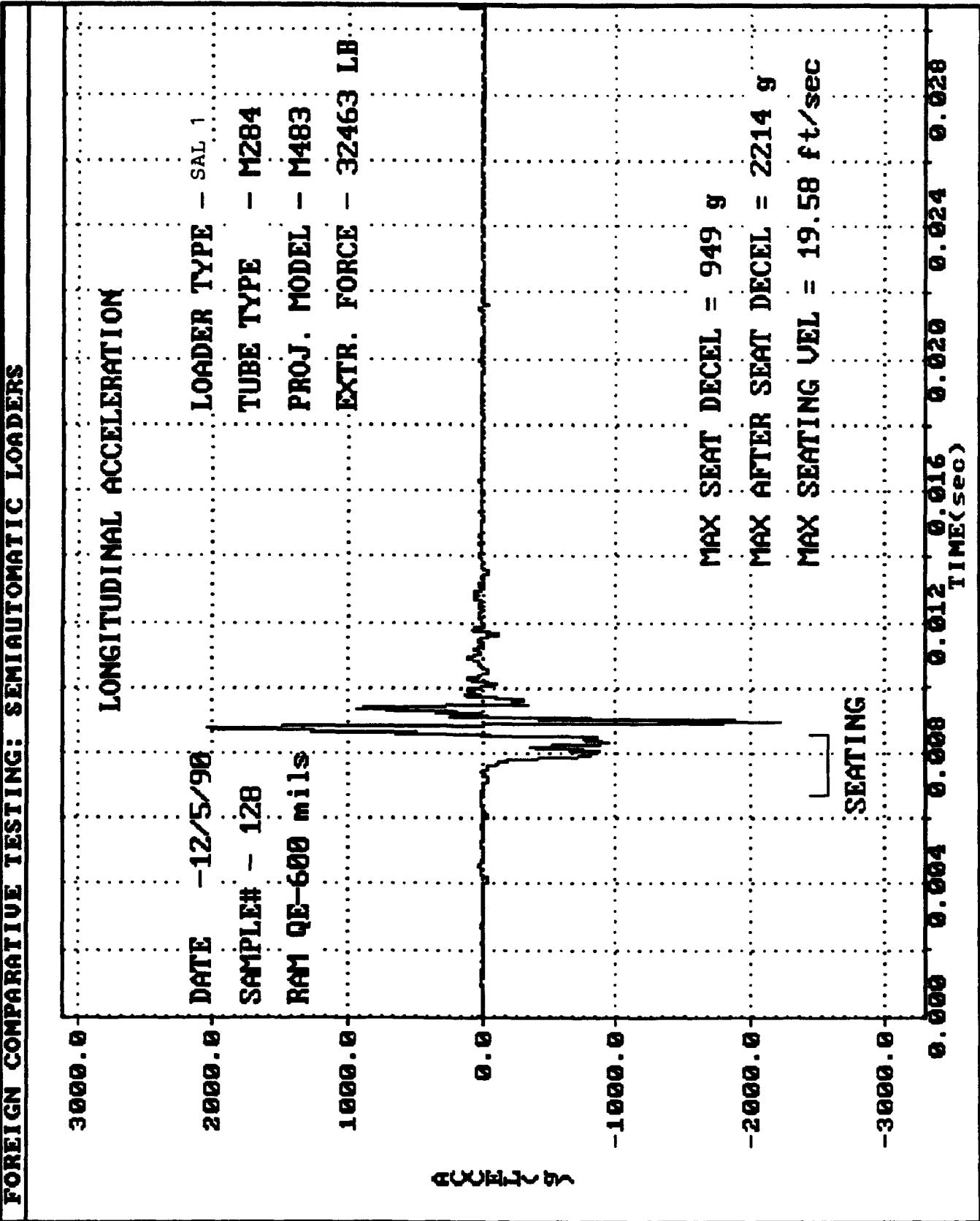


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION

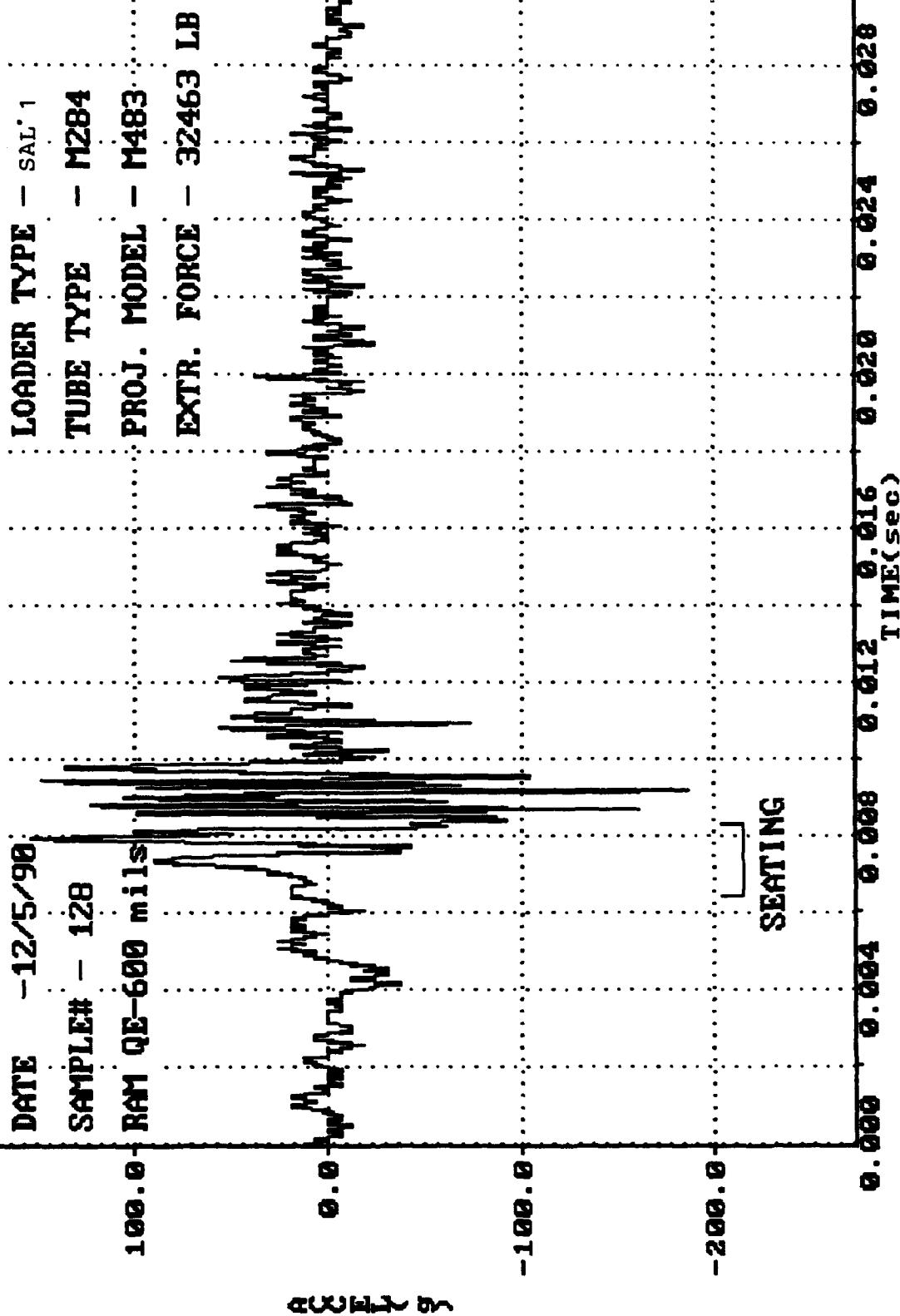


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

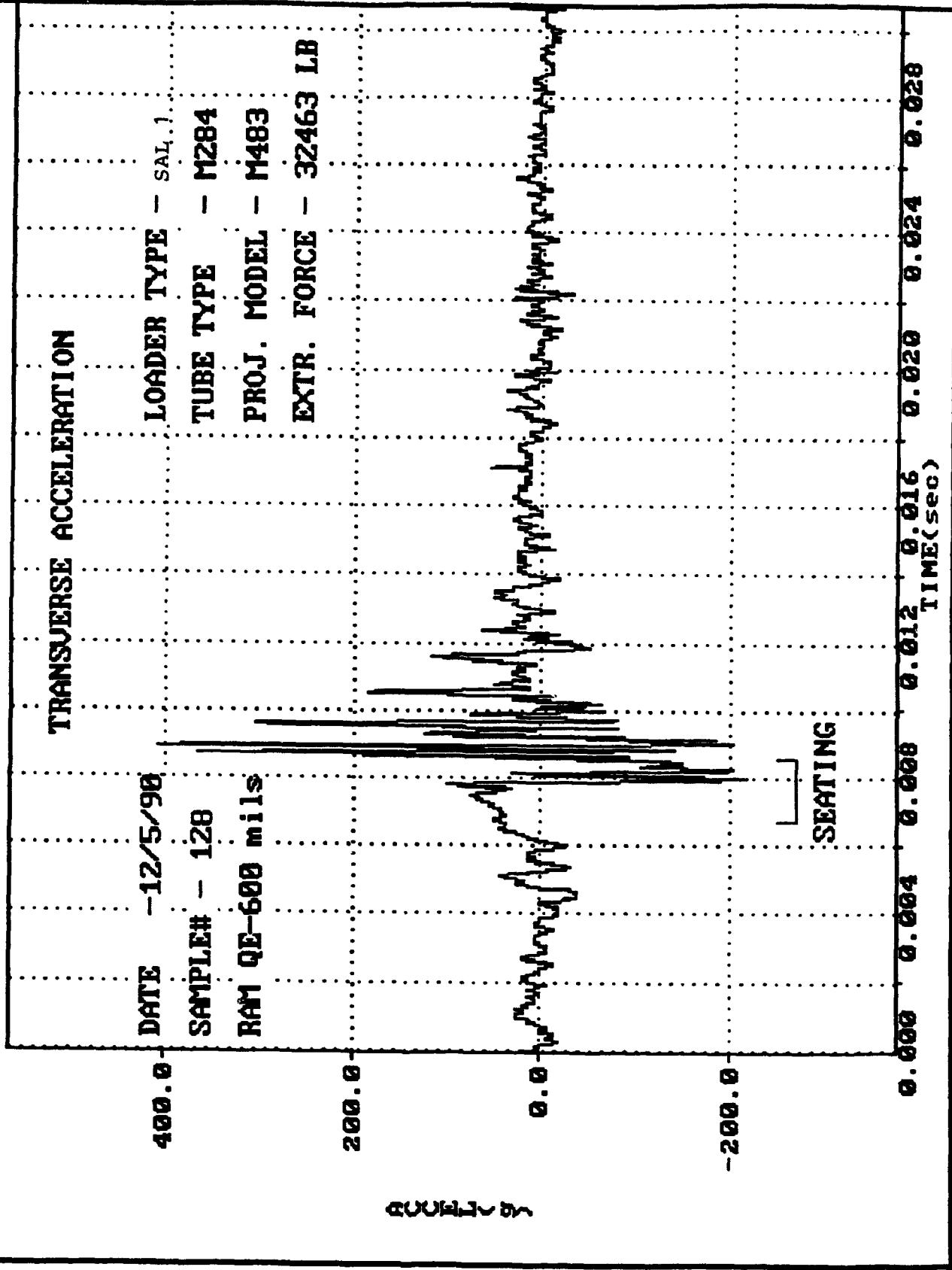


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

VERTICAL ACCELERATION



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

LONGITUDINAL ACCELERATION

DATE - 12/5/90

SAMPLE# - 135

RAM QE - 900 mils

1000.0

LOADER TYPE - SAL 1
TUBE TYPE - M284
PROJ. MODEL - M483
EXTR. FORCE - 32463 LB

ACCELERATION

102

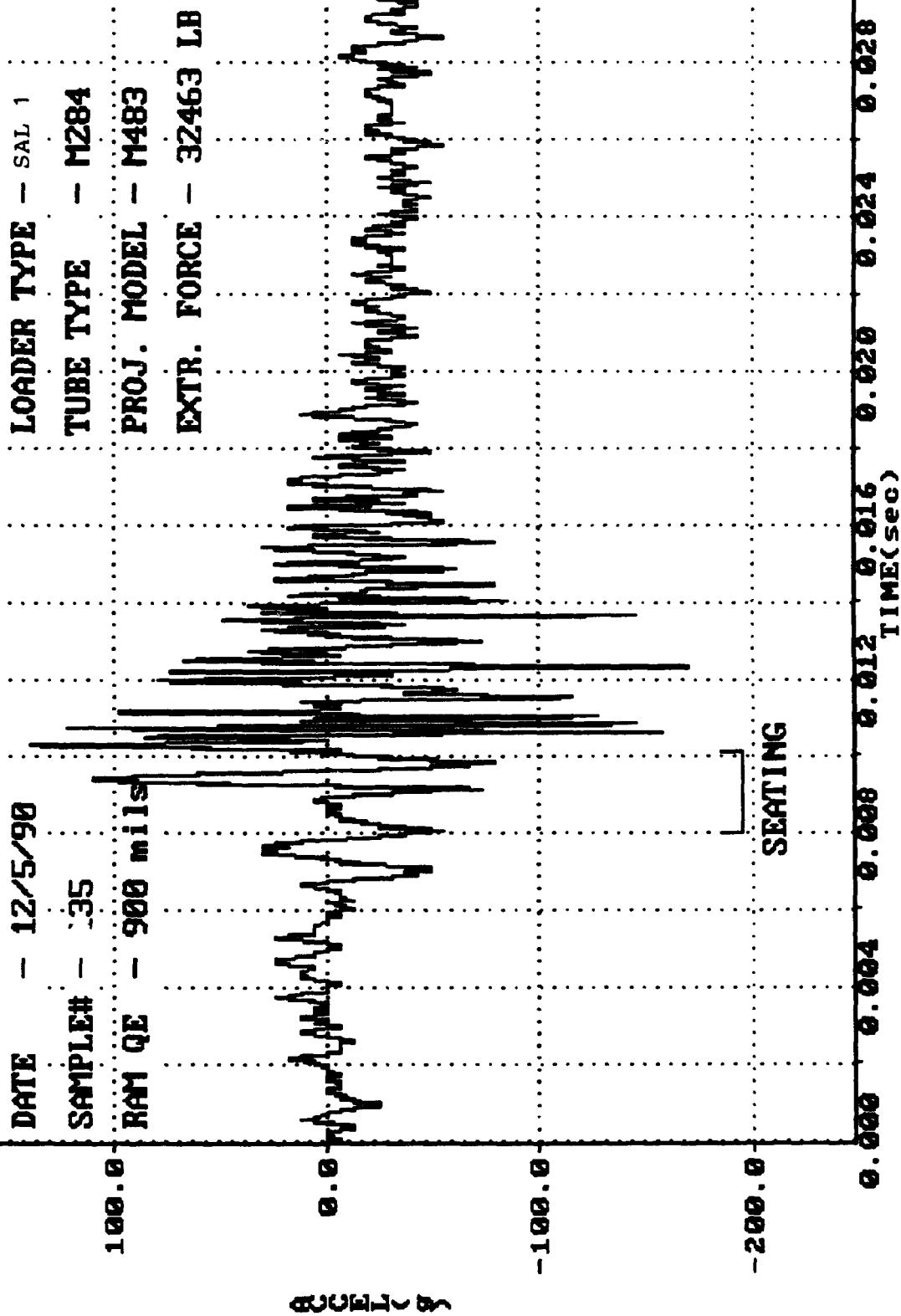
MAX SEAT DECEL = 942 g
MAX AFTER SEAT ACCEL = 1750 g
MAX SEATING VEL = 18.09 ft/sec

SEATING

0.000 0.004 0.008 0.012 0.016 0.020 0.024 0.028
TIME(sec)

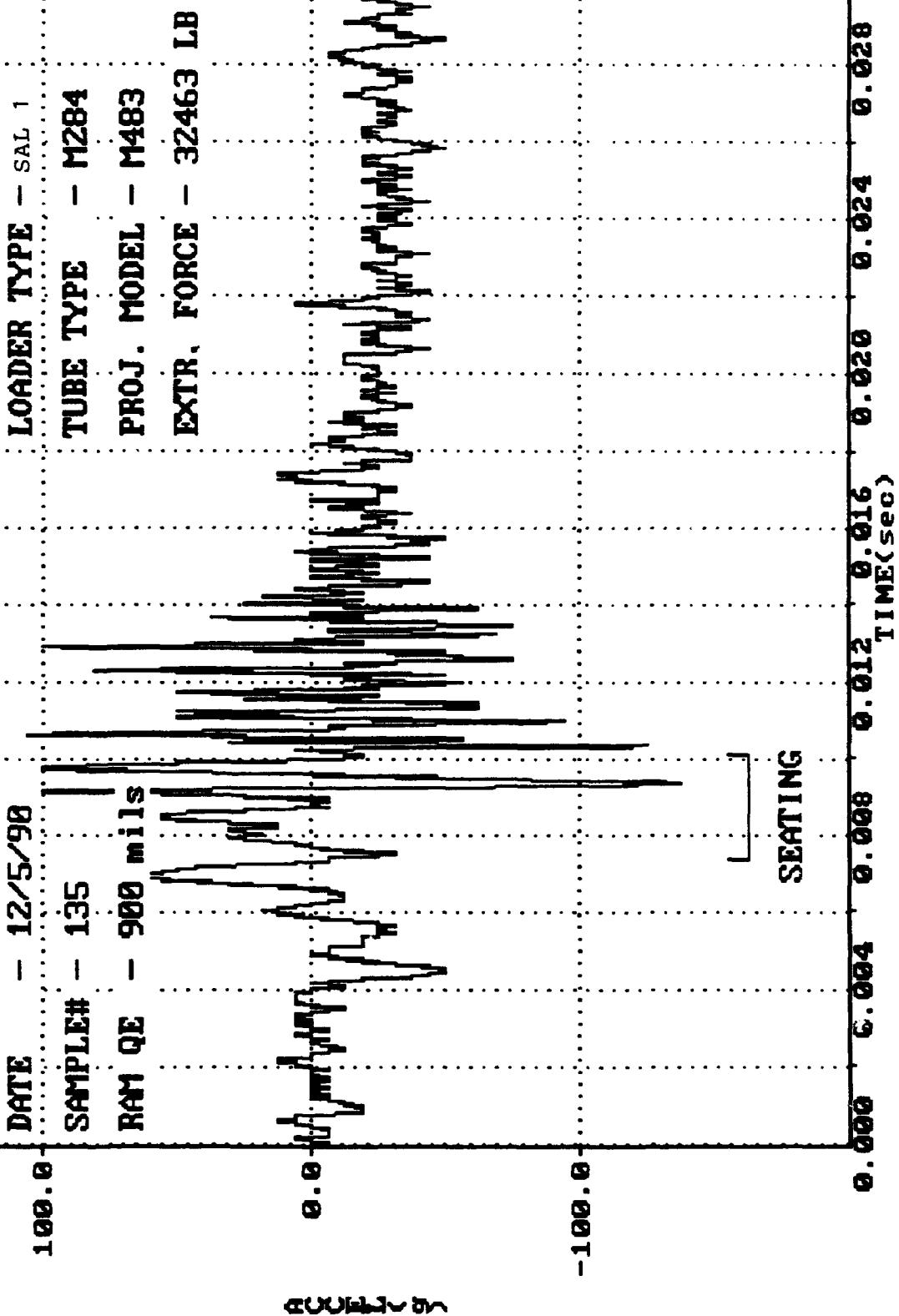
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

VERTICAL ACCELERATION

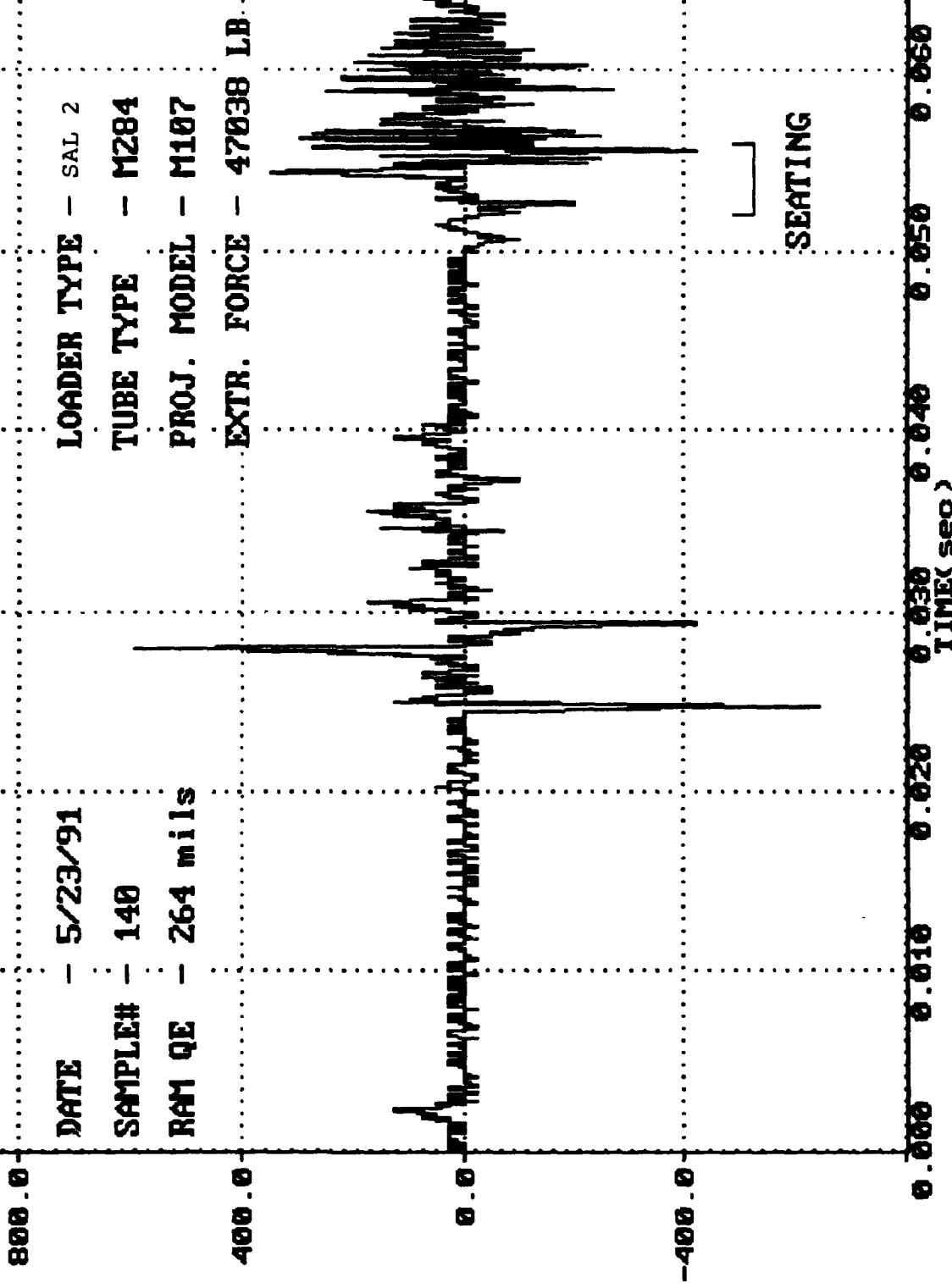


EXCERPT

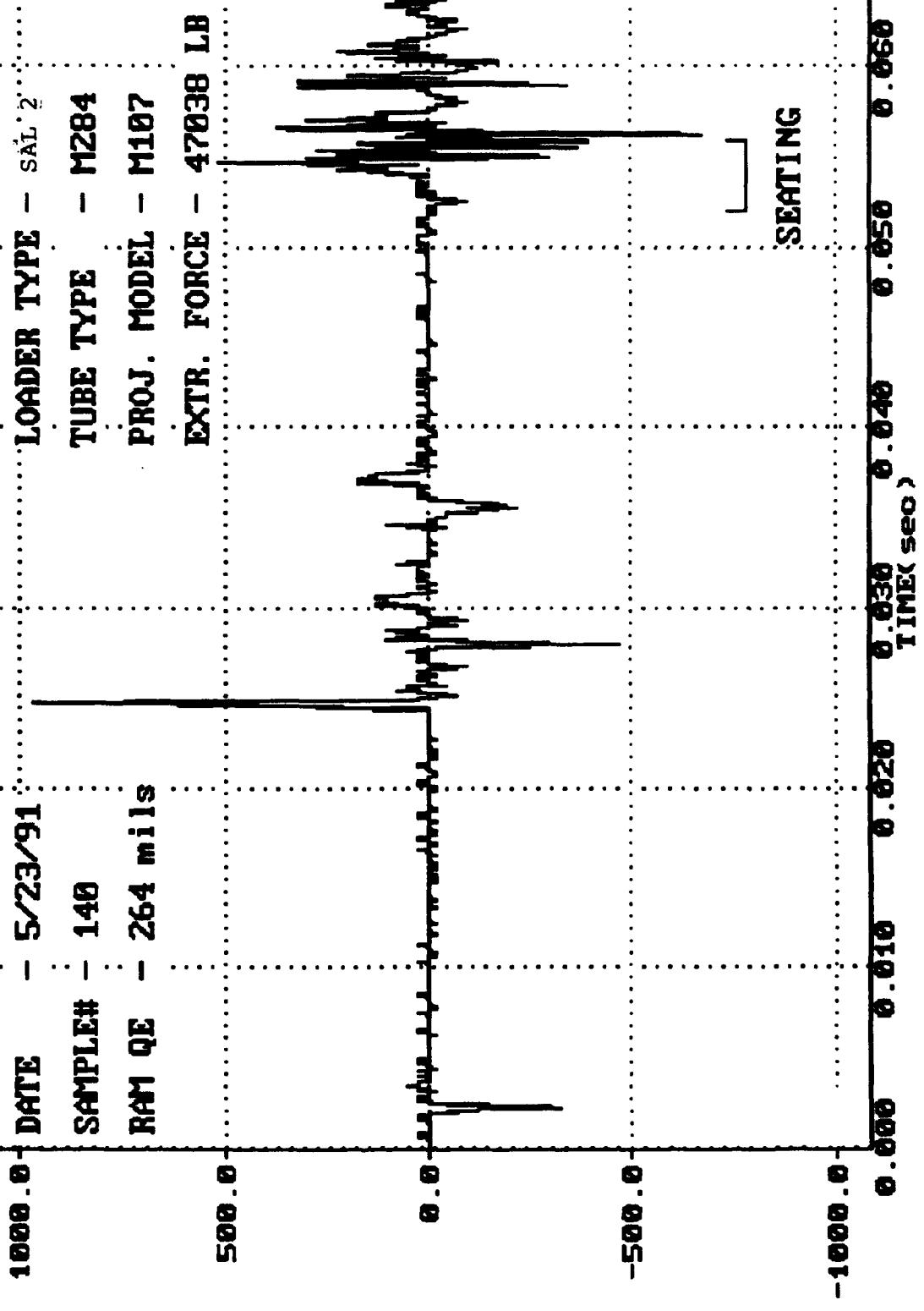
APPENDIX C
KW RAMS

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION

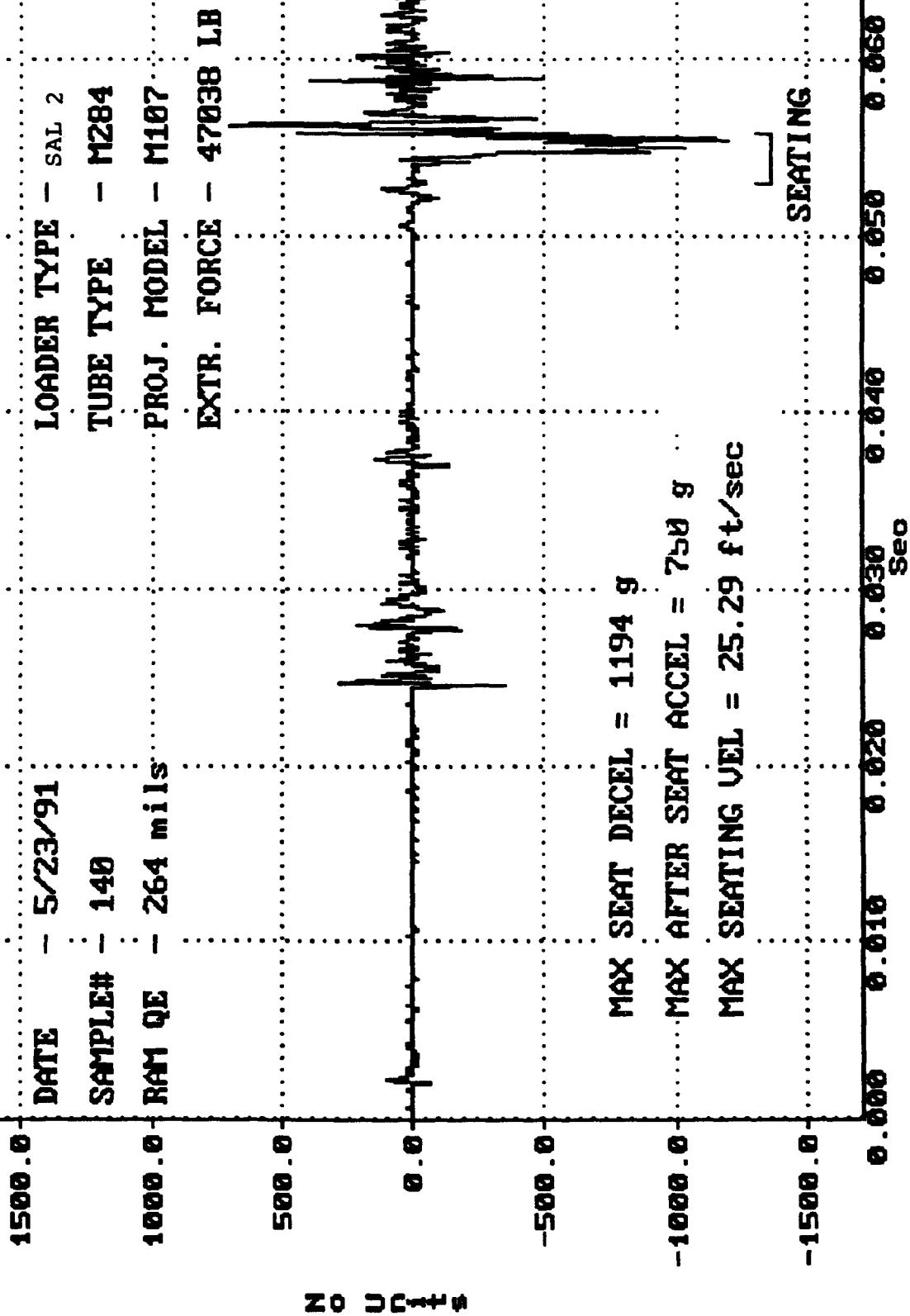


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



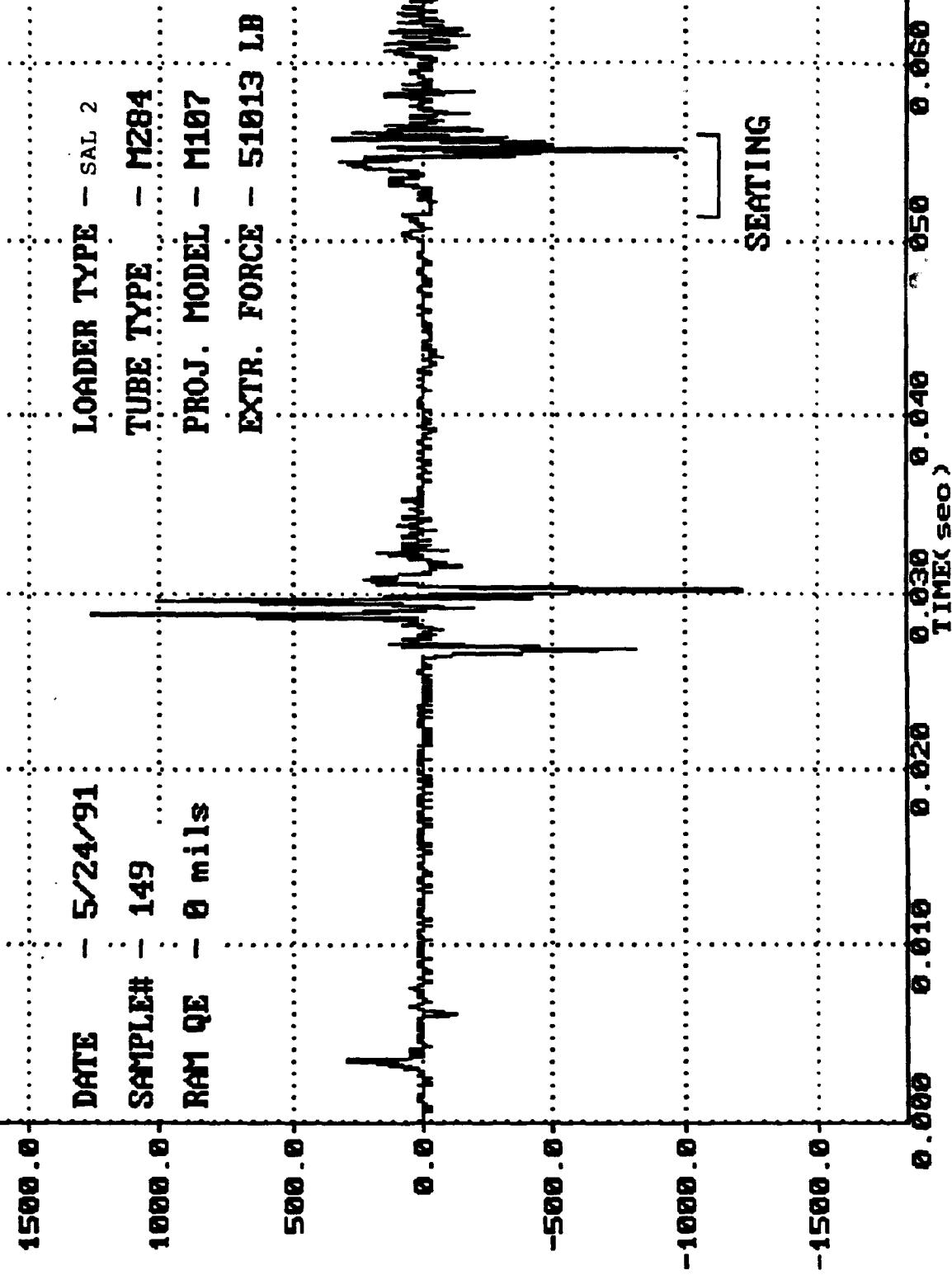
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

LONGITUDINAL ACCELERATION



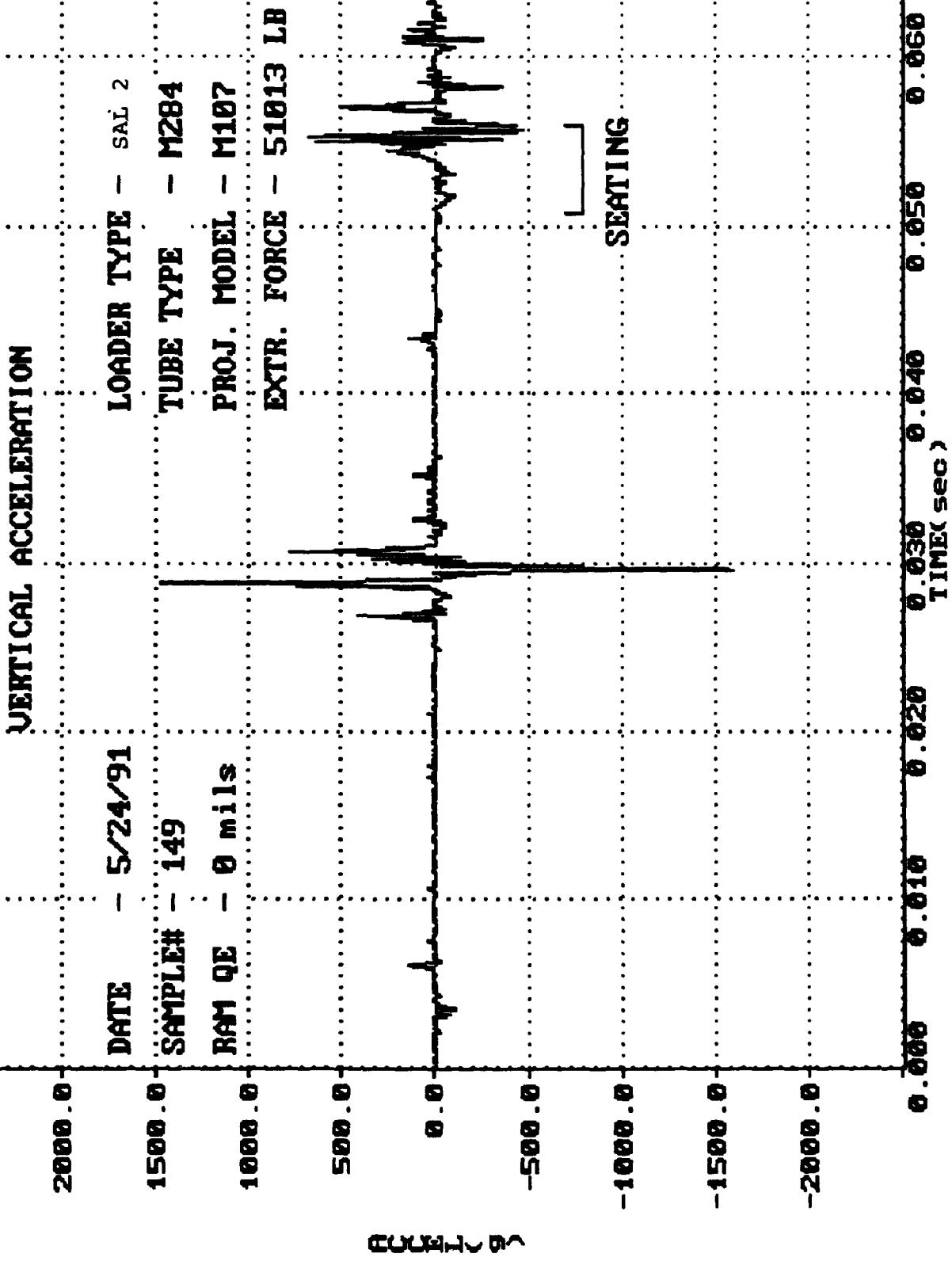
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION



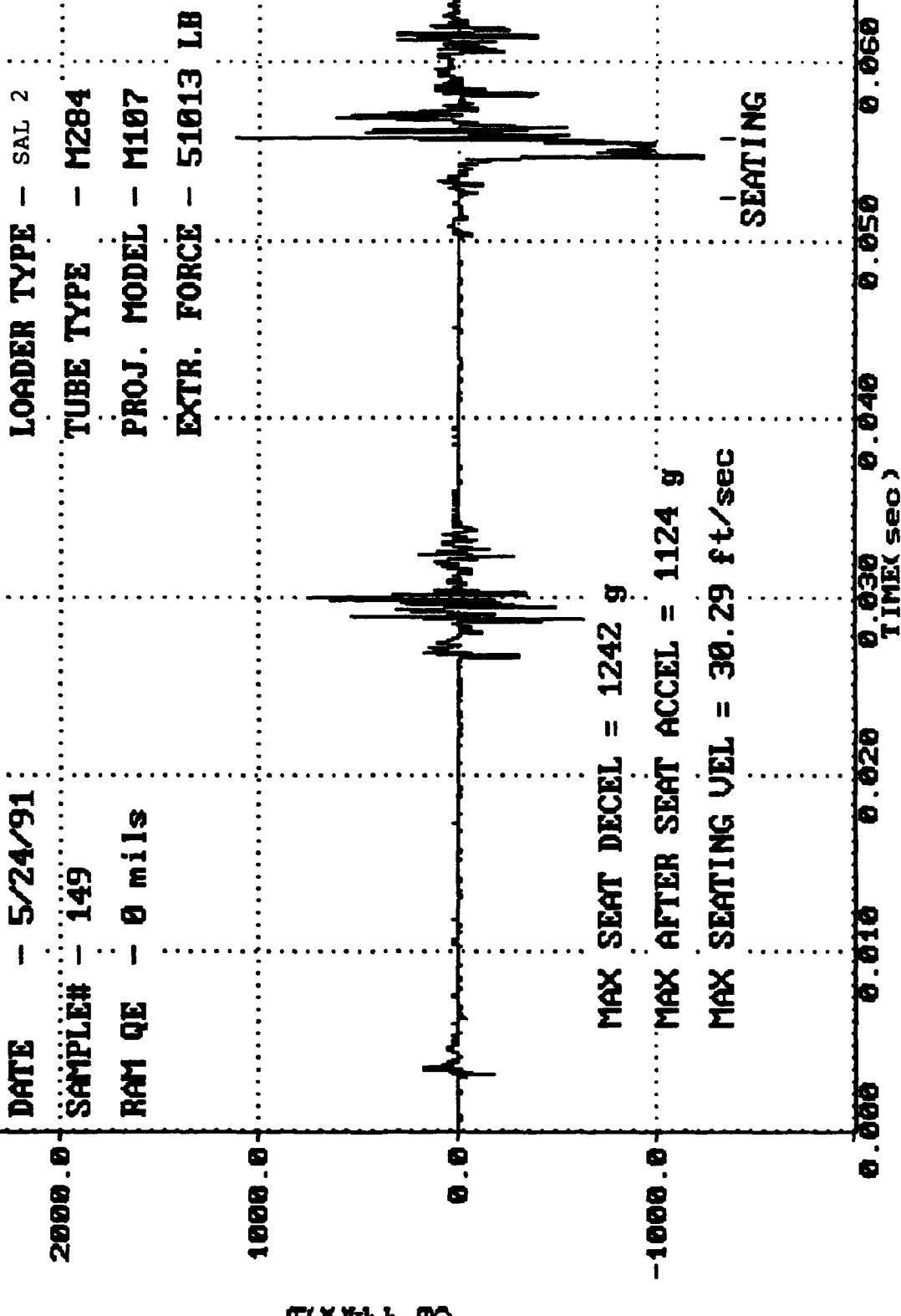
ACCELERATION

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



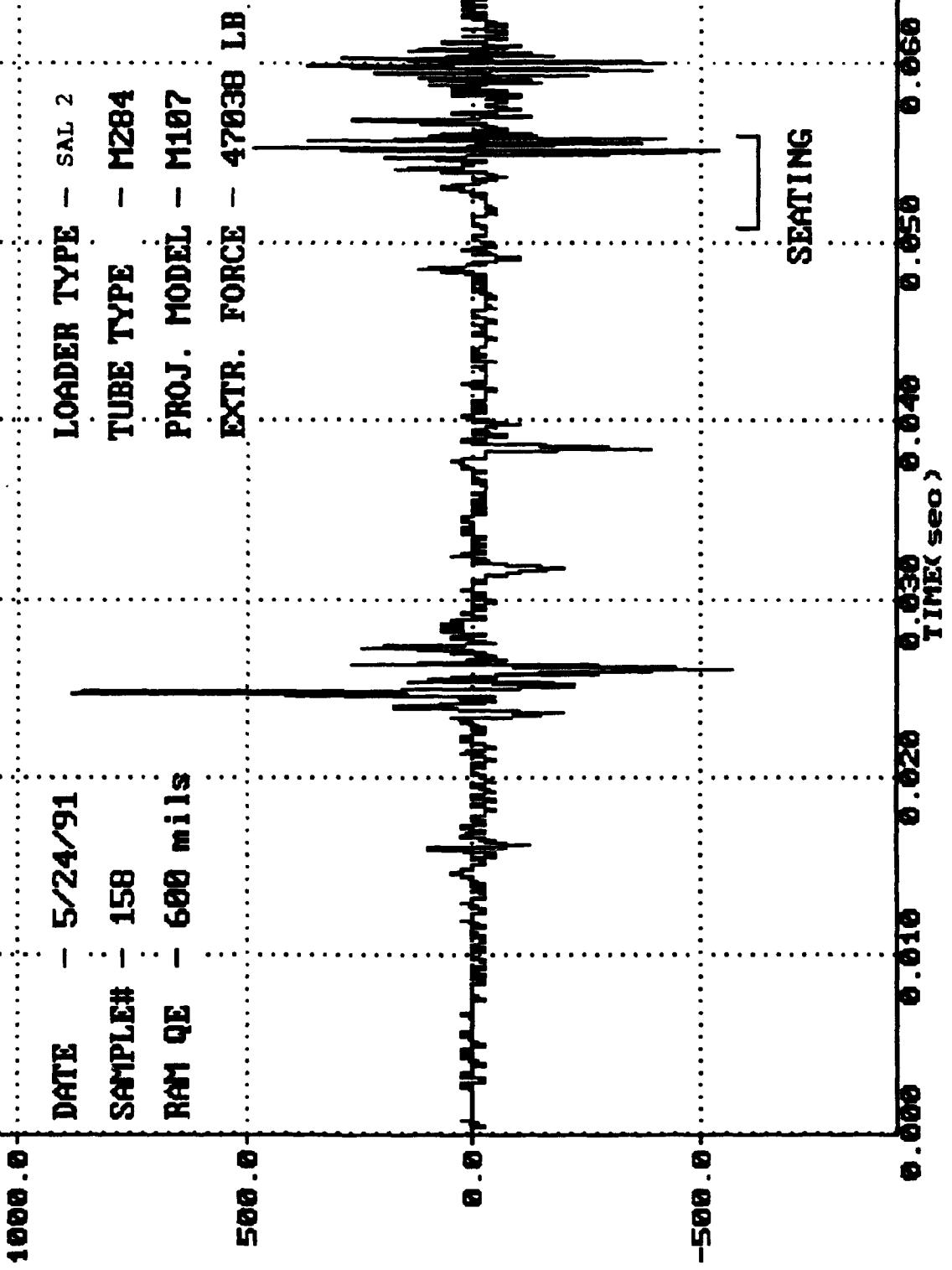
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

LONGITUDINAL ACCELERATION

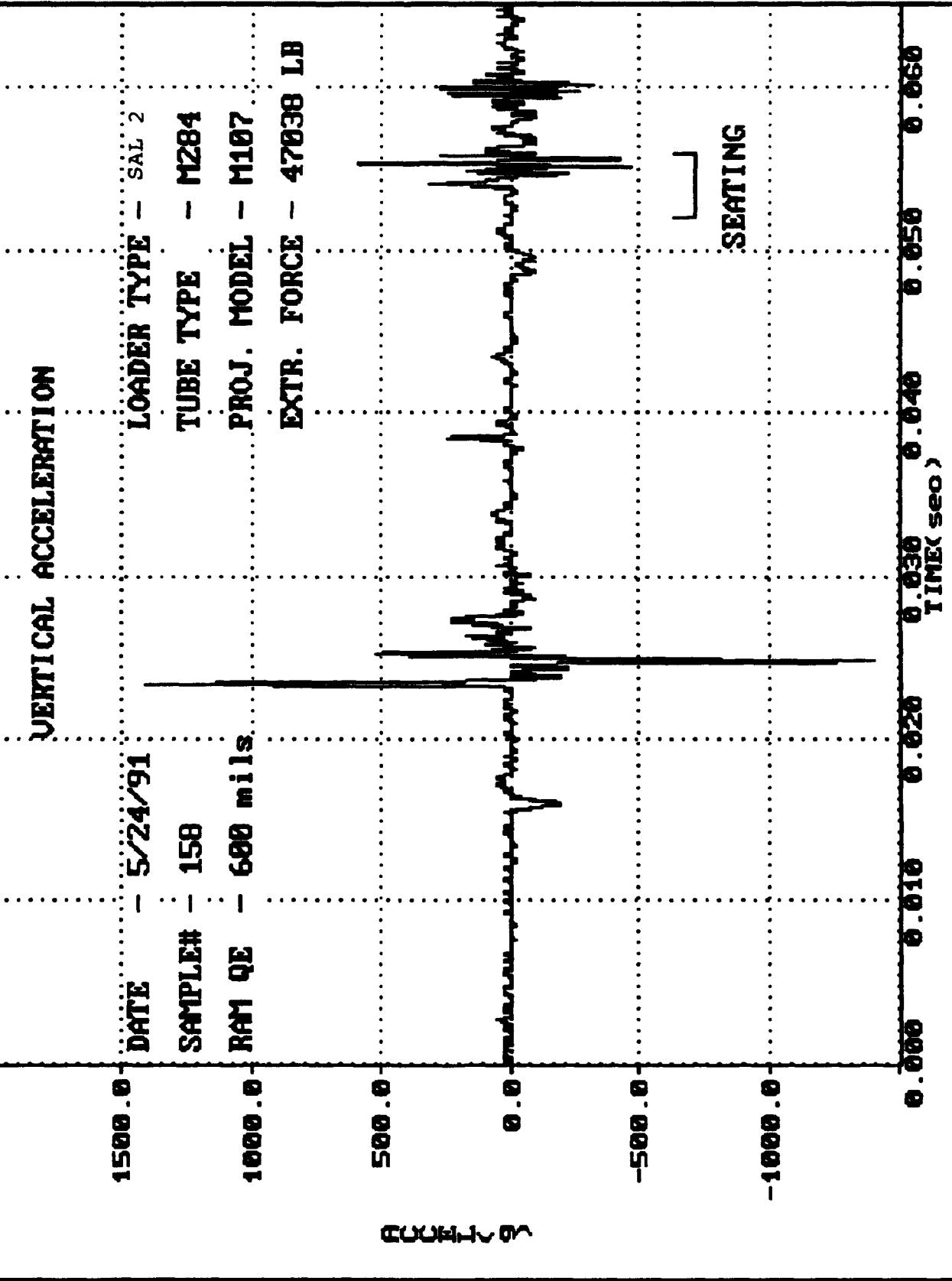


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION

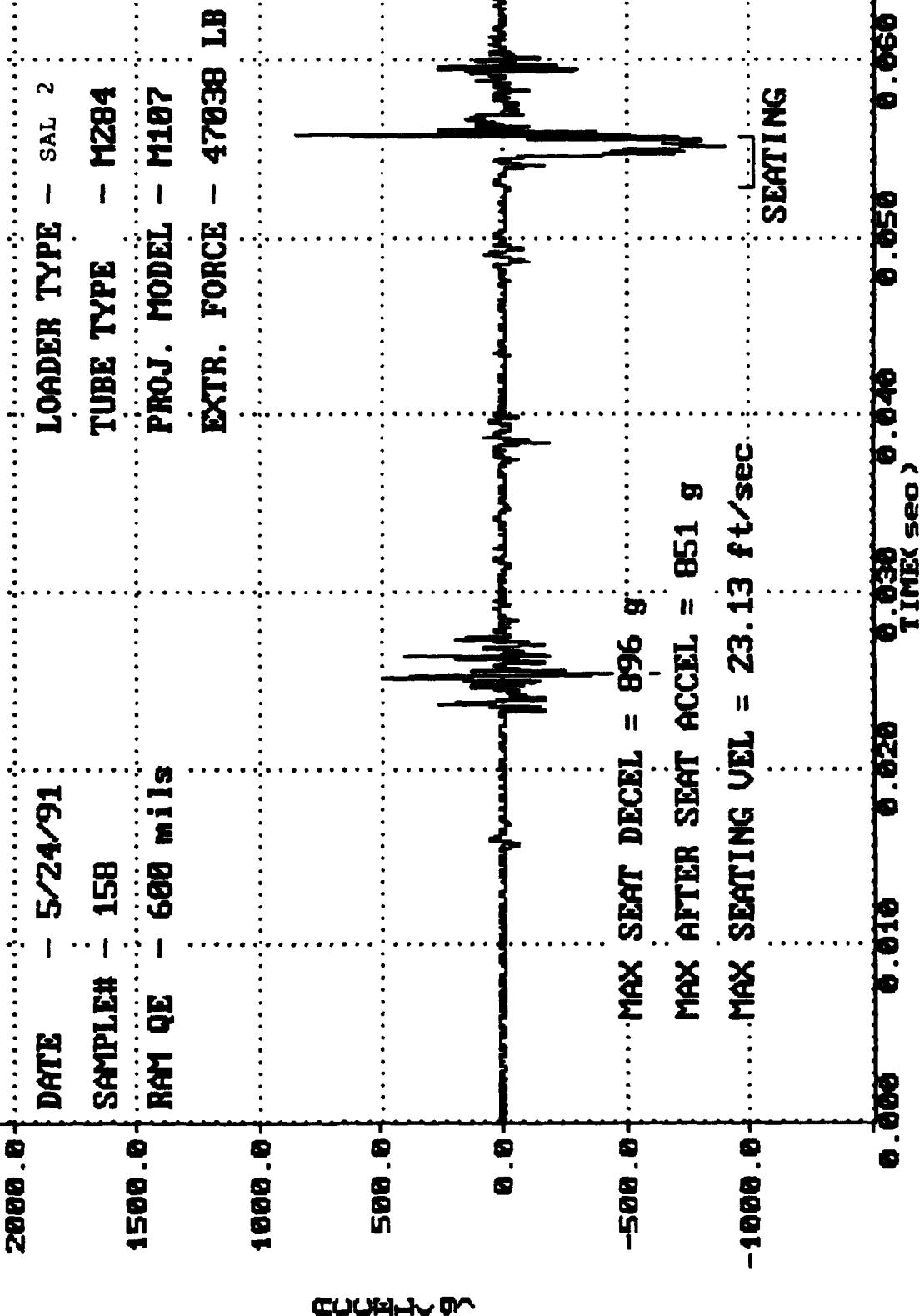


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FORREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

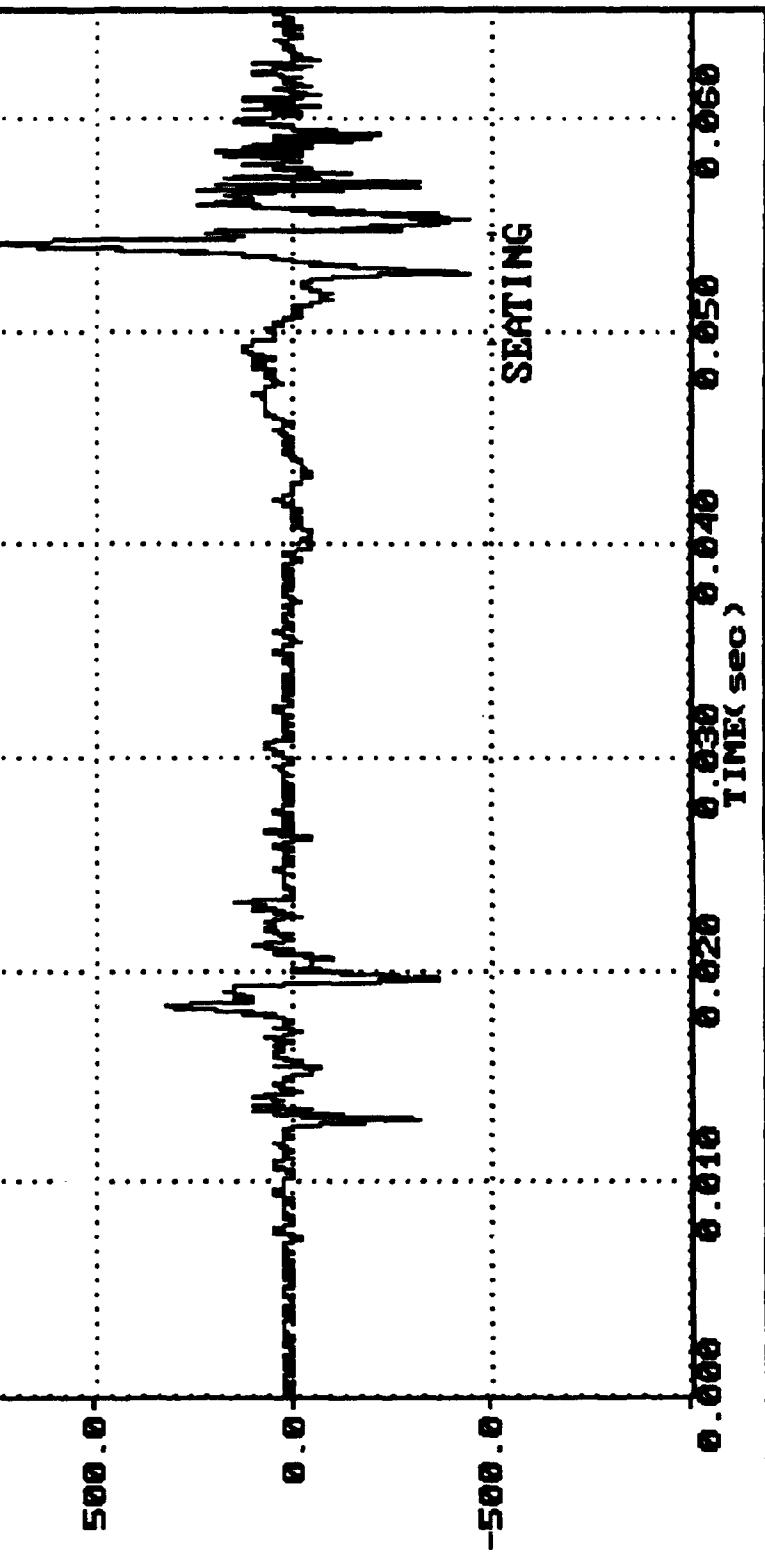
LONGITUDINAL ACCELERATION



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION

1500.0 DATE - 5/24/91 LOADER TYPE - SAL.2
SAMPLE# - 159 TUBE TYPE - M284
RAM QE - 1000 mils PROJ. MODEL - M107
1000.0 EXTR. FORCE - 39750 lb



COUNTS/sec

FUNCTION COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

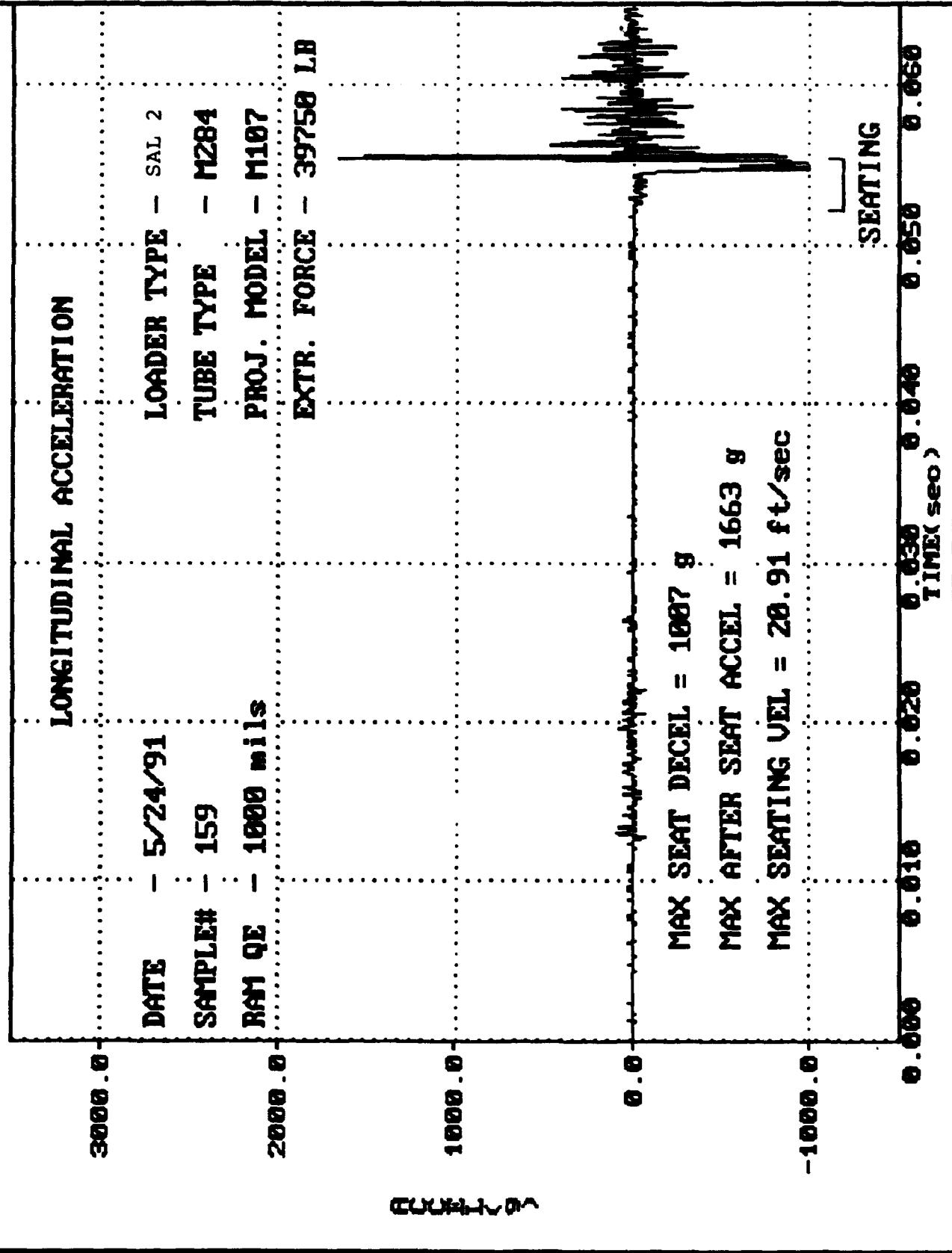
VERTICAL ACCELERATION

1500.0 DATE - 5/24/91 LOADER TYPE - SAL 2
SAMPLE# - 159 TUBE TYPE - M284
RAM QE - 1000 mils PROJ. MODEL - M107
1000.0 EXTR. FORCE - 39750 LB

ACCELERATION

117

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION

1500.0 DATE - 5/24/91

1000.0 LOADER TYPE - SAL 2

SAMPLE# - 166 TUBE TYPE - M284

RAM QE - 264 mils

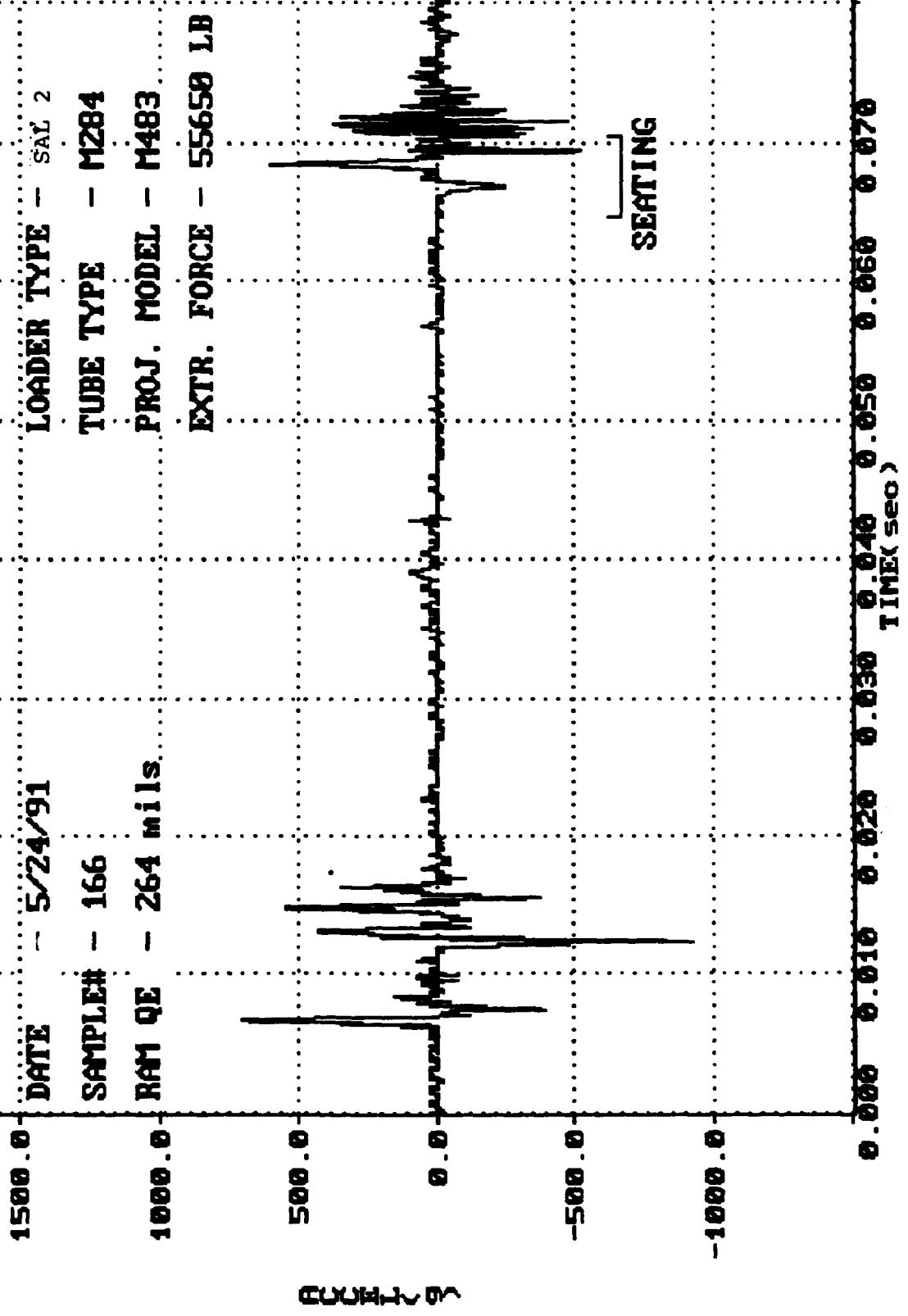
PROJ. MODEL - M483

EXTR. FORCE - 55650 LB

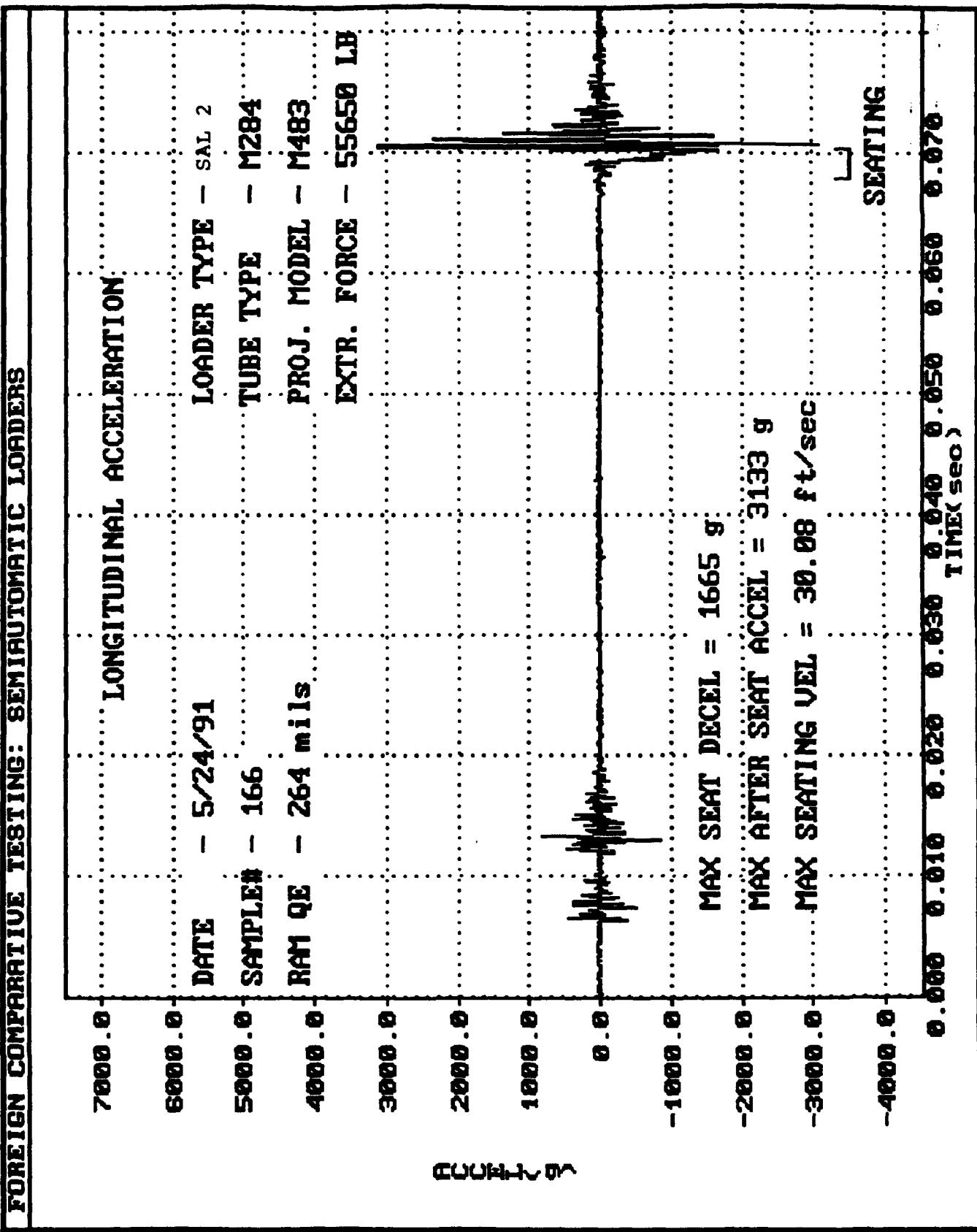
ACCELERATION

119

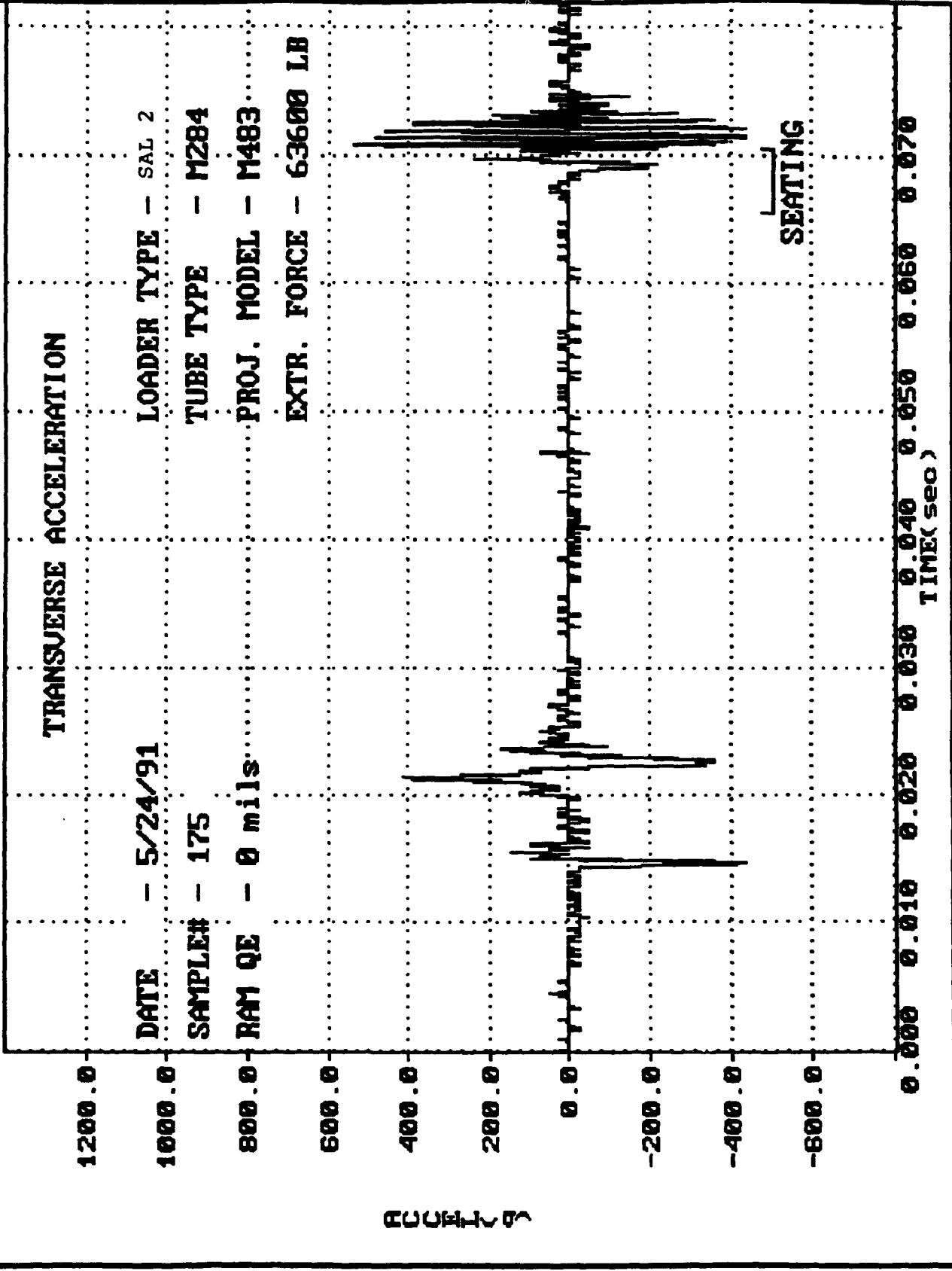
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

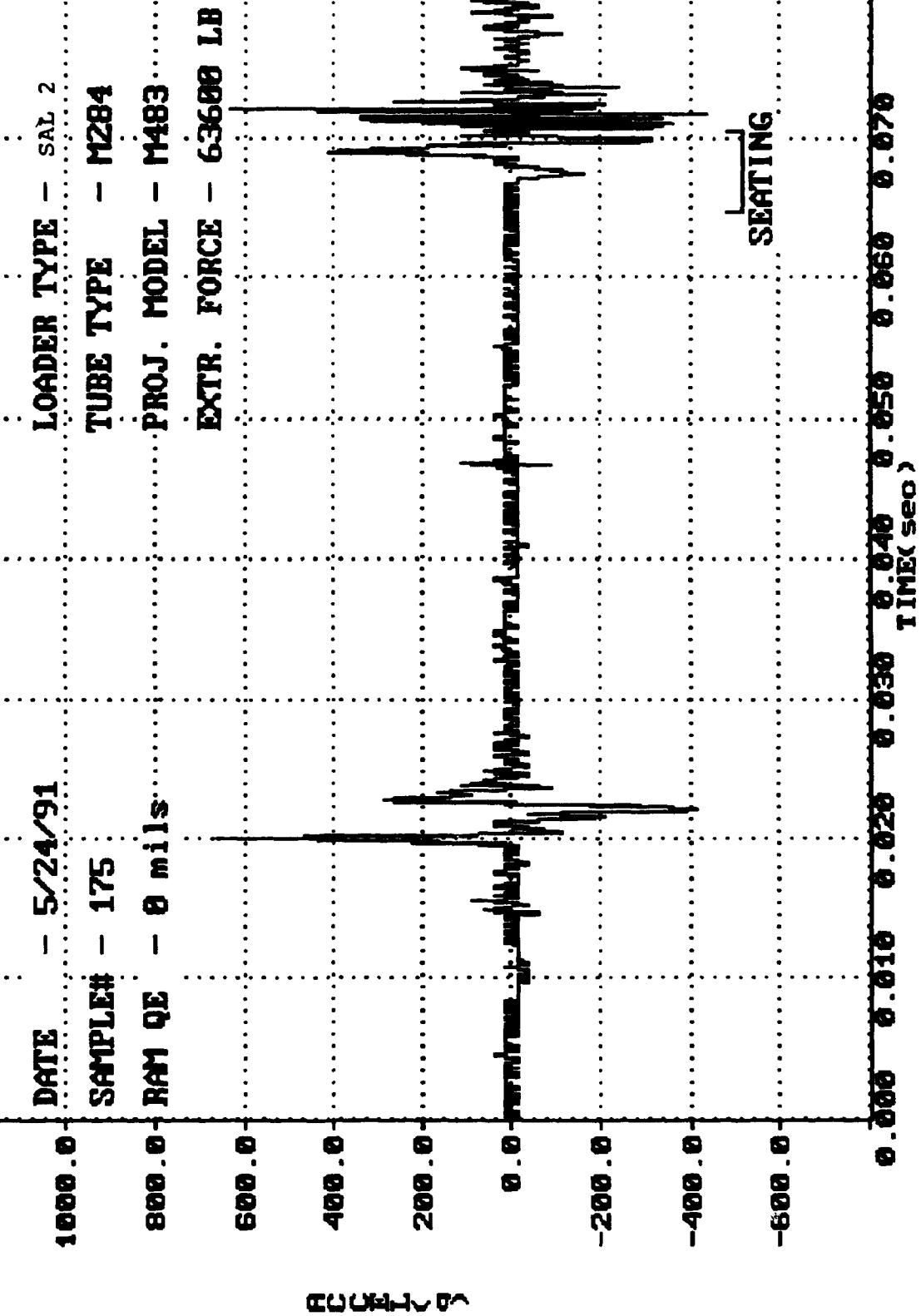


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



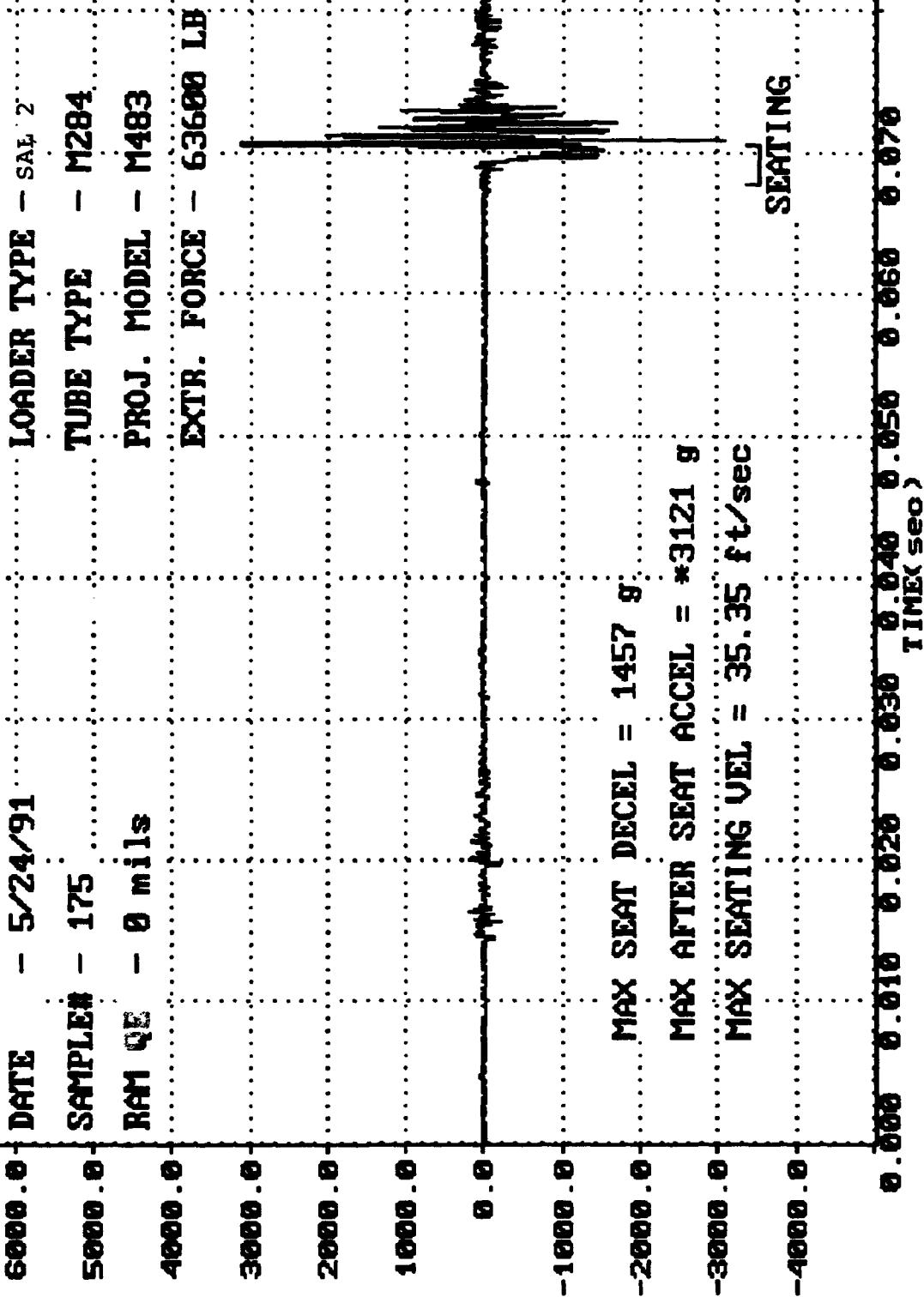
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

VERTICAL ACCELERATION



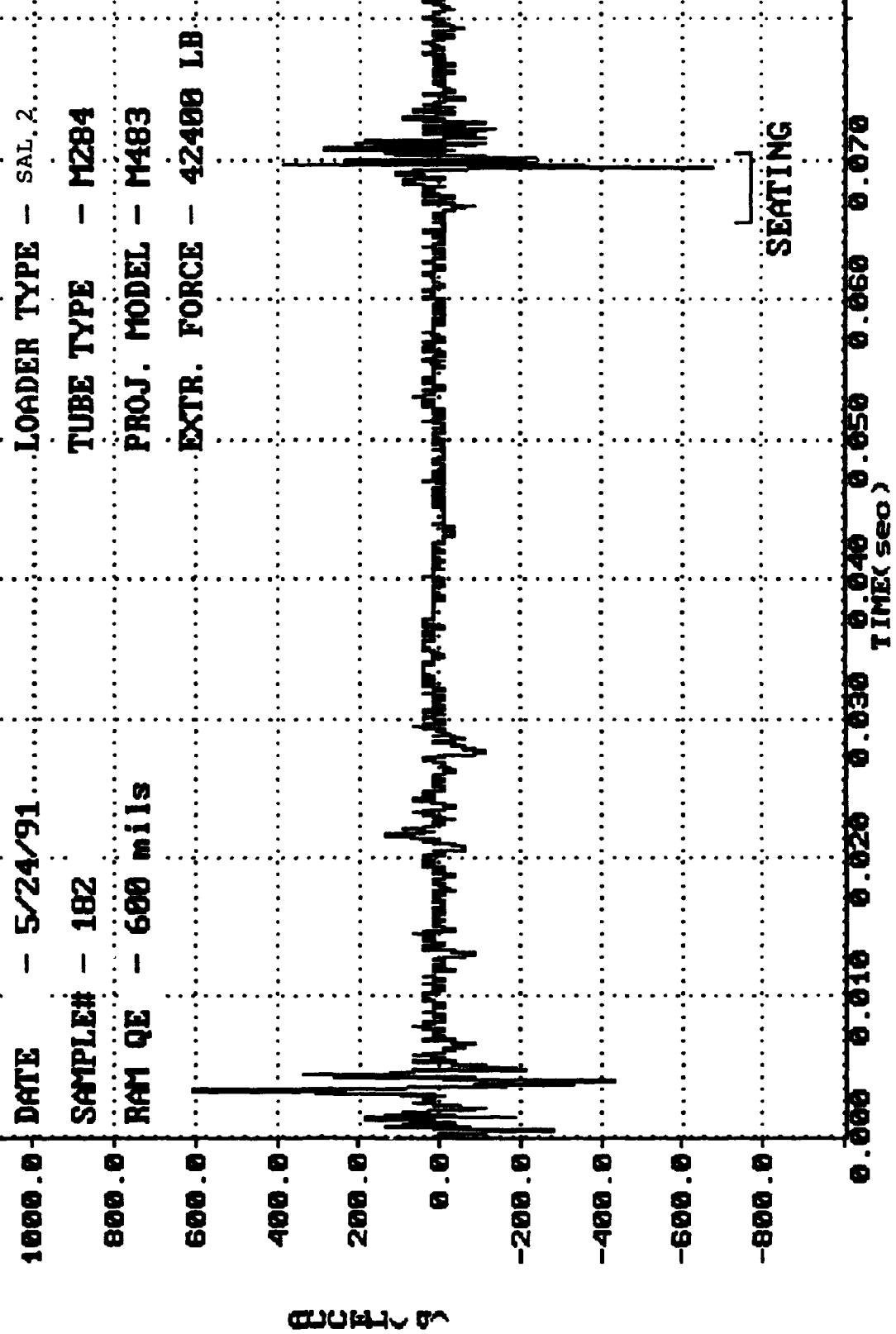
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

LONGITUDINAL ACCELERATION



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

VERTICAL ACCELERATION

1500.0 - DATE - 5/24/91
1000.0 - SAMPLE# - 182
1000.0 - RAM QE - 600 mils
1000.0 - EXTR. FORCE - 42400 LB

LOADER TYPE - SAL'Z

TUBE TYPE - M284

PROJ. MODEL - M483

EXTR. FORCE - 42400 LB

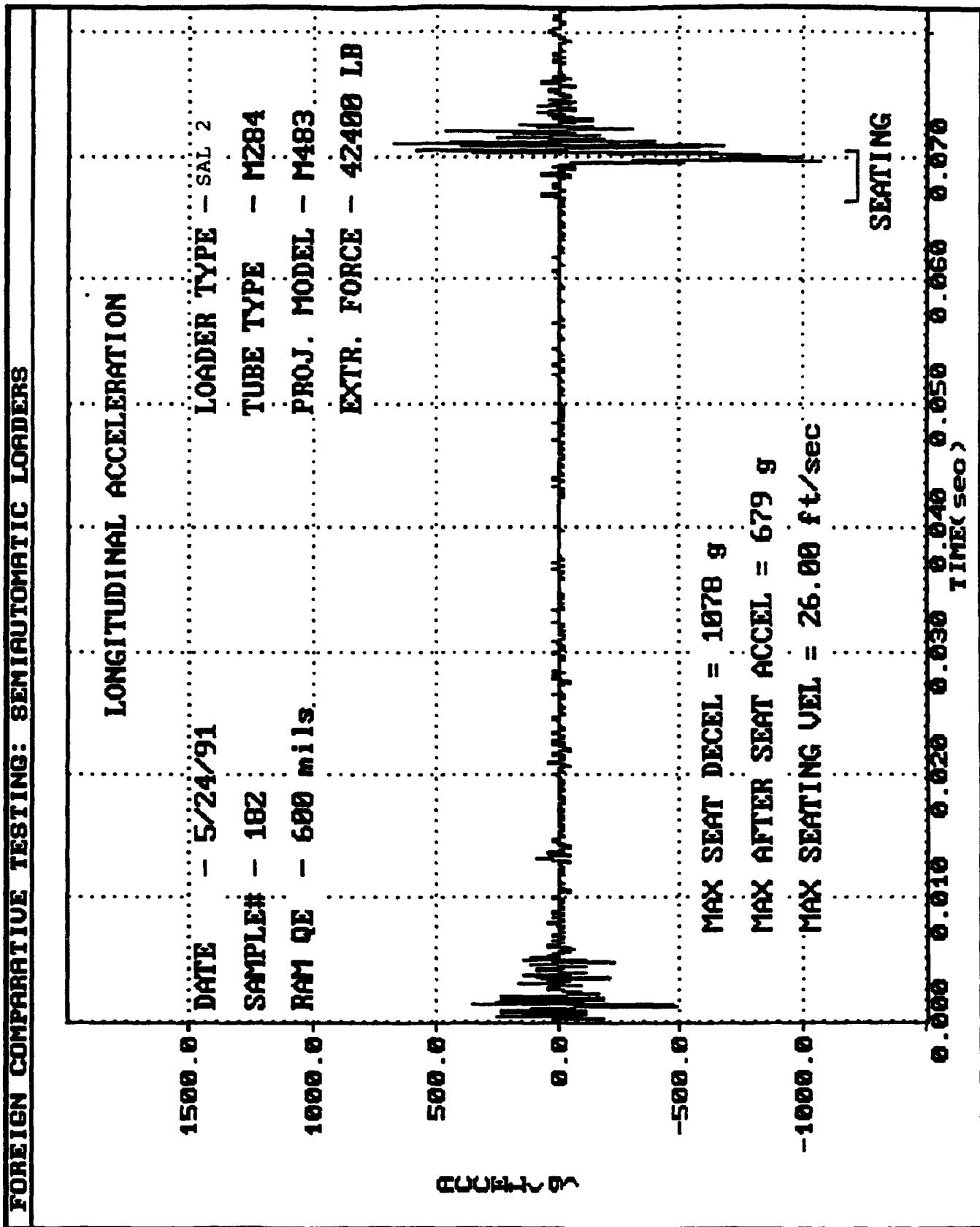
ACCELERATION

126

SEATING

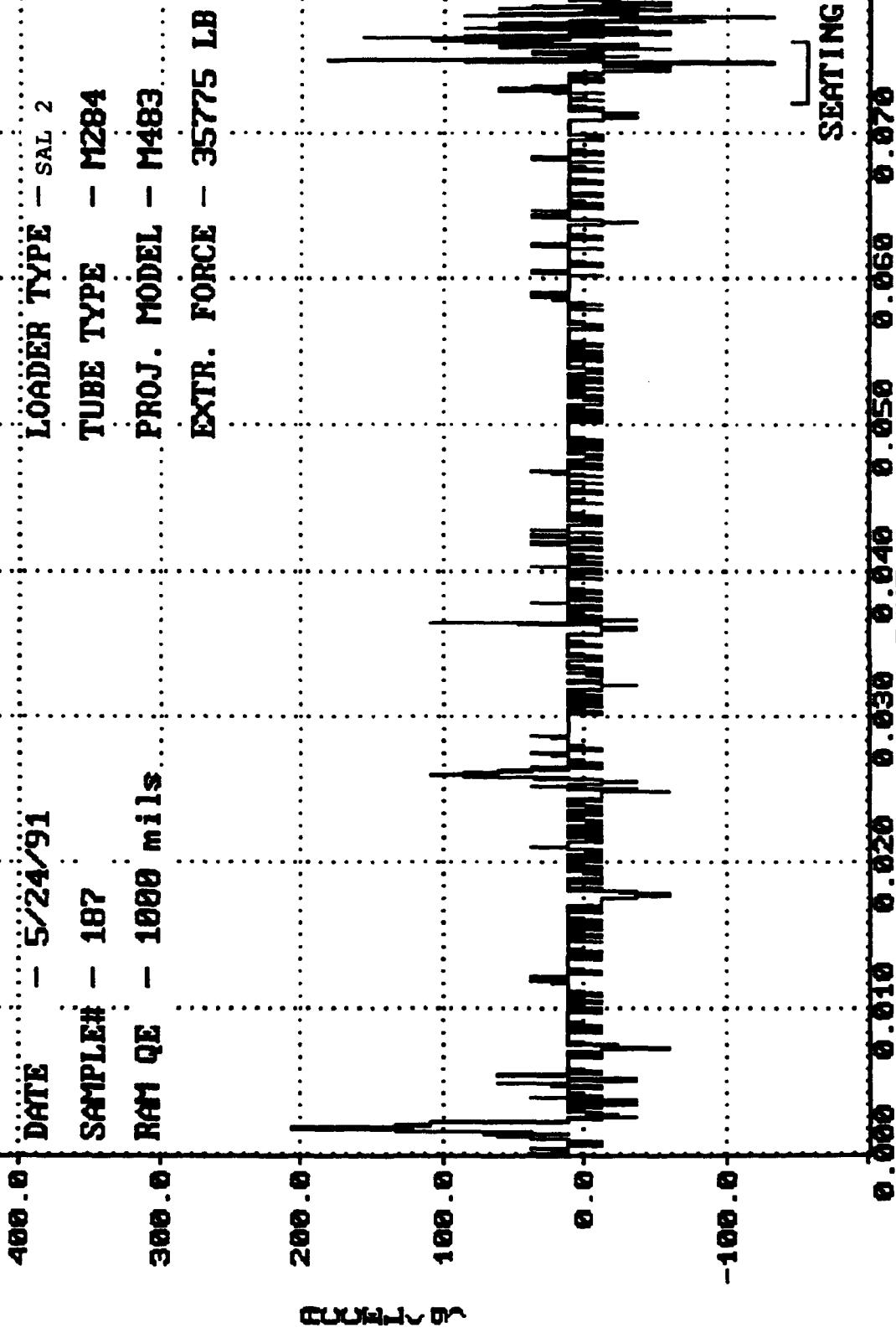
0.000 0.016 0.028 0.038 0.048 0.058 0.068 0.078

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

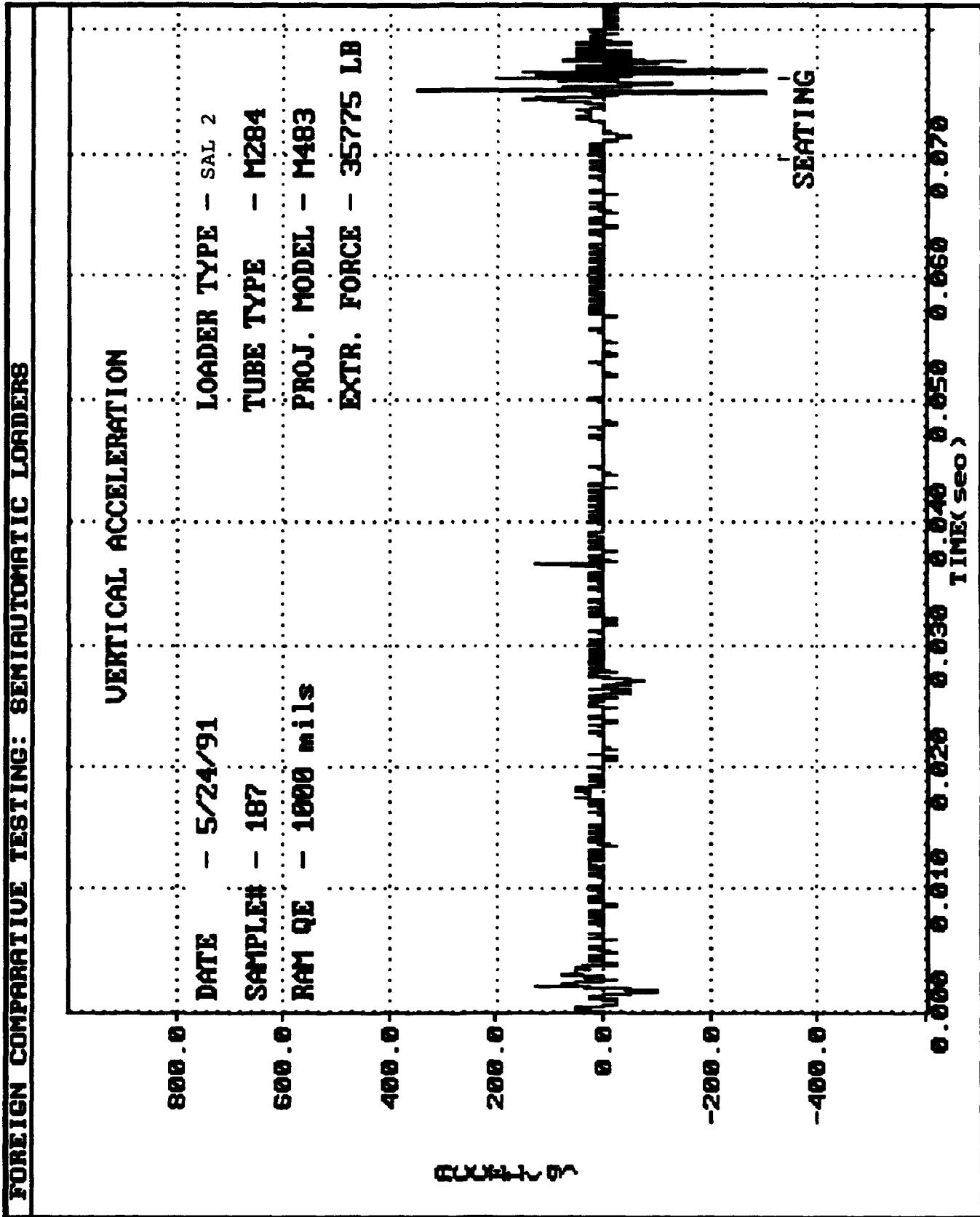


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION

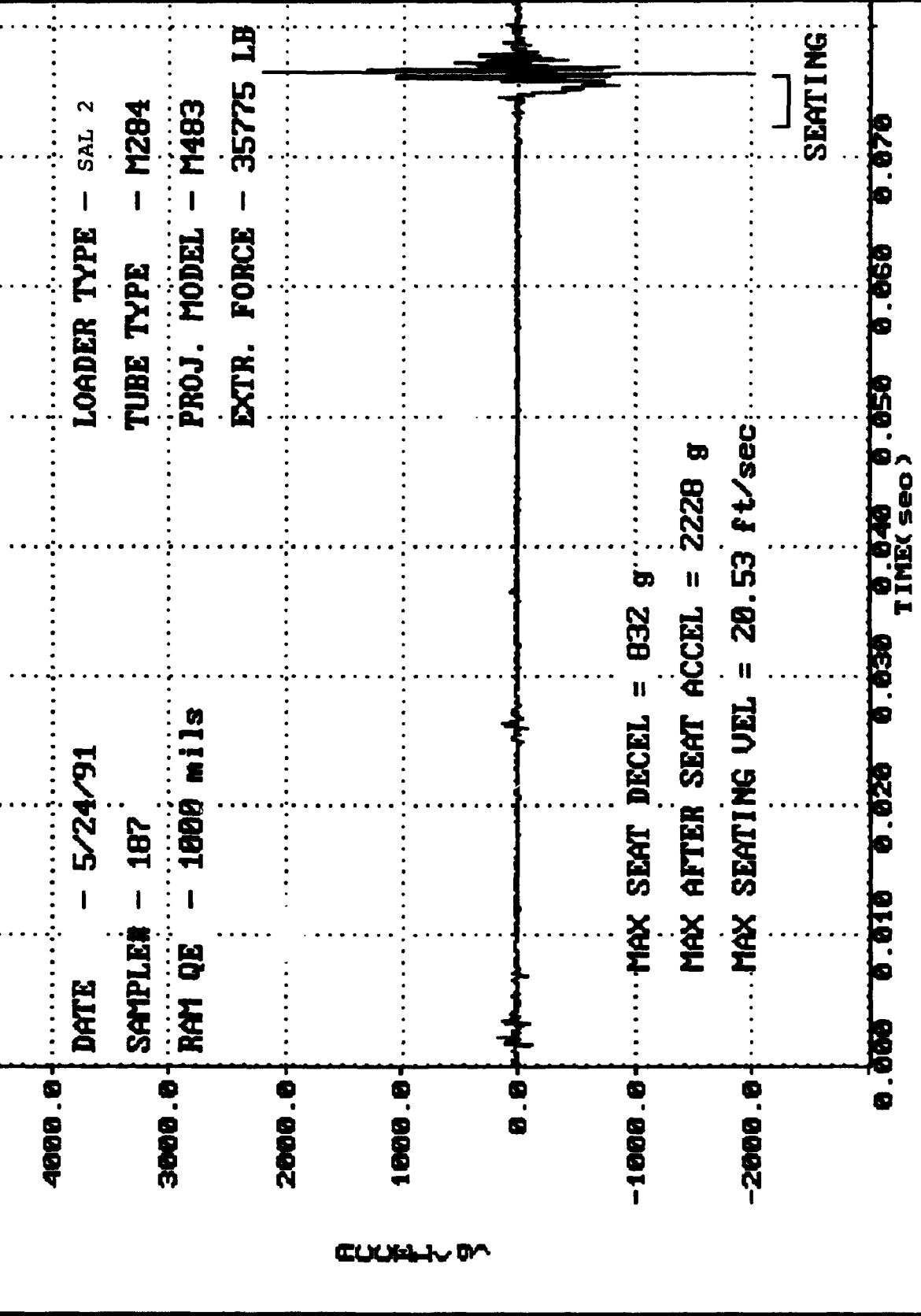


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

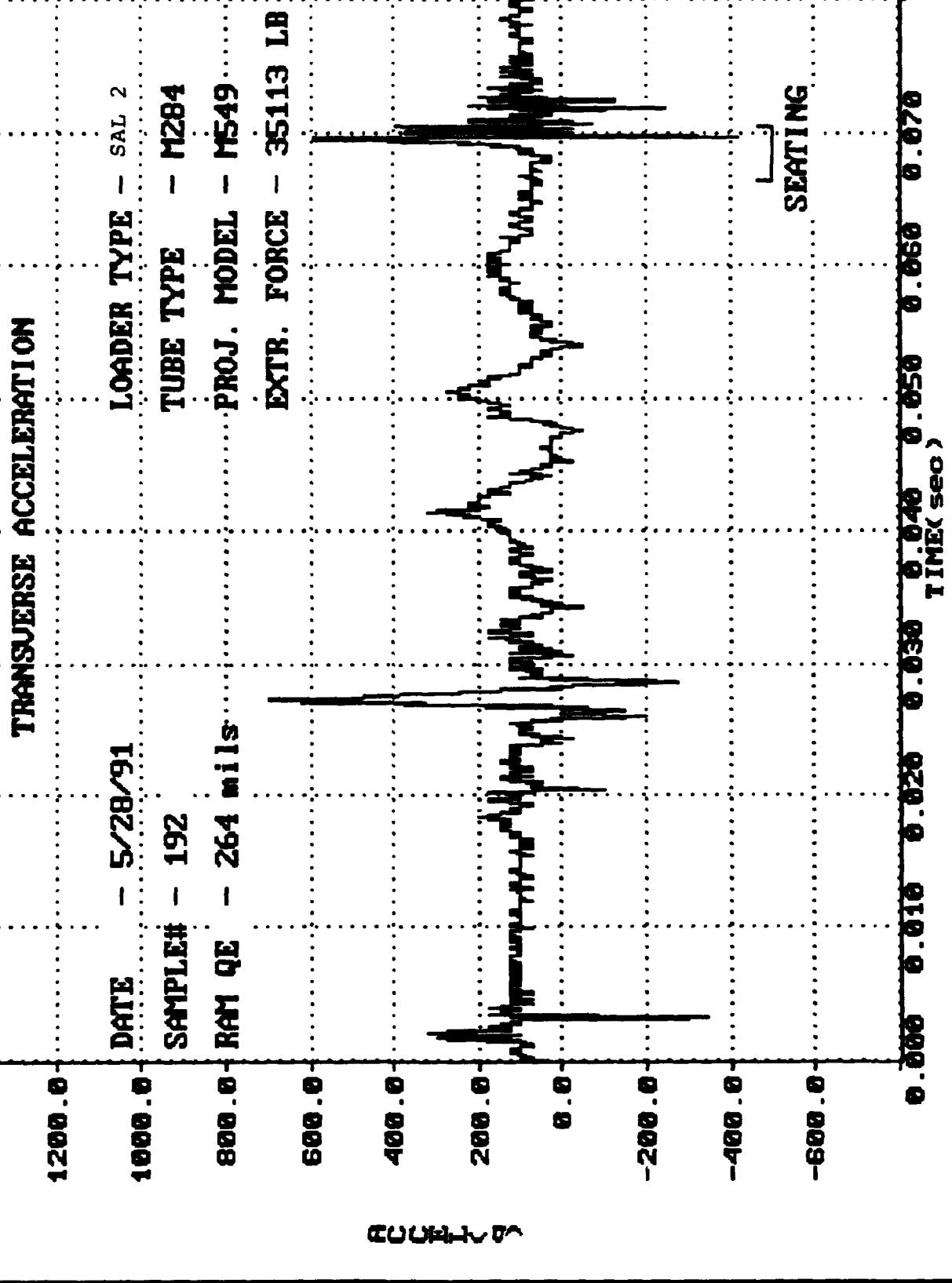


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

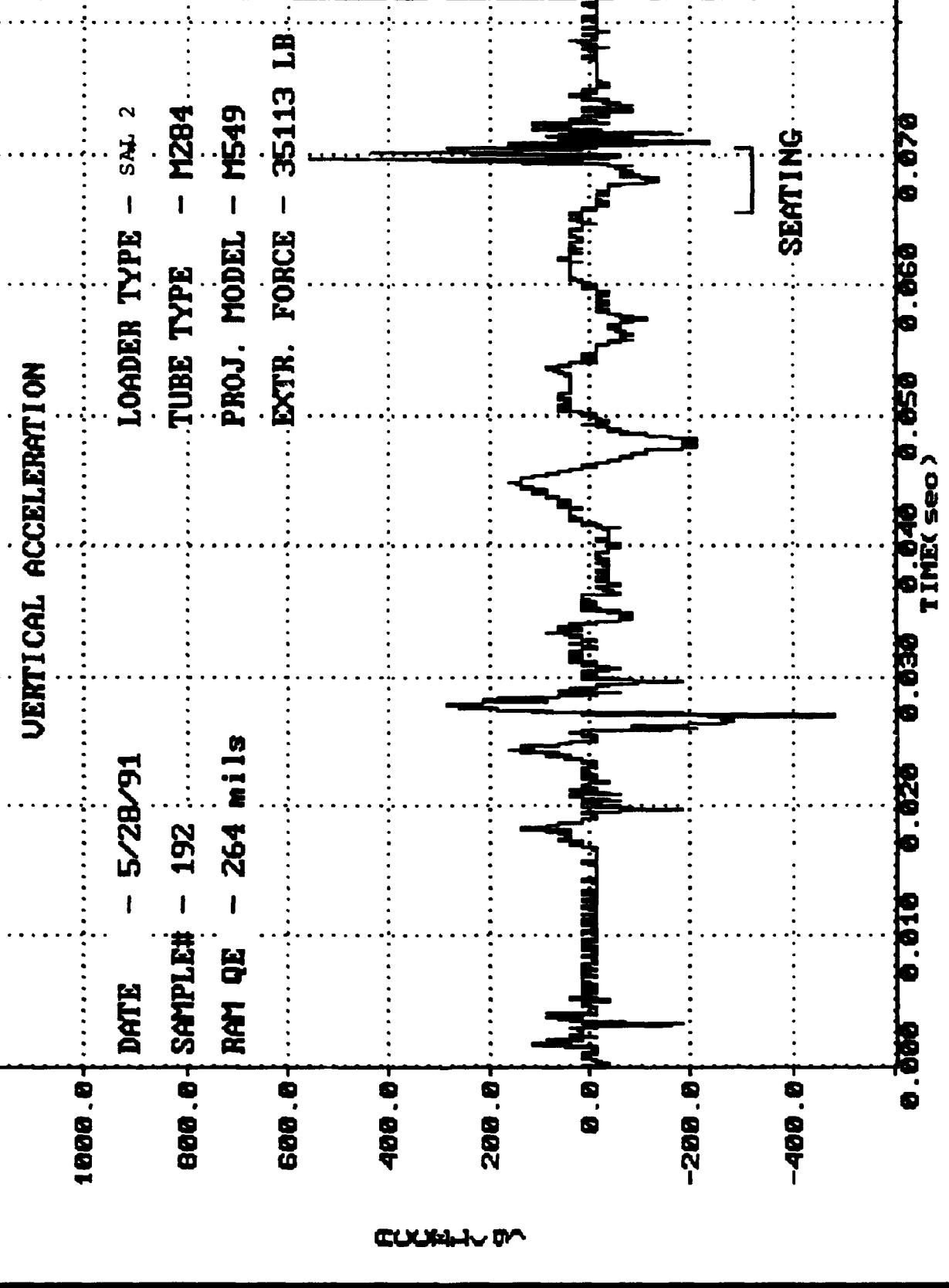
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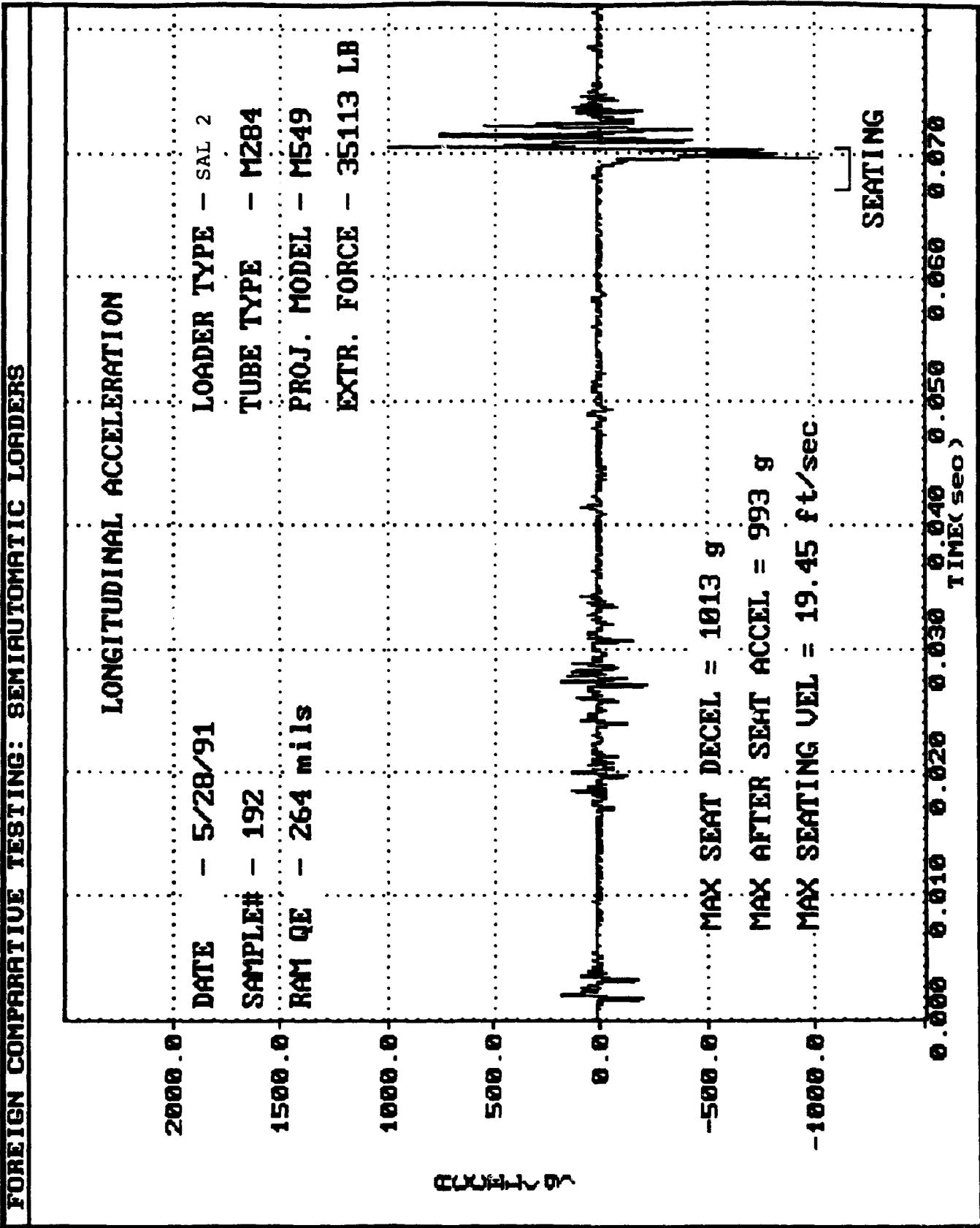
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FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION

DATE - 5/28/91

SAMPLE# - 201

RAM QE - 0 mils

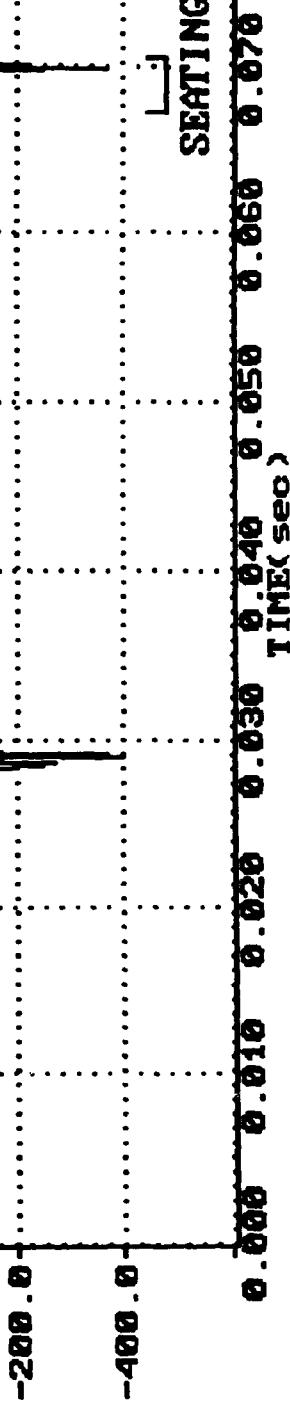
LOADER TYPE - SAL 2

TUBE TYPE - M284

PROJ. MODEL - M549

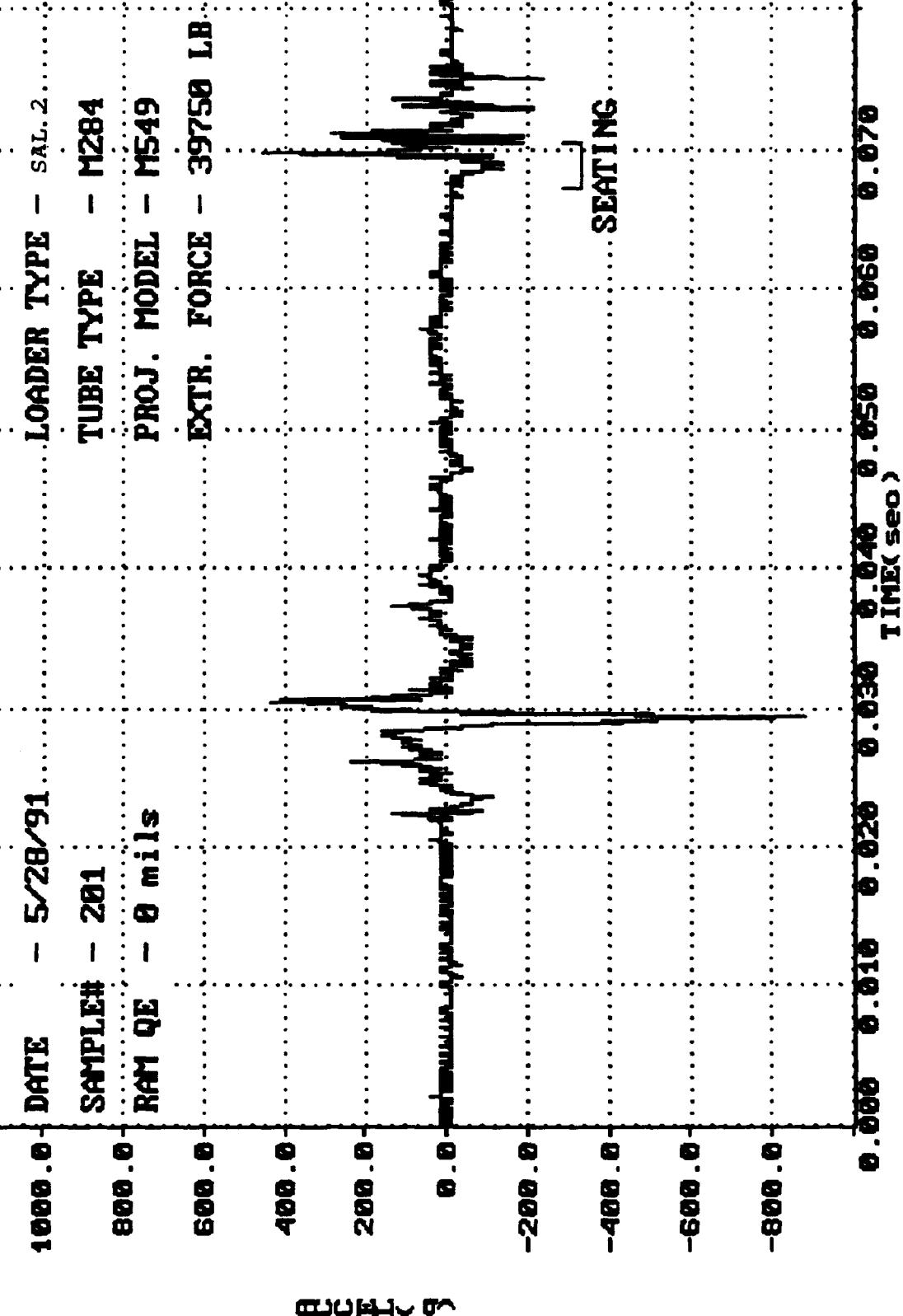
EXTR. FORCE - 39750 LB

ACCELERATION



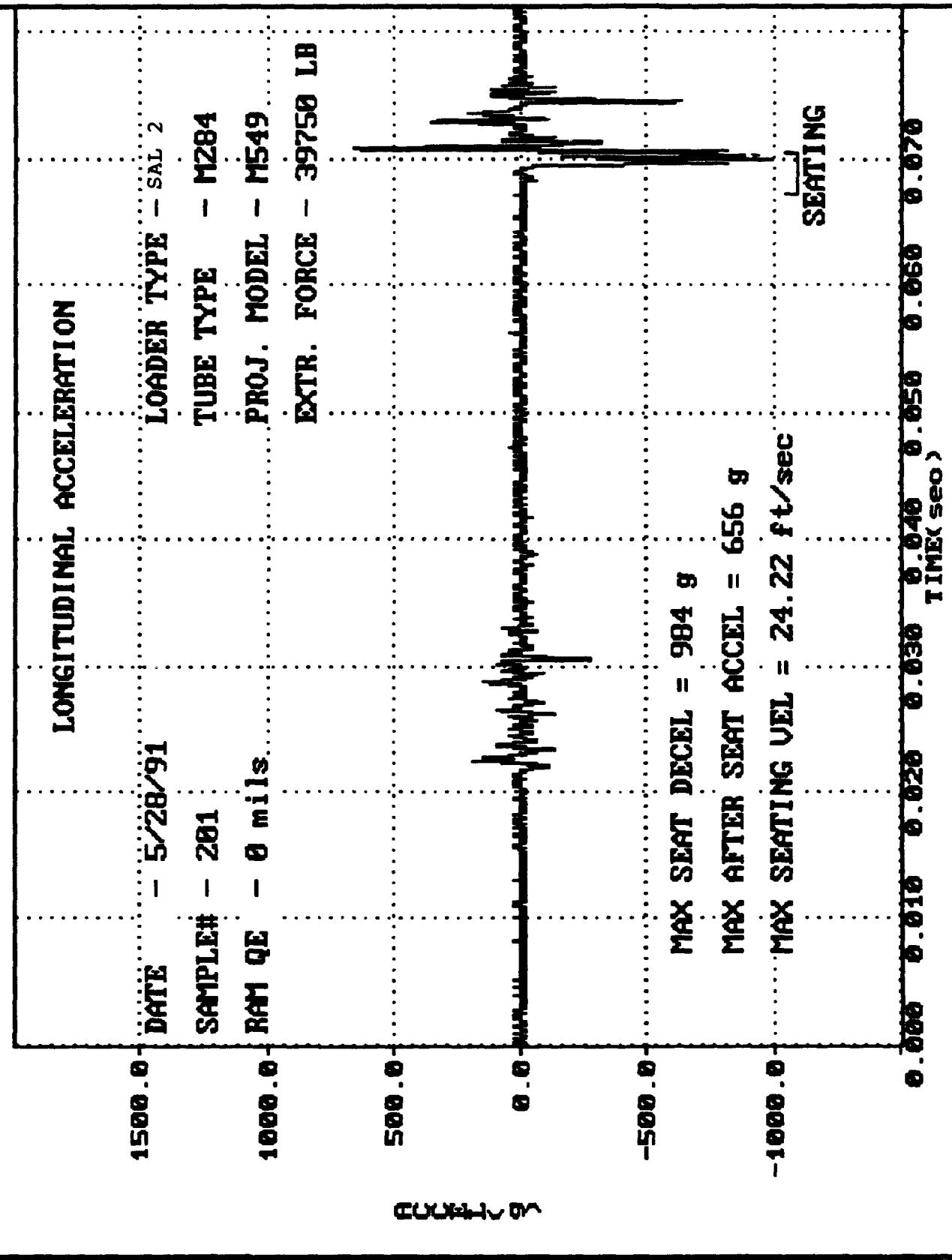
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

VERTICAL ACCELERATION



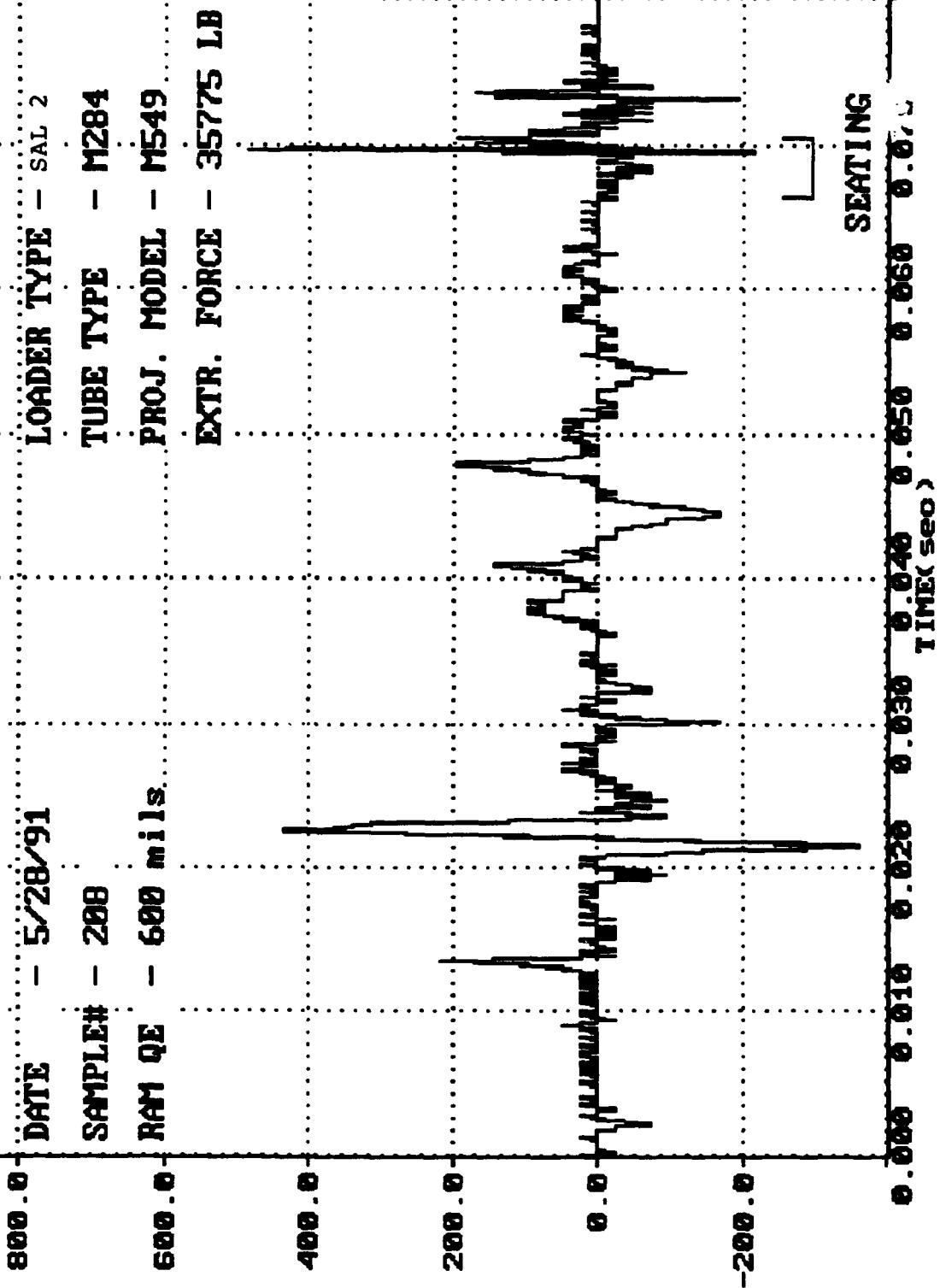
SEATING

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

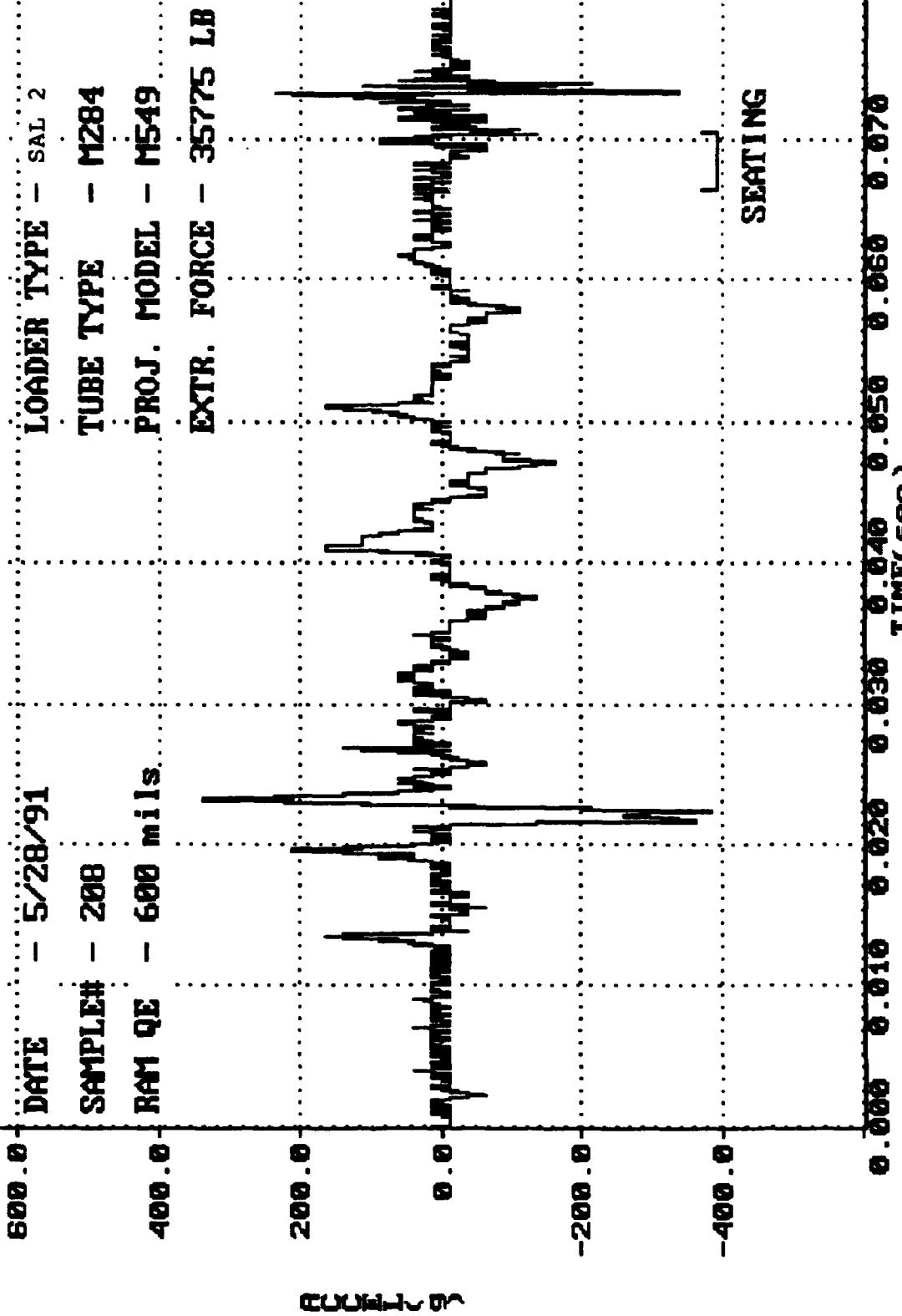
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SEATING

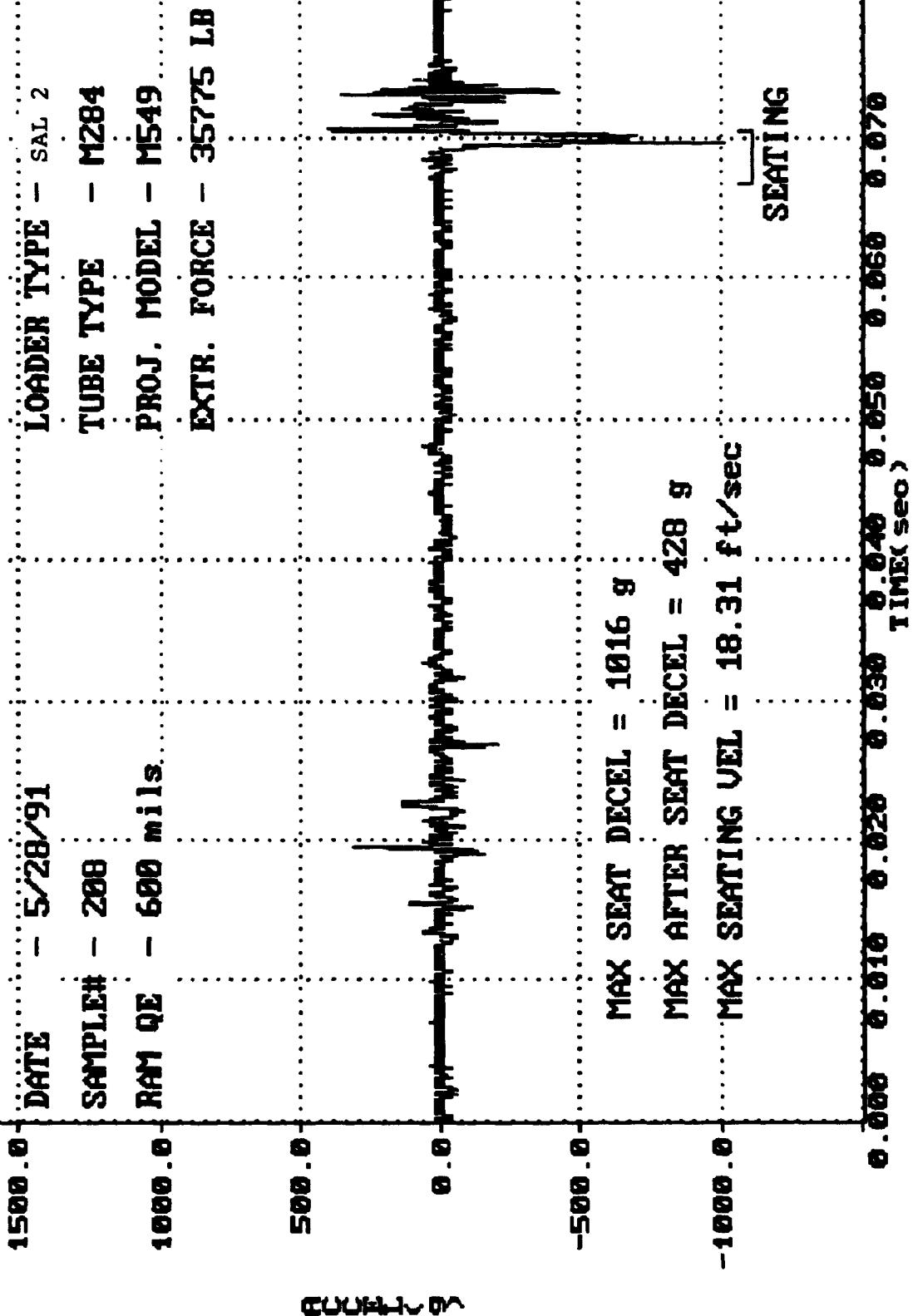
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VERTICAL ACCELERATION

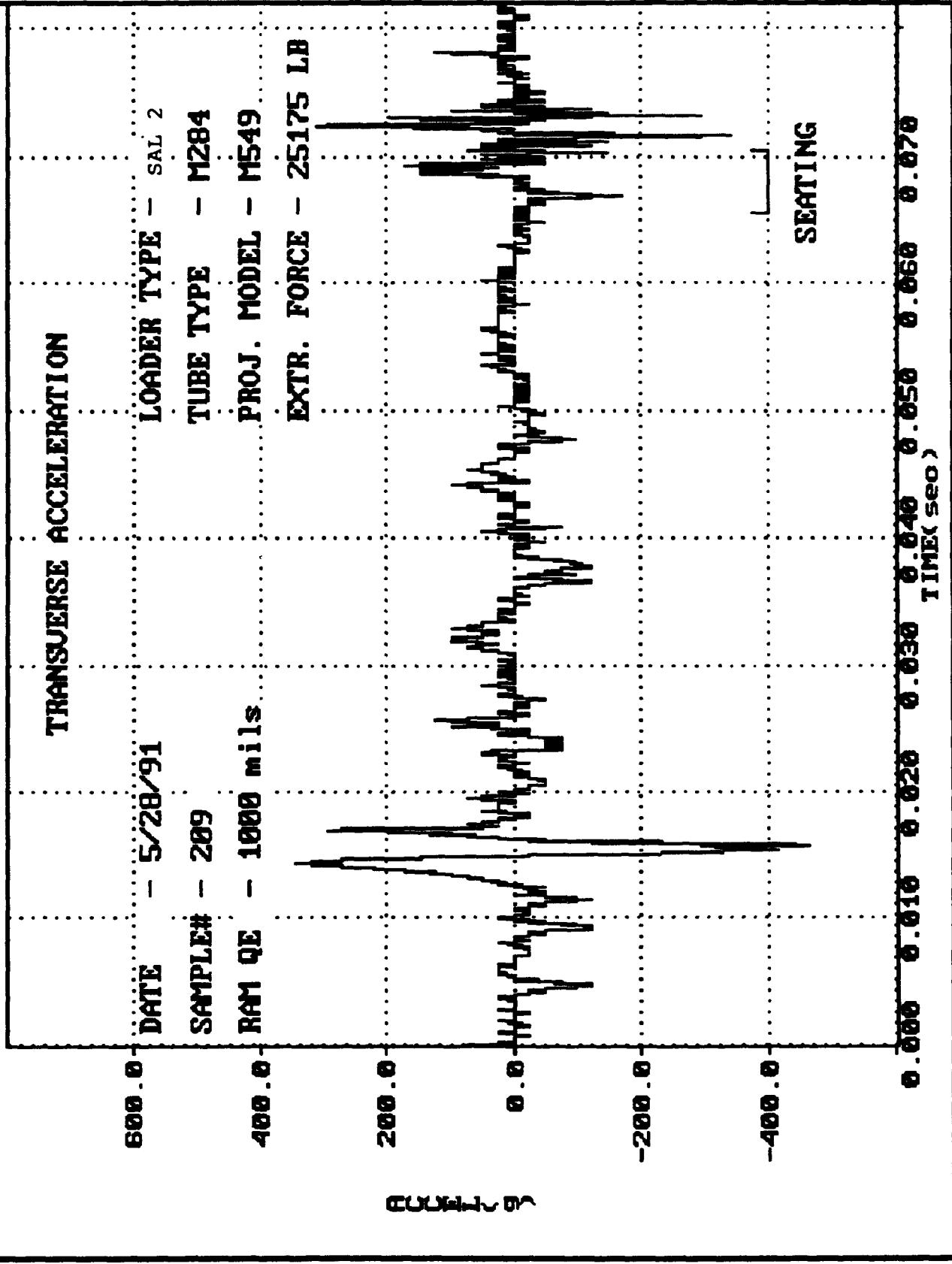


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LONGITUDINAL ACCELERATION

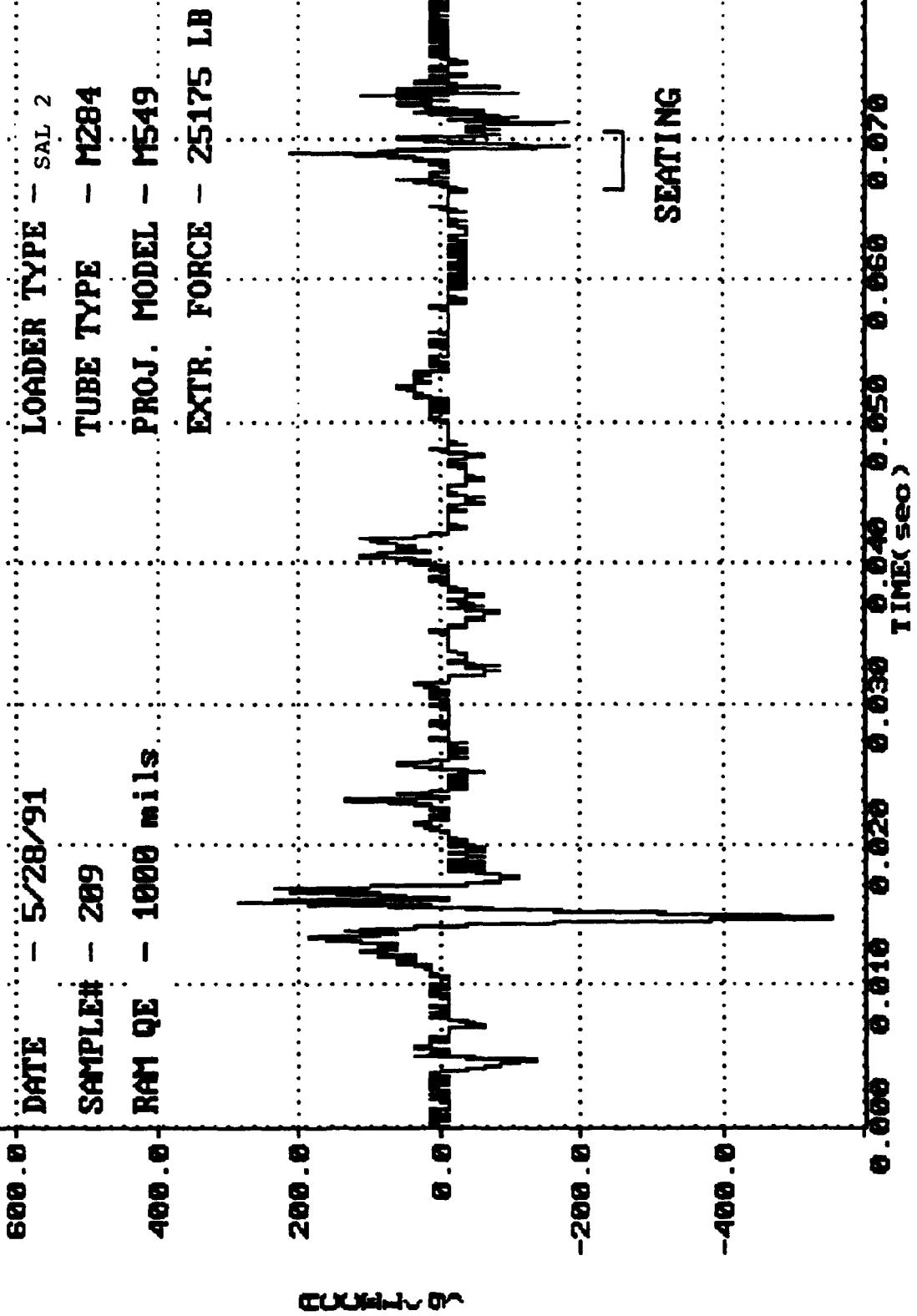


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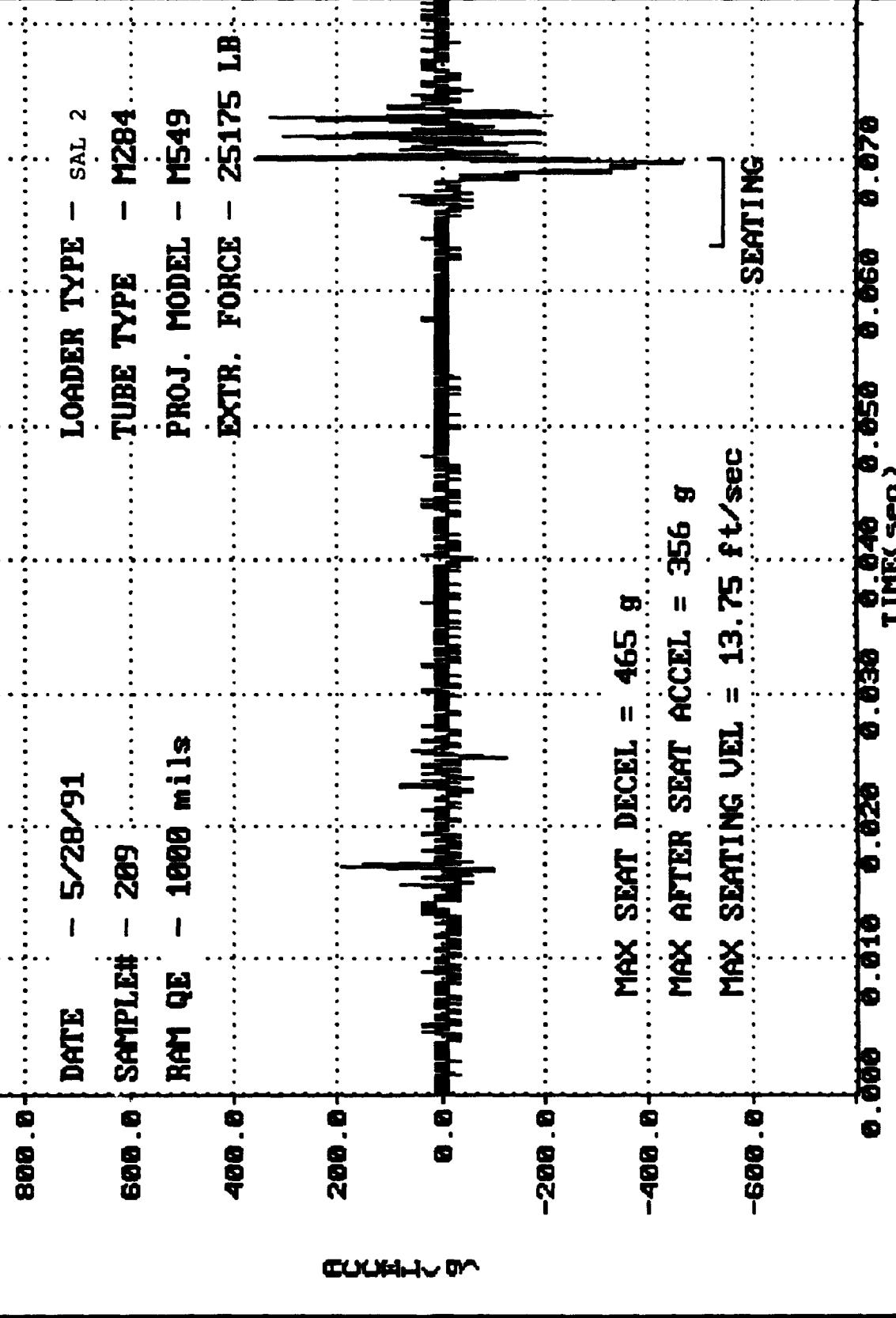
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VERTICAL ACCELERATION



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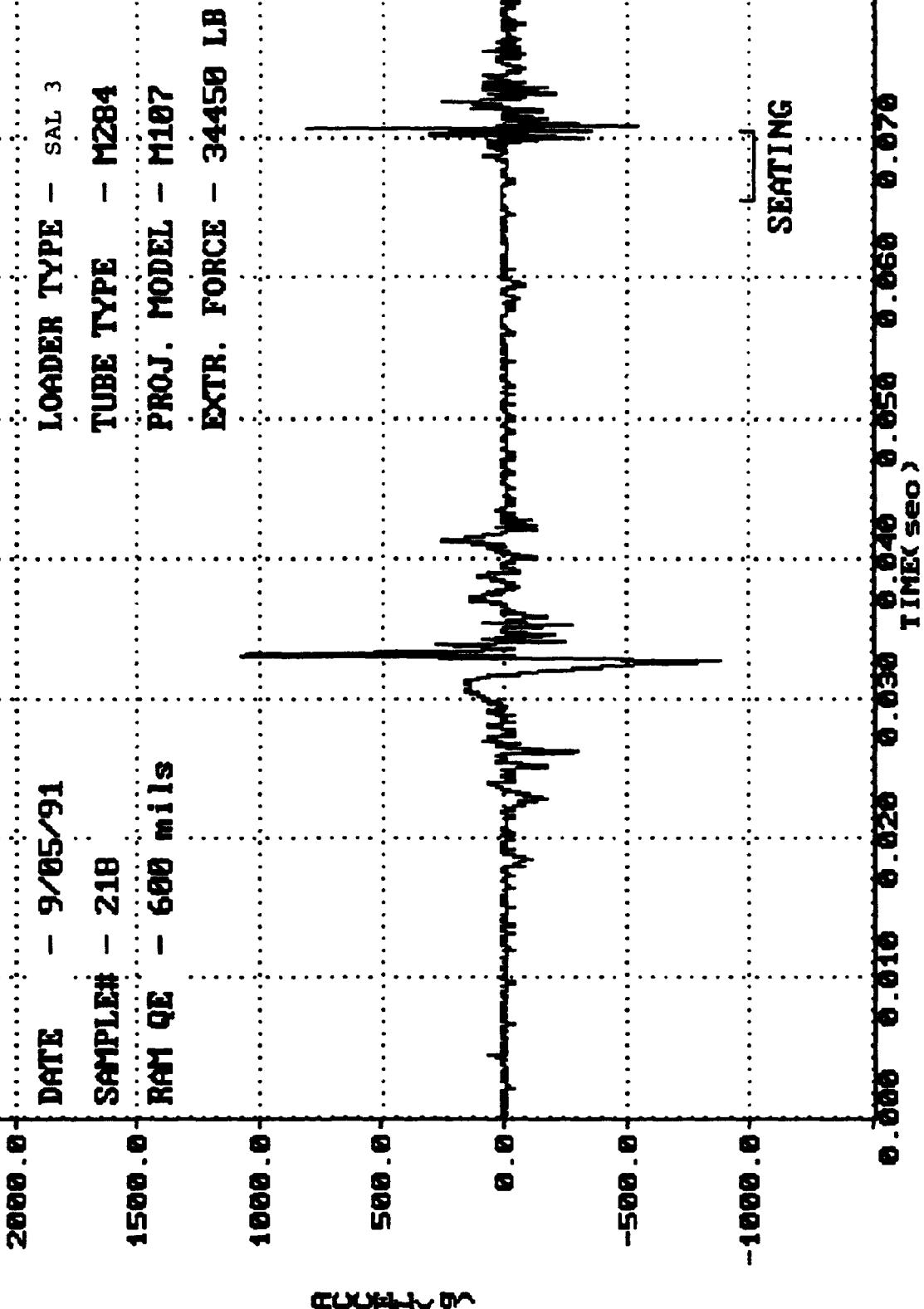
LONGITUDINAL ACCELERATION



APPENDIX D
IT RAMS

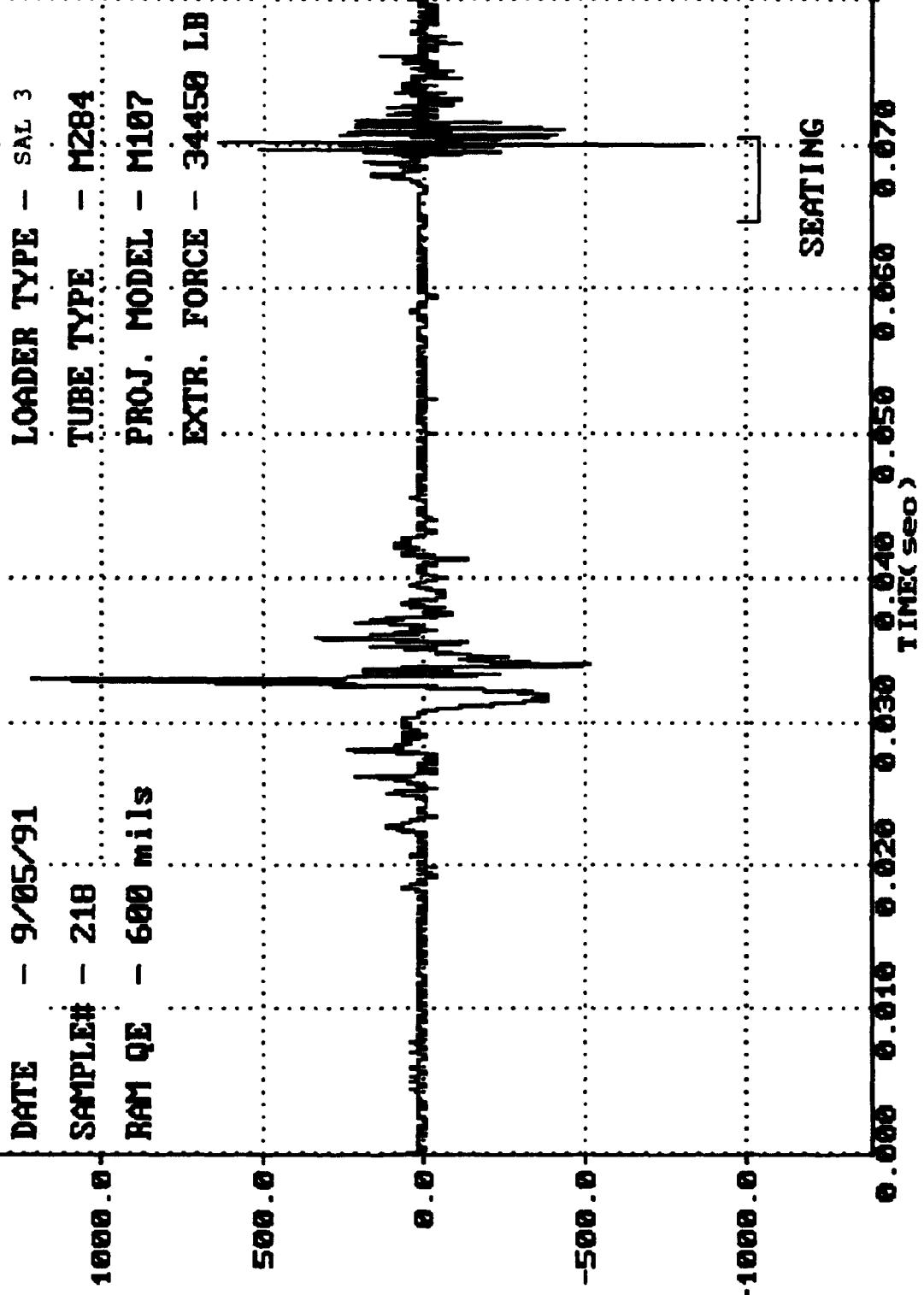
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TRANSVERSE ACCELERATION



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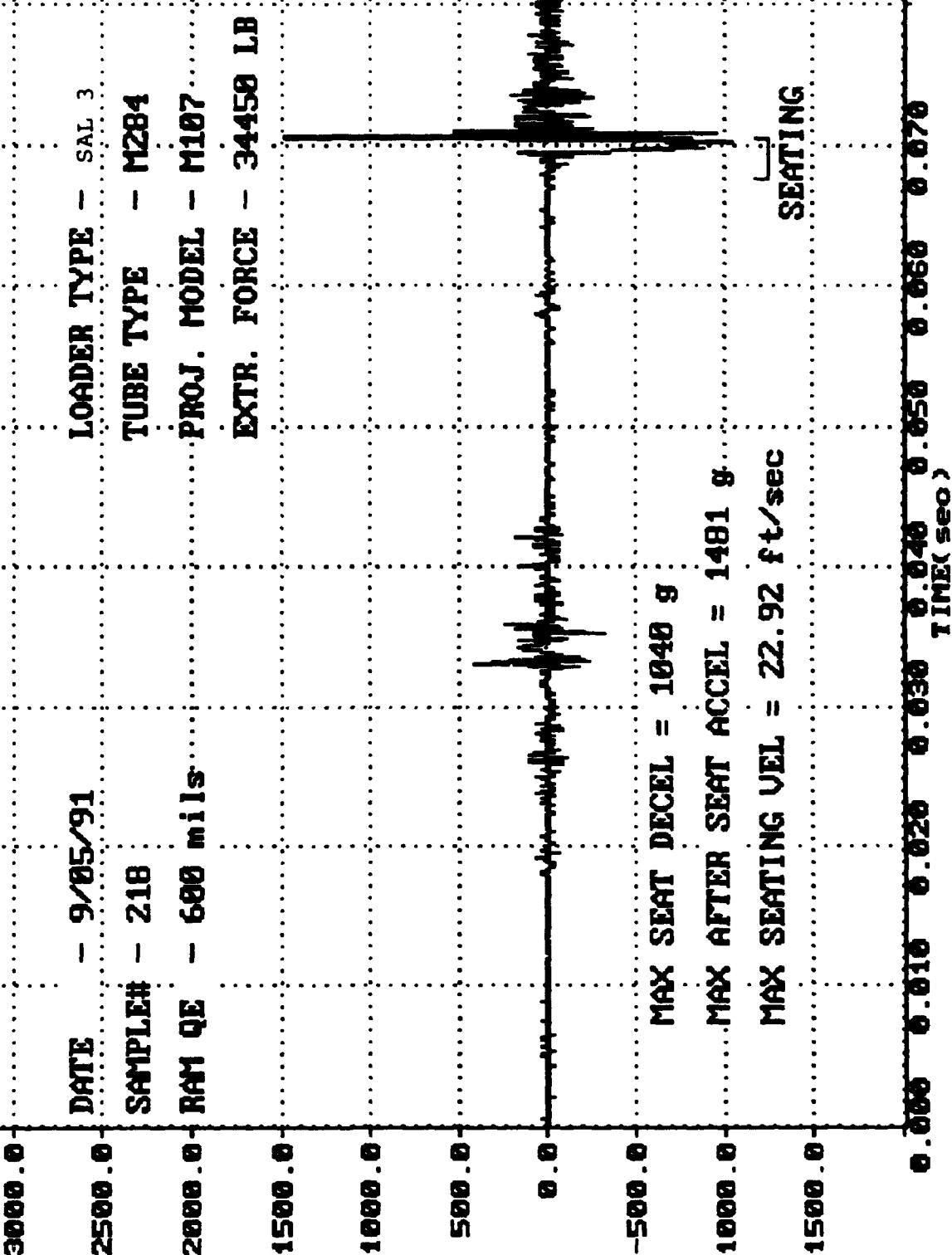
VERTICAL ACCELERATION



COUNTDOWN

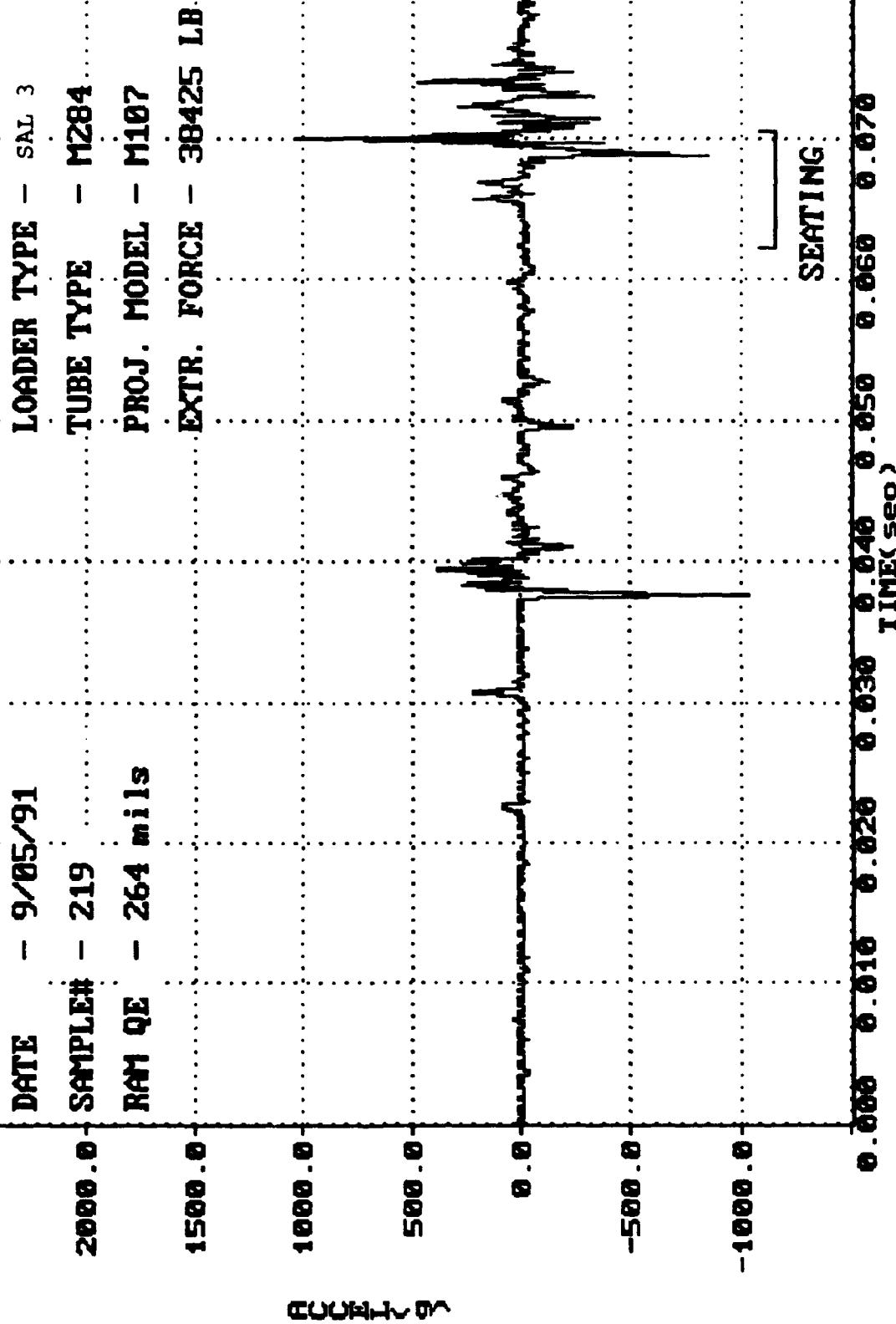
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LONGITUDINAL ACCELERATION



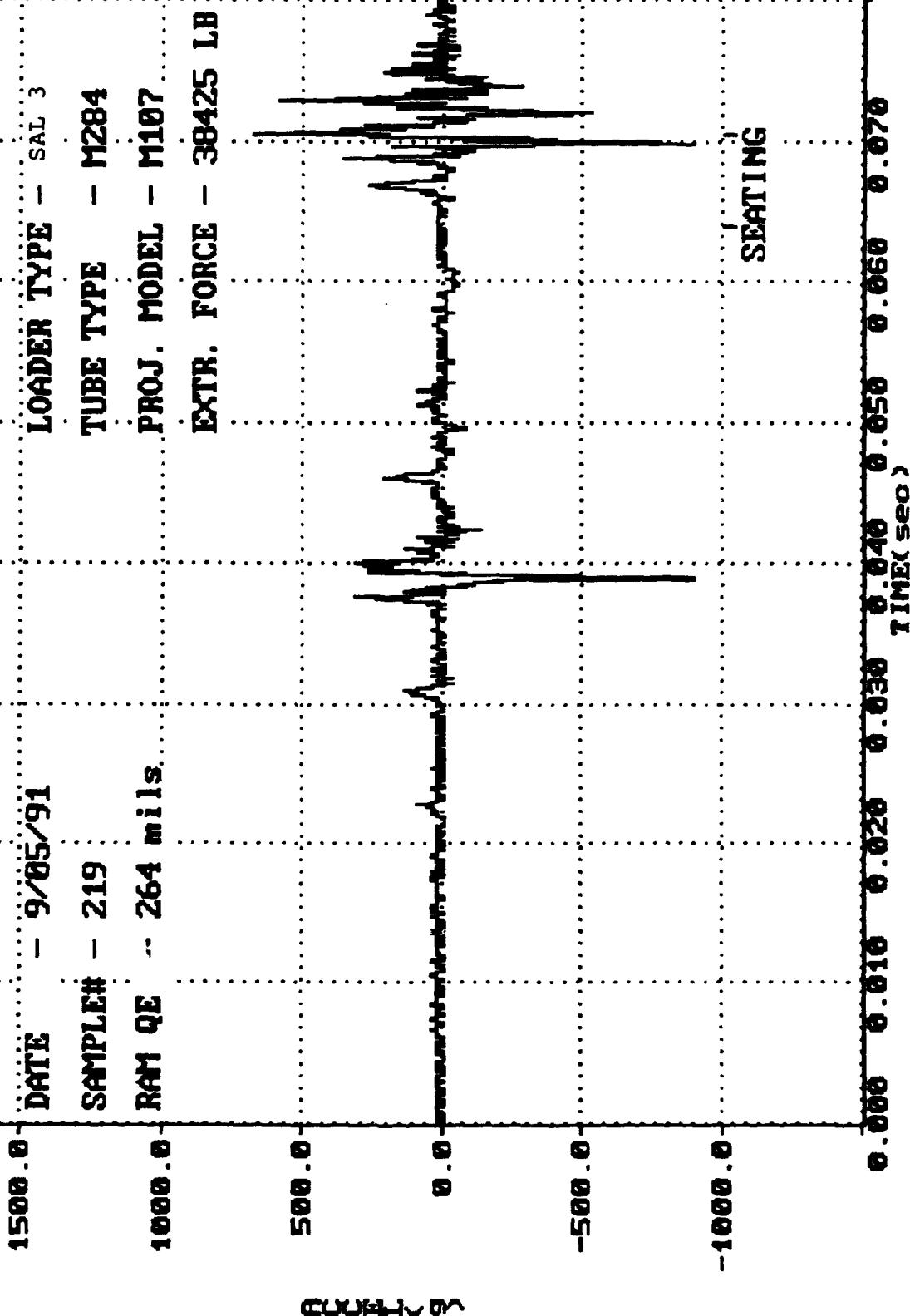
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TRANSVERSE ACCELERATION

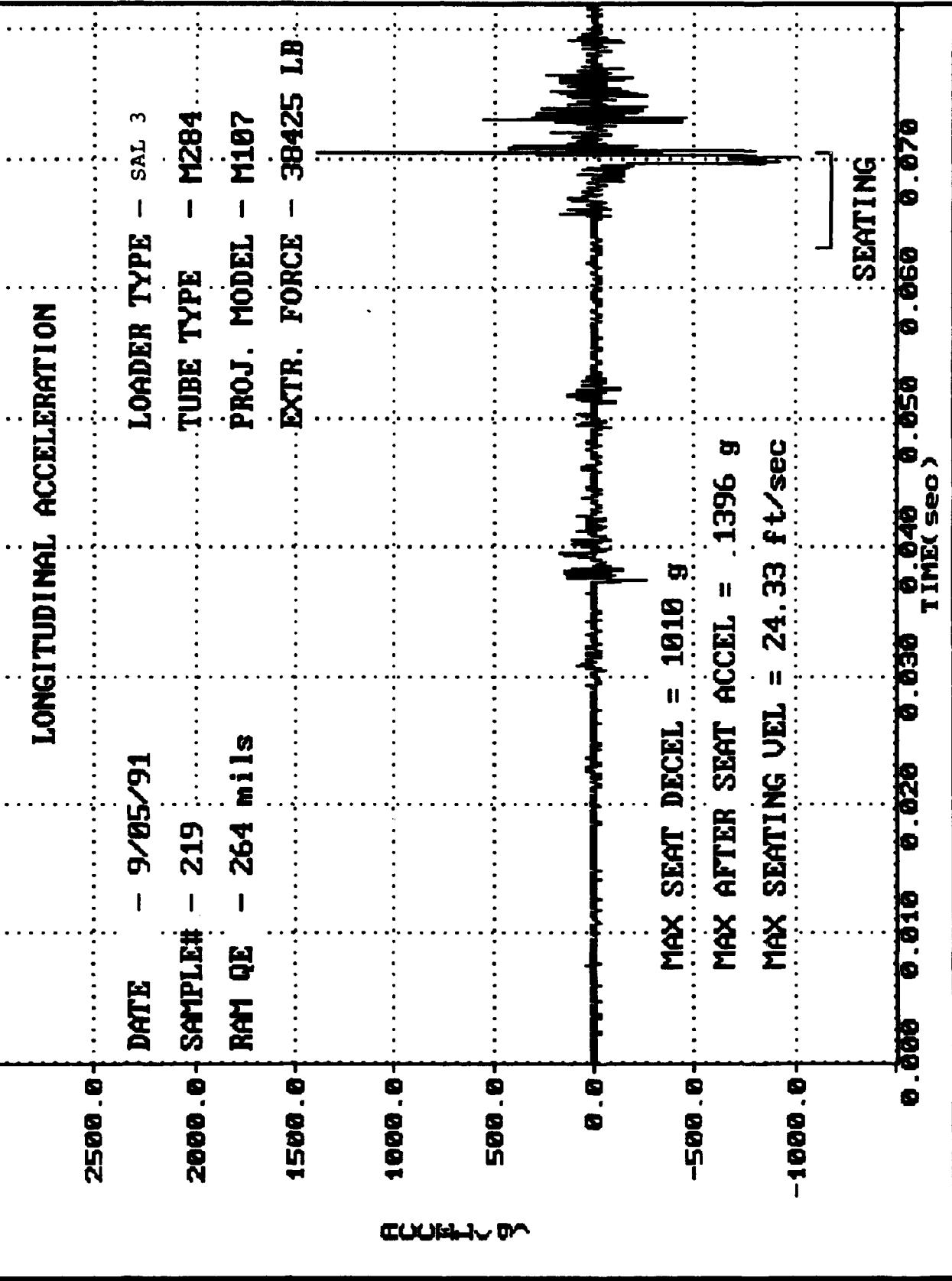


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

VERTICAL ACCELERATION

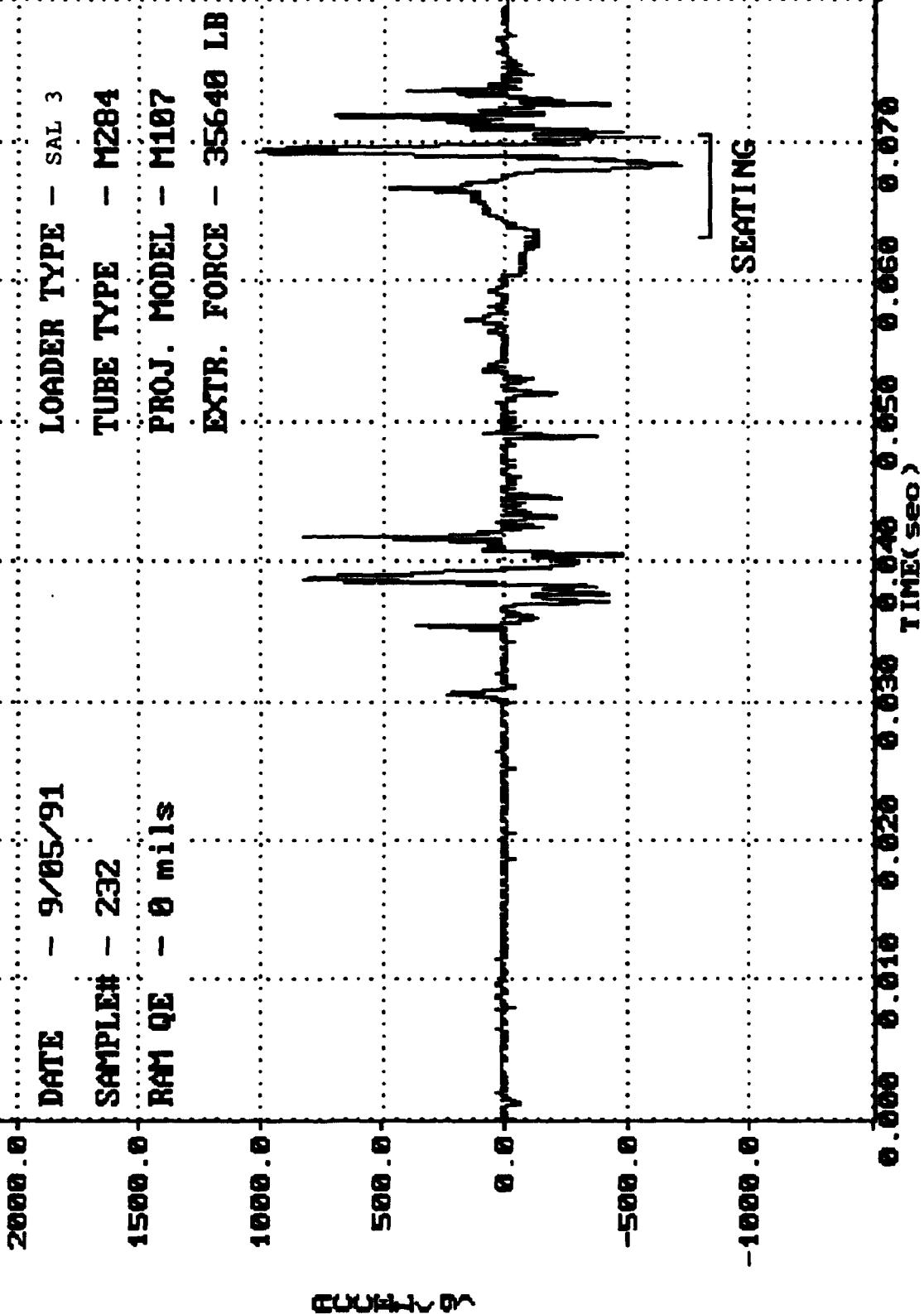


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



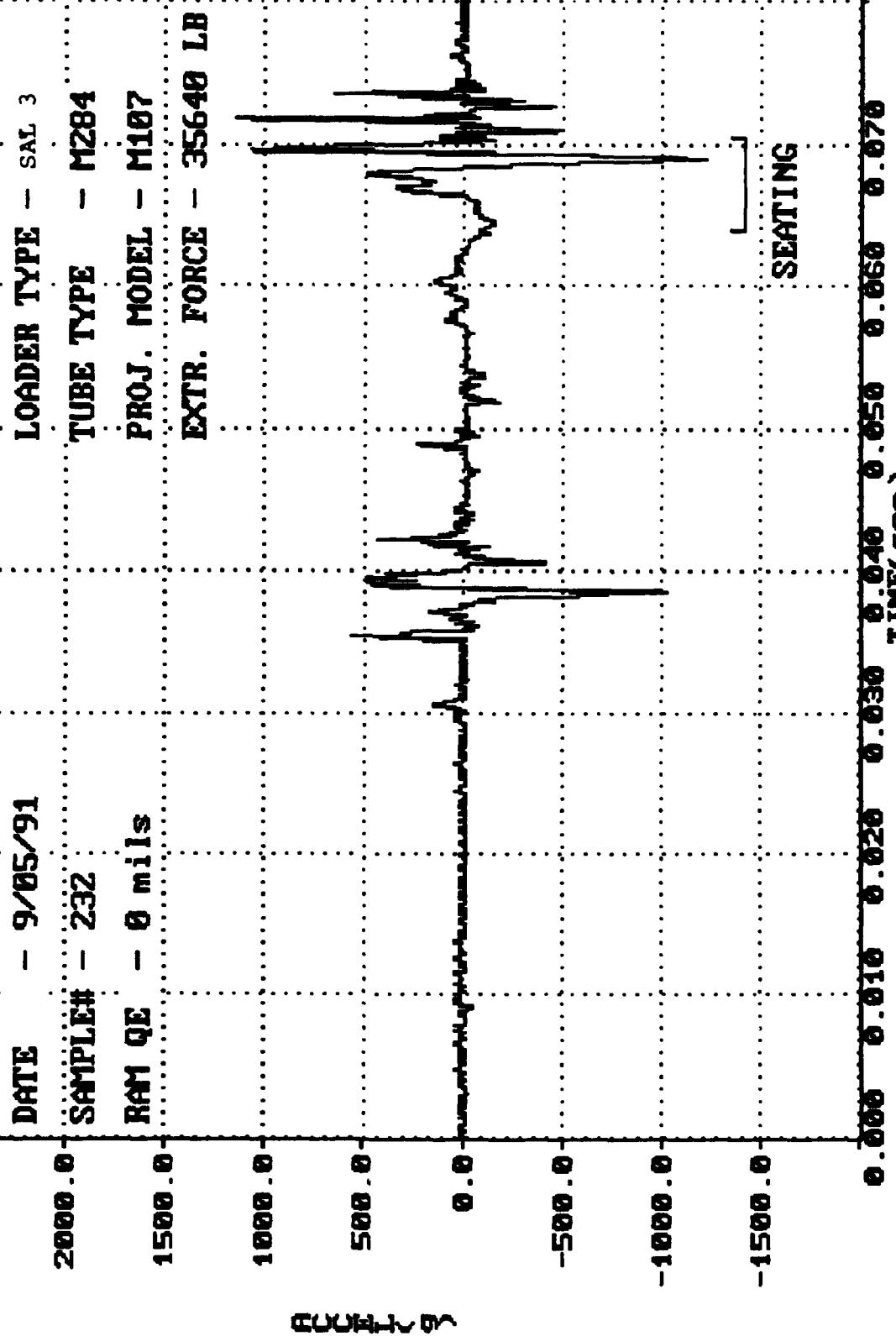
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION



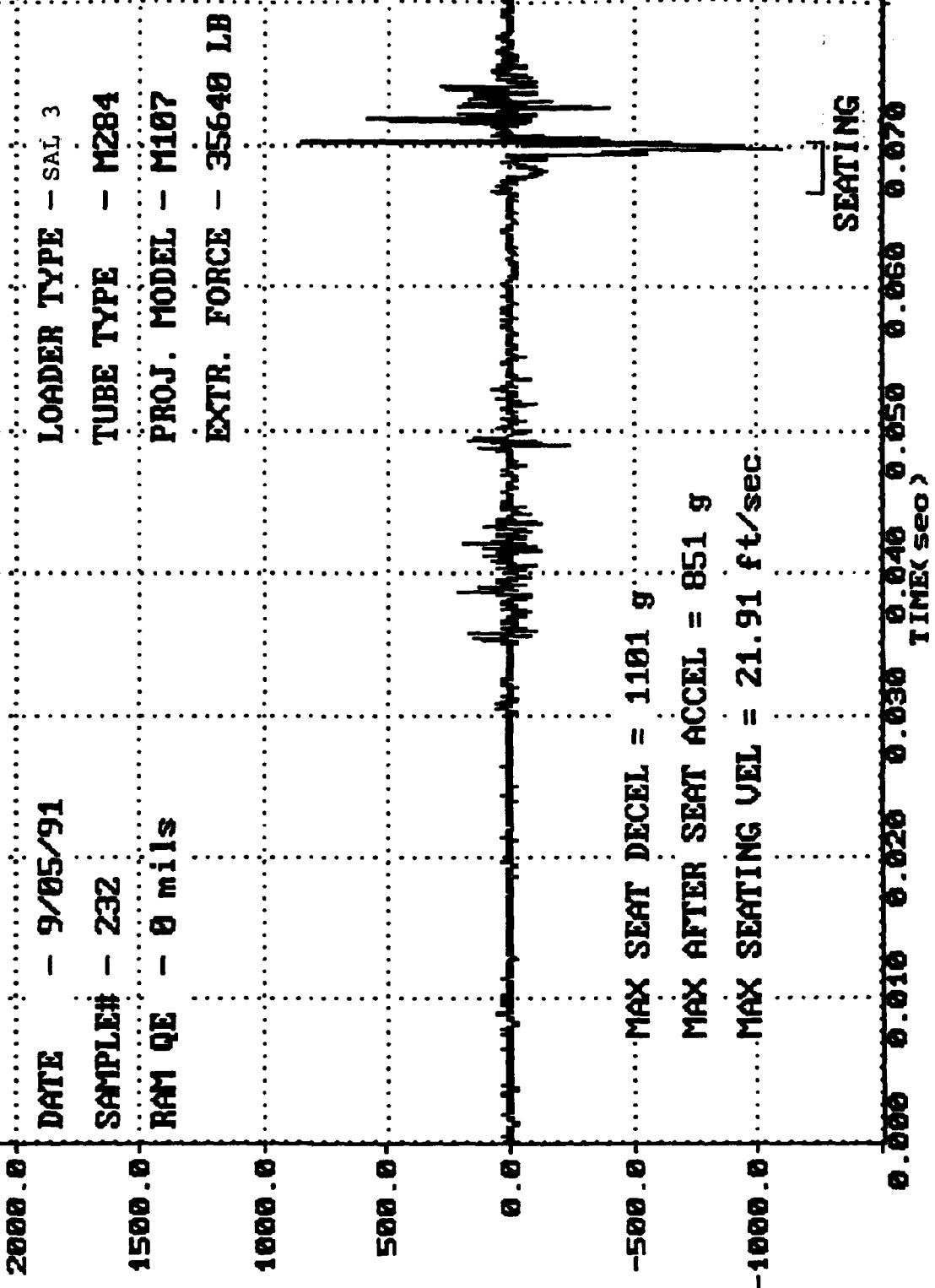
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

VERTICAL ACCELERATION



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

LONGITUDINAL ACCELERATION



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION

DATE - 9/05/91
SAMPLE# - 237
RAM QI - 750 mils
LOADER TYPE - SAL 3
TUBE TYPE - M284
PROJ. MODEL - M107
EXTR. FORCE - 35775 LB

ACCELERATION

154

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

VERTICAL ACCELERATION

1500.0 DATE - 9/05/91
SAMPLE# - 237
RAM QE - 750 mils
1000.0
500.0
0.0
-500.0

LOADER TYPE - SAL. 3
TUBE TYPE - M284
PROJ. MODEL - M107
EXTR. FORCE - 35775 LB

COUCH TV DR

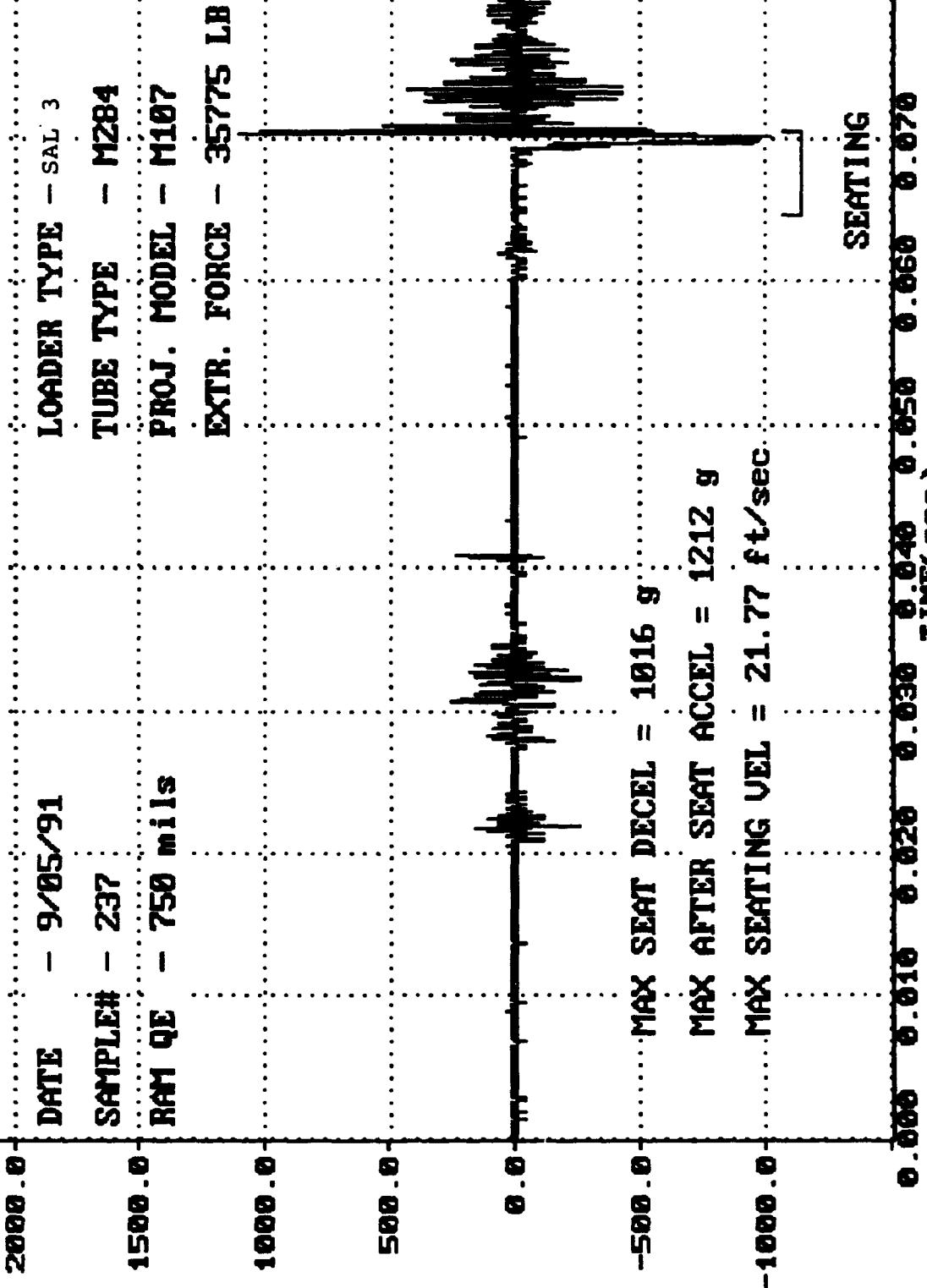
155

SEATING

0.000 0.010 0.020 0.030 0.040 0.050 0.060 0.070
TIME (sec)

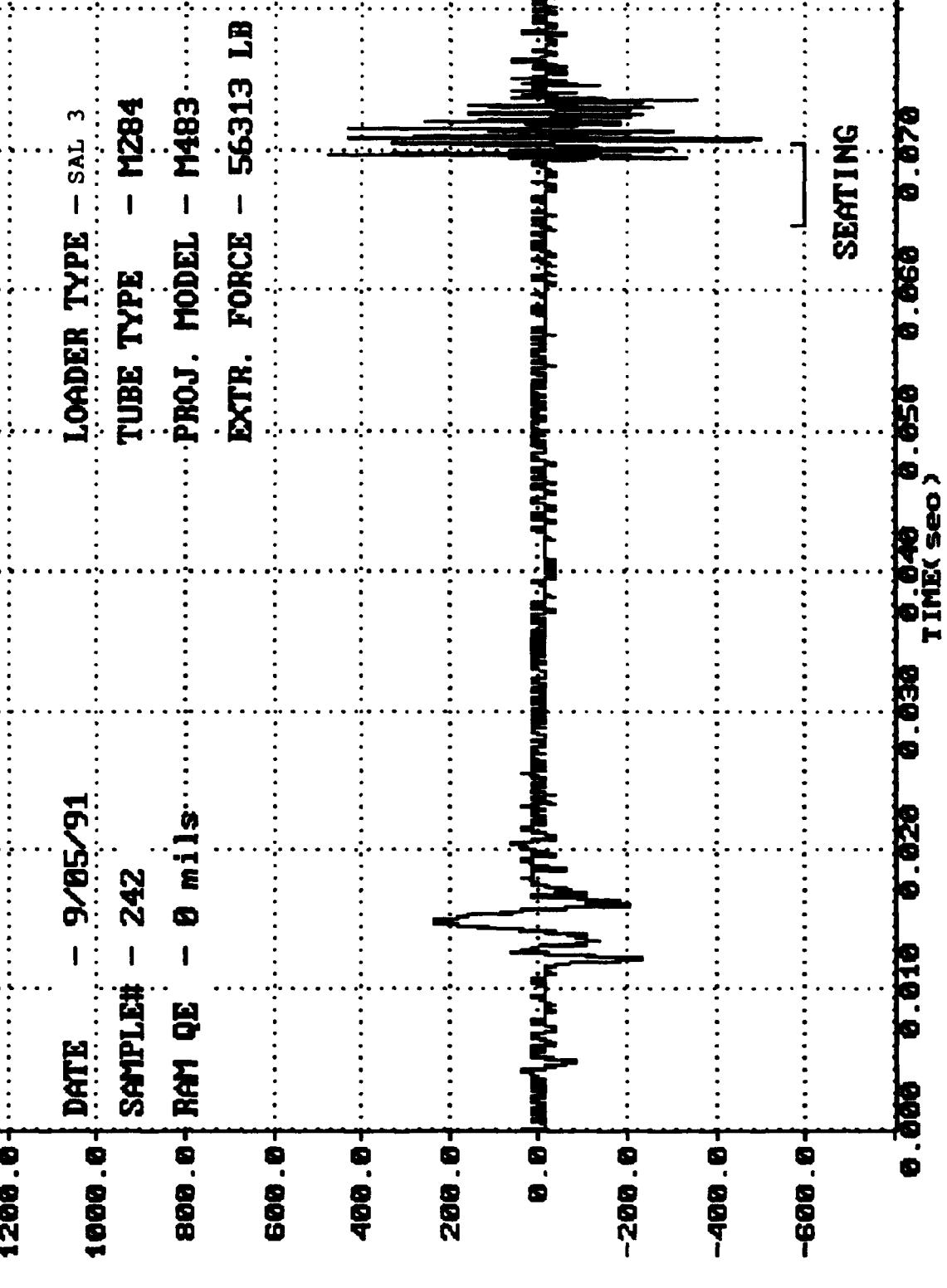
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

LONGITUDINAL ACCELERATION

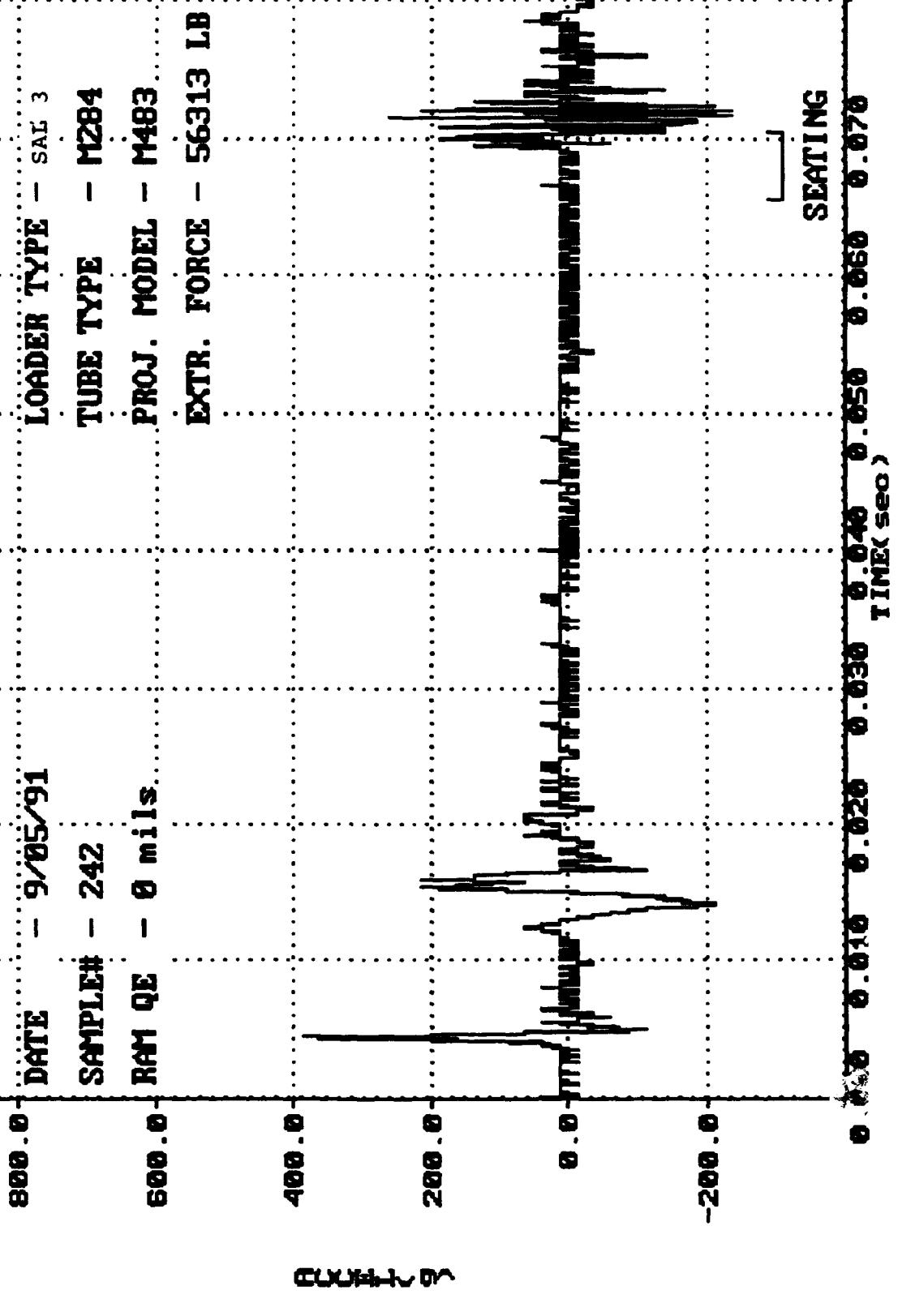


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION

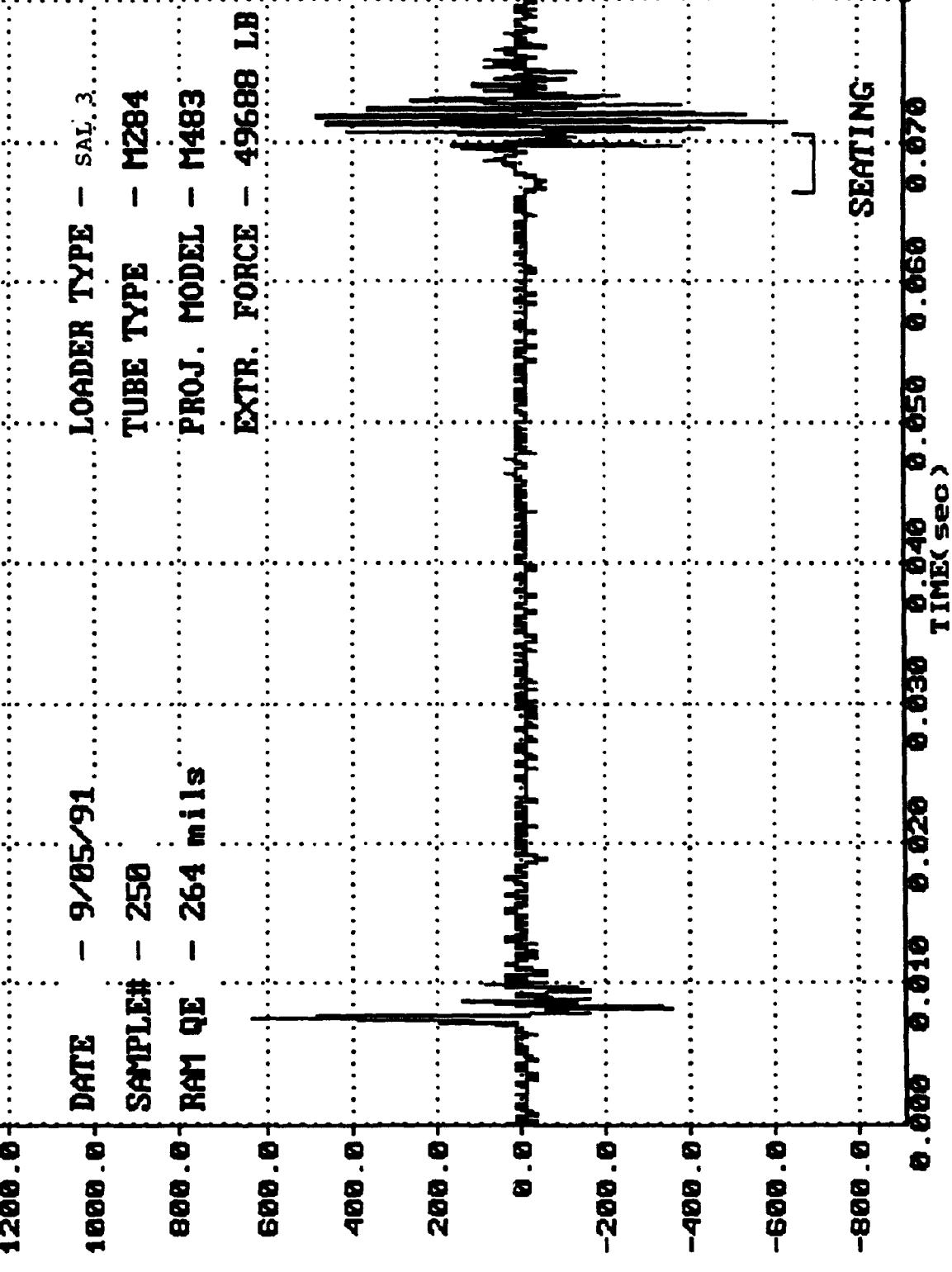


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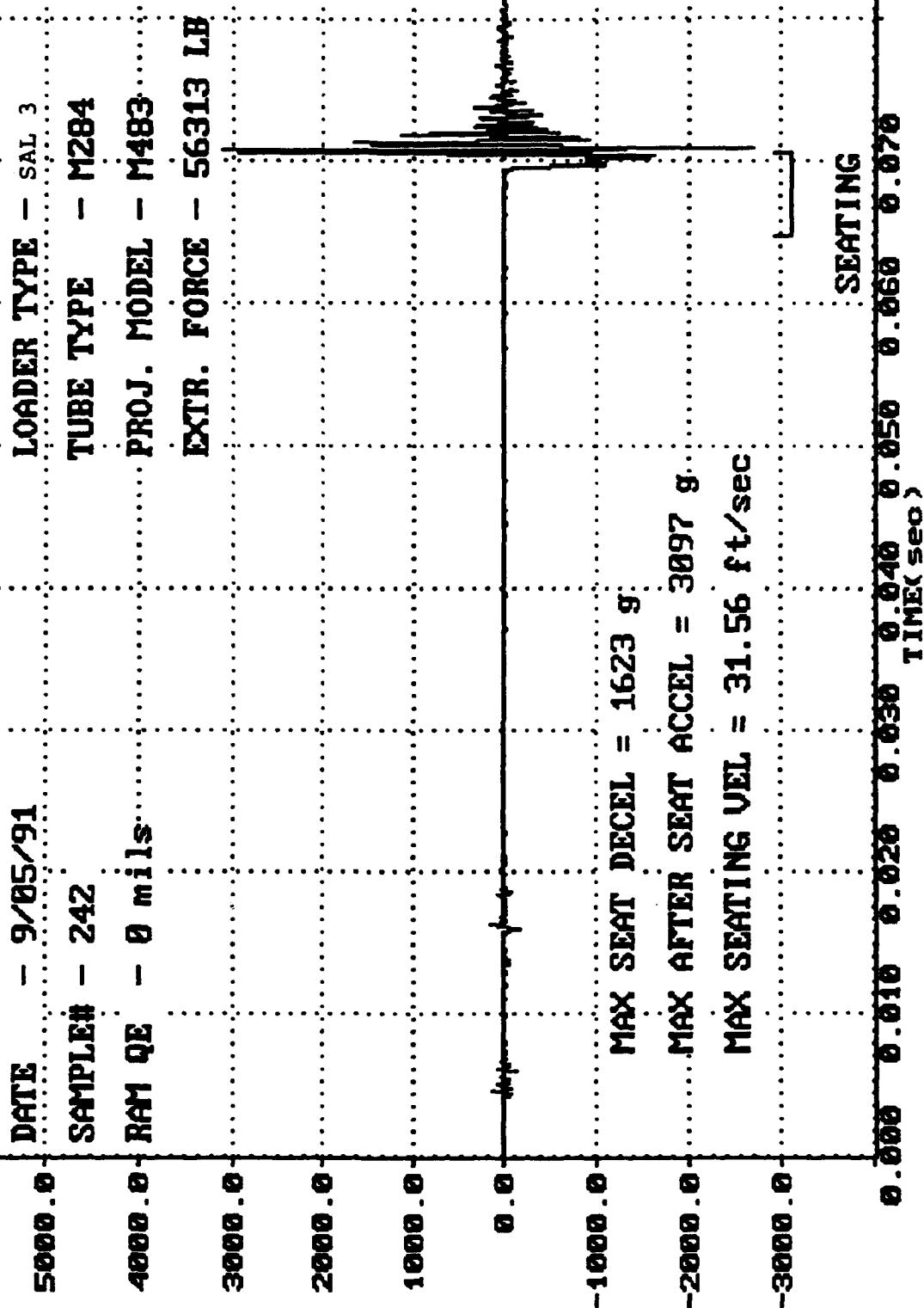
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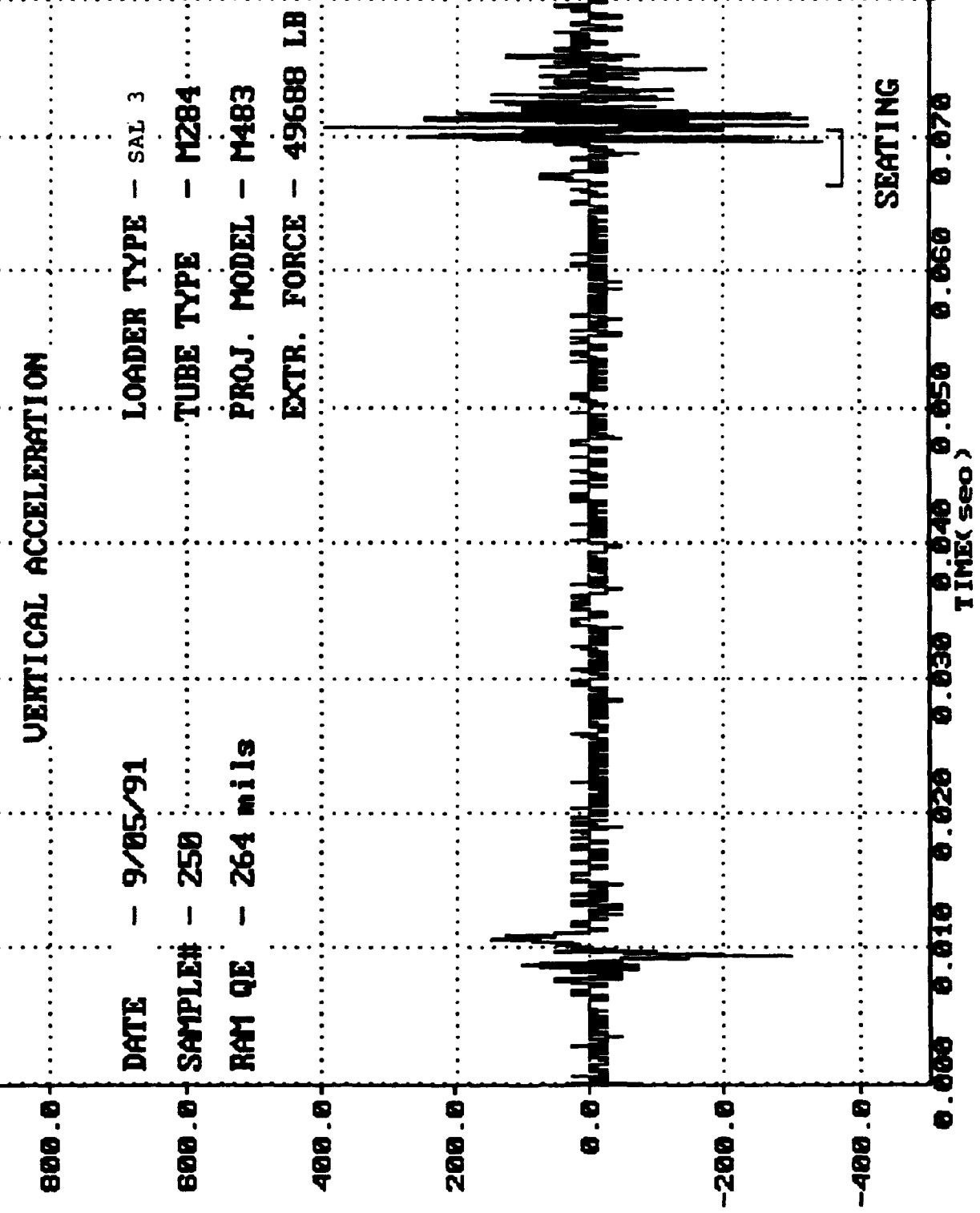
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LONGITUDINAL ACCELERATION

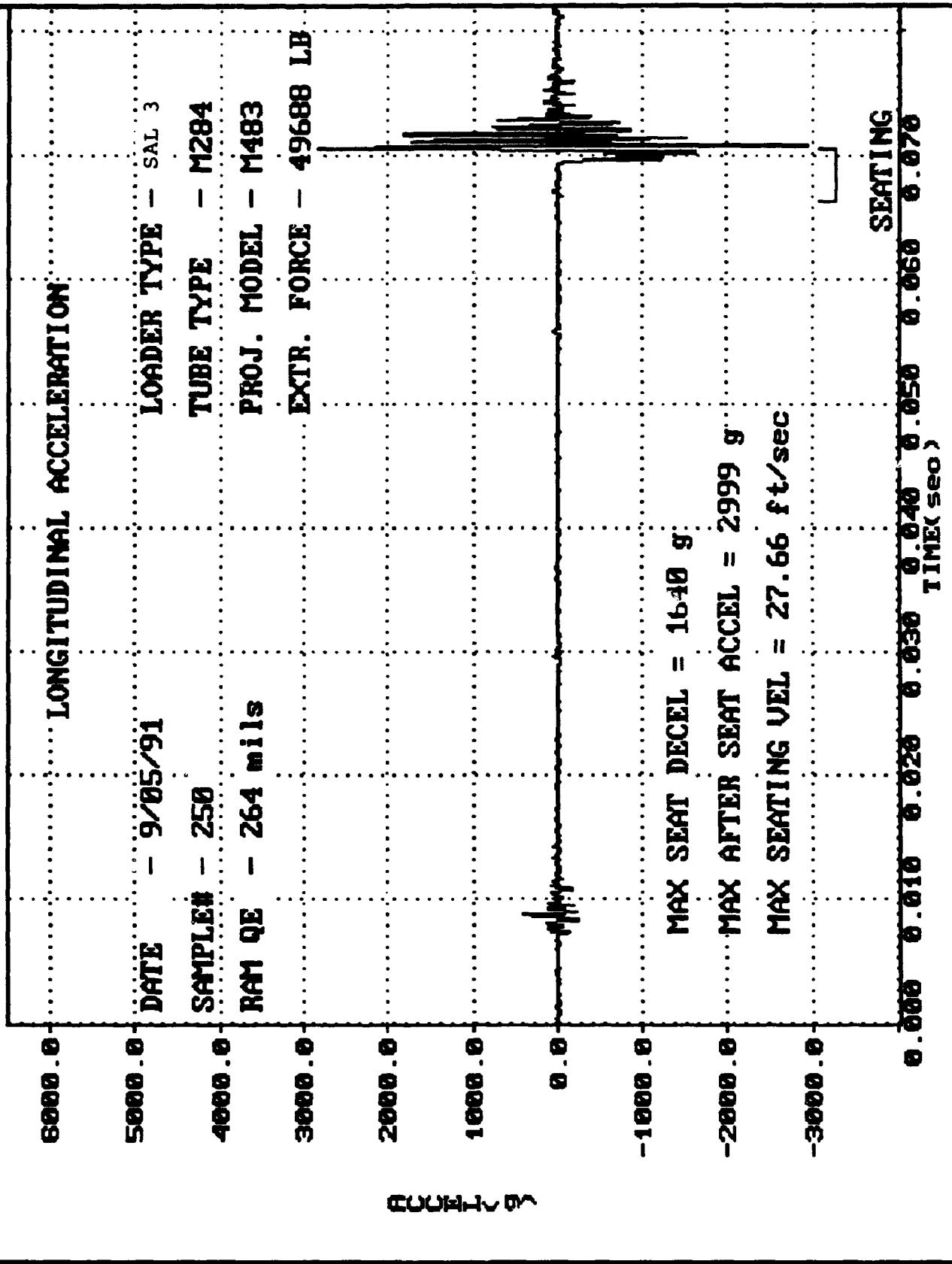


ACCELERATION

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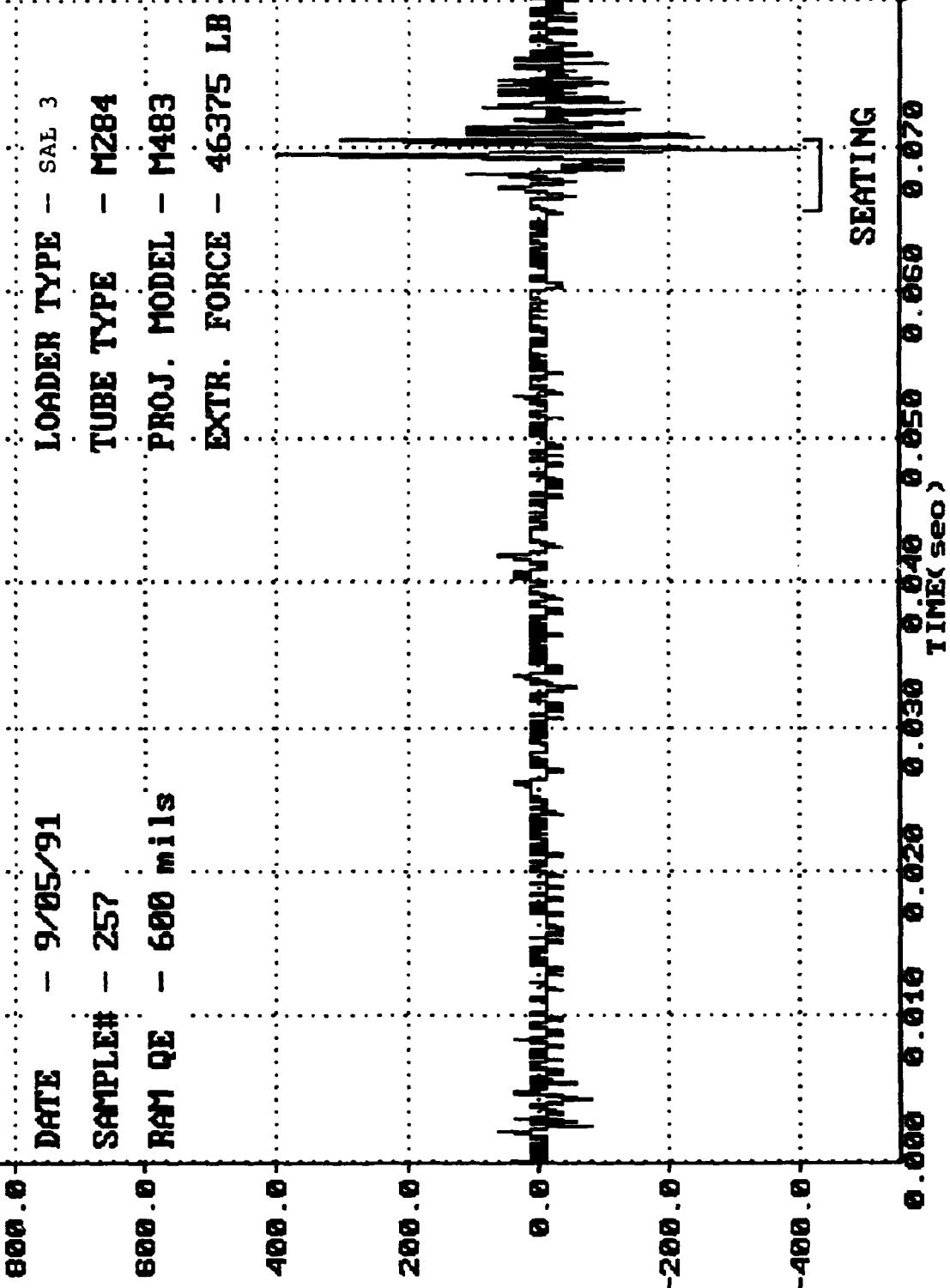


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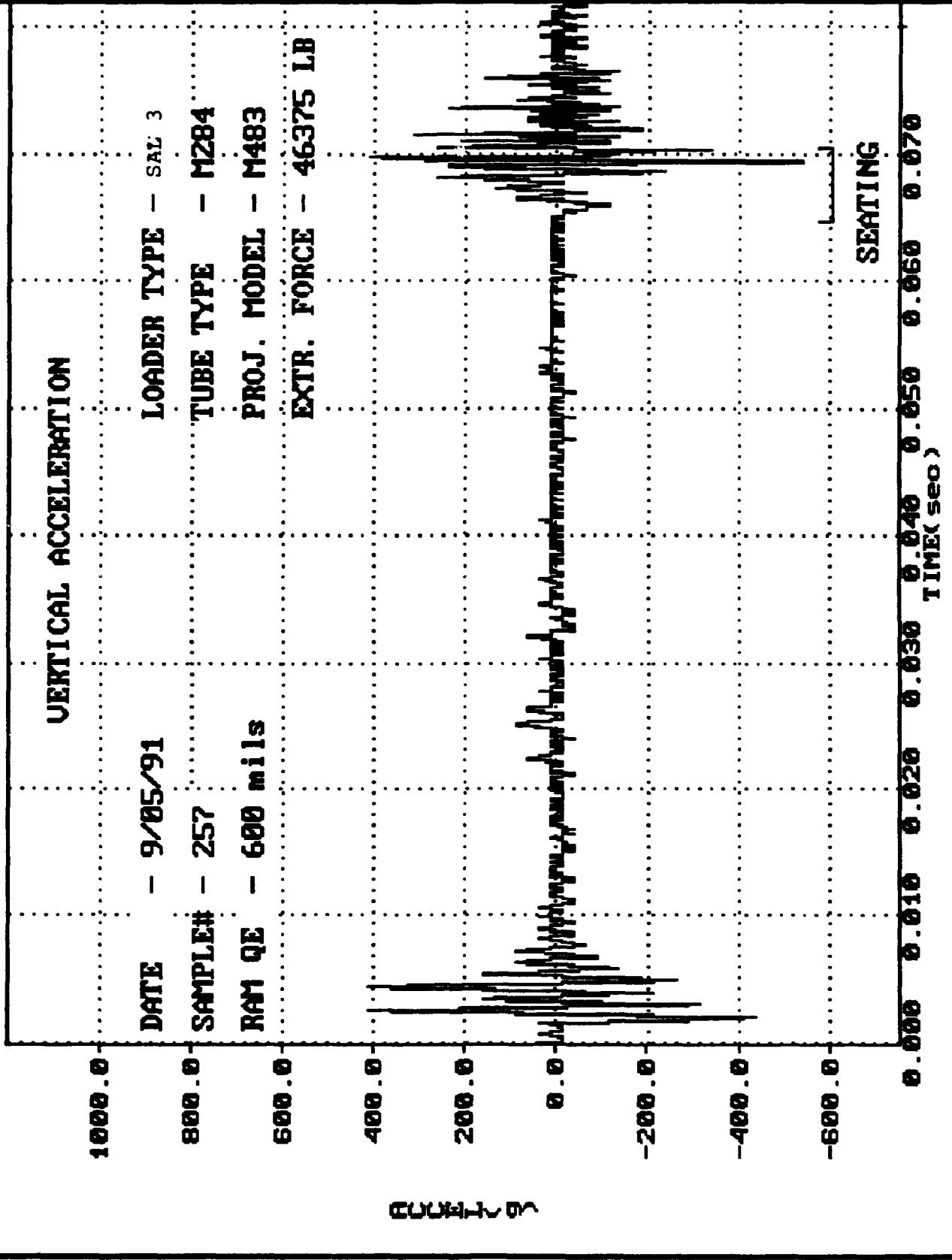


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TRANSVERSE ACCELERATION

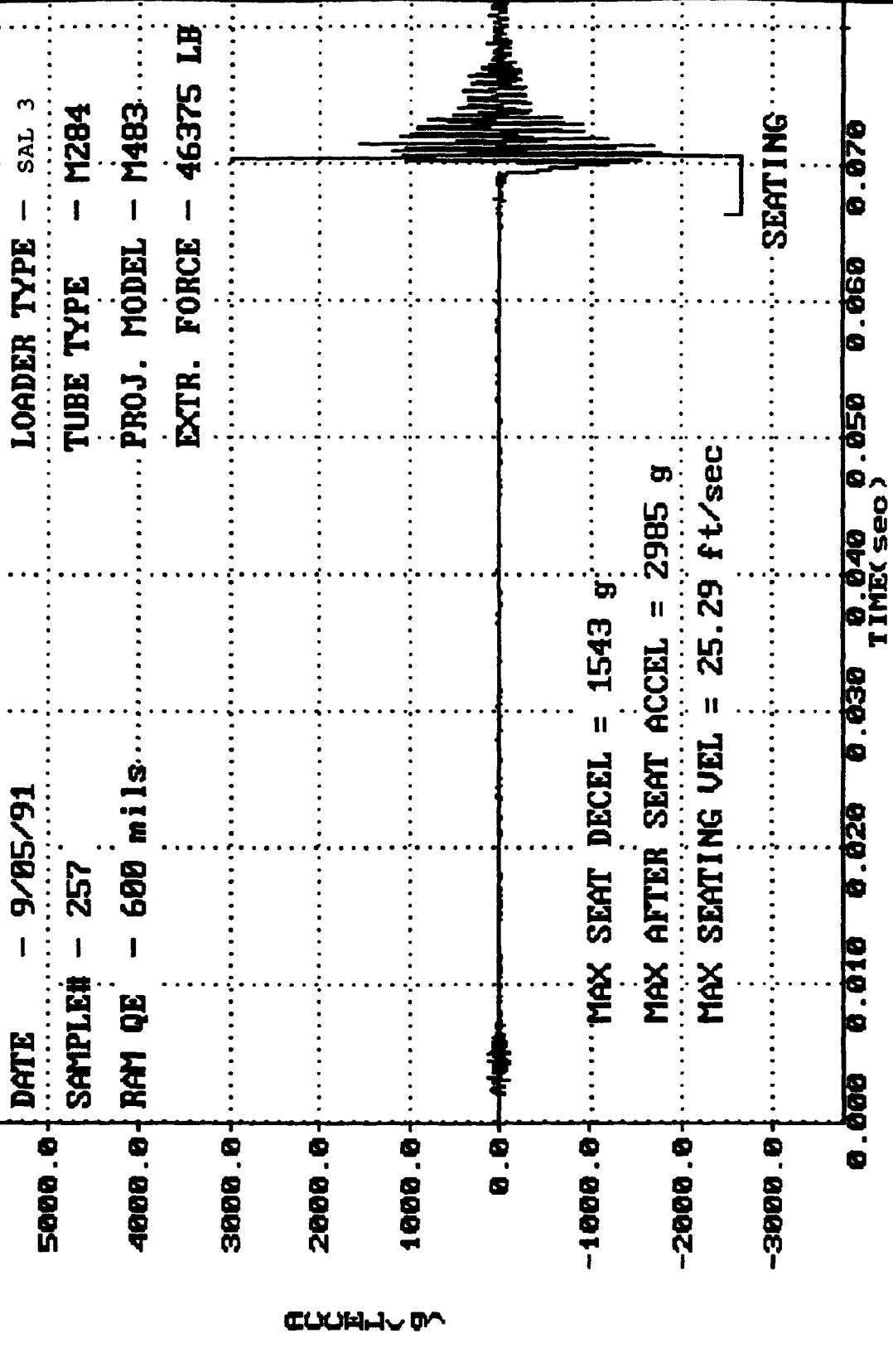


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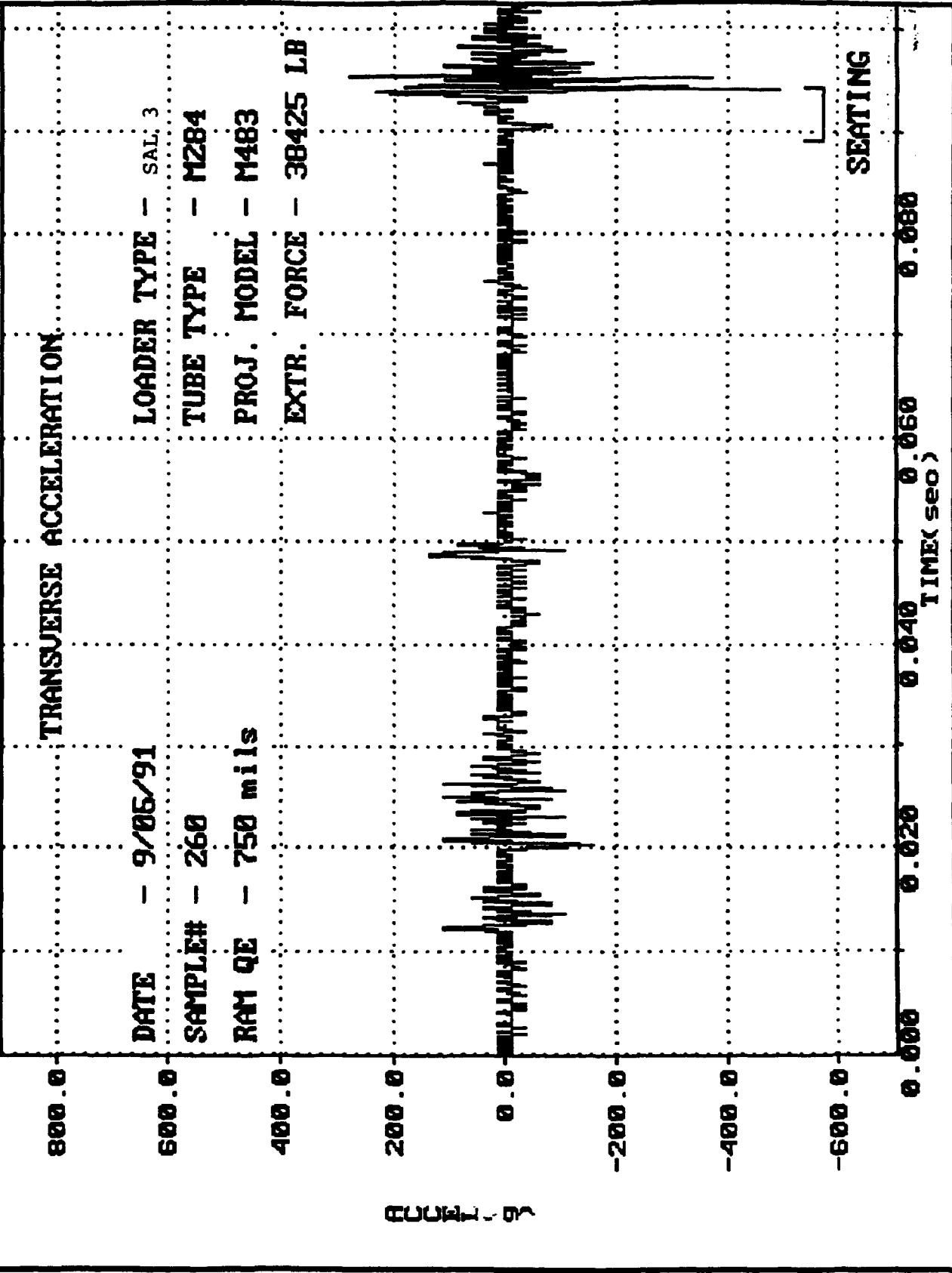


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

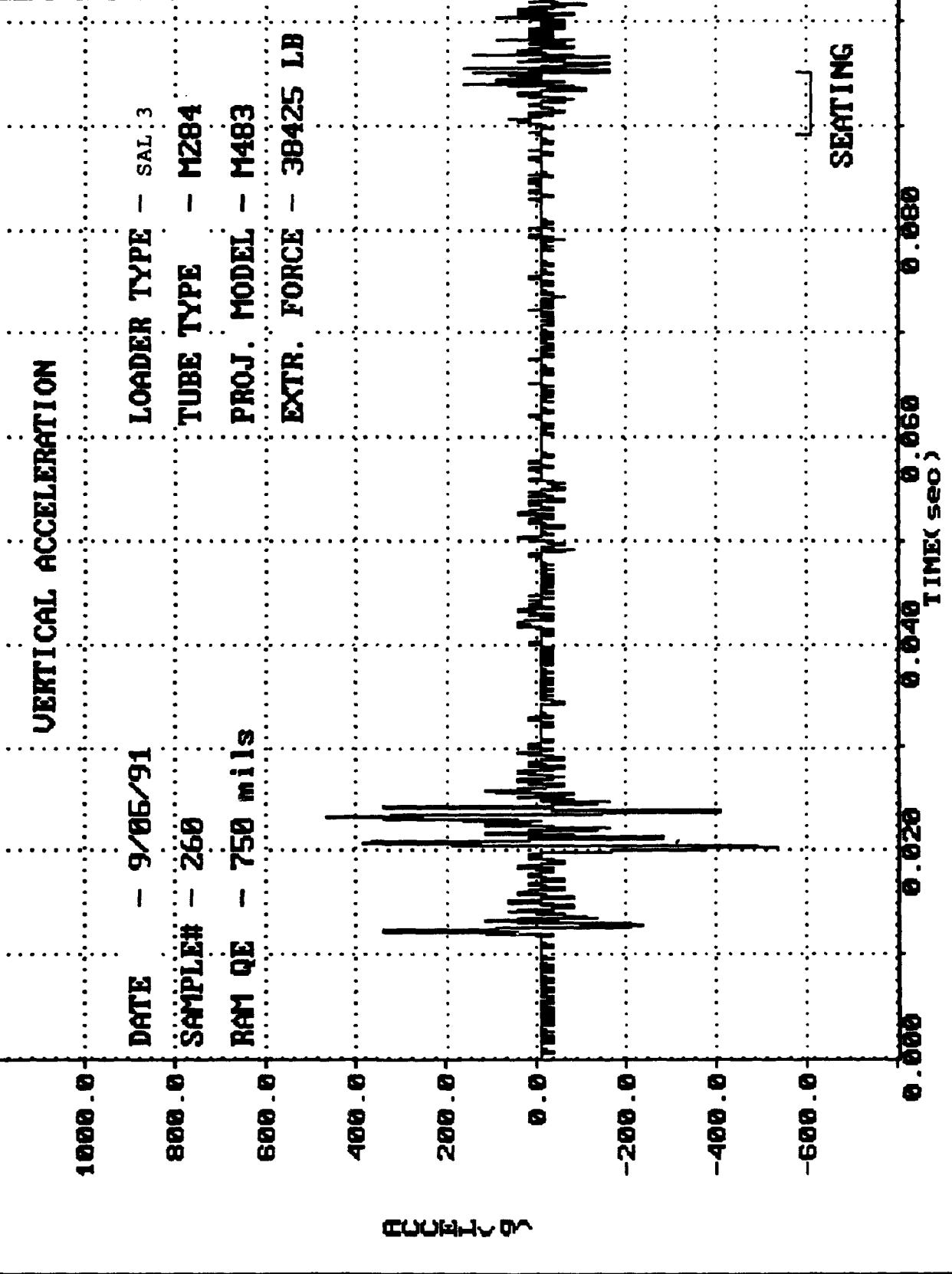
LONGITUDINAL ACCELERATION



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

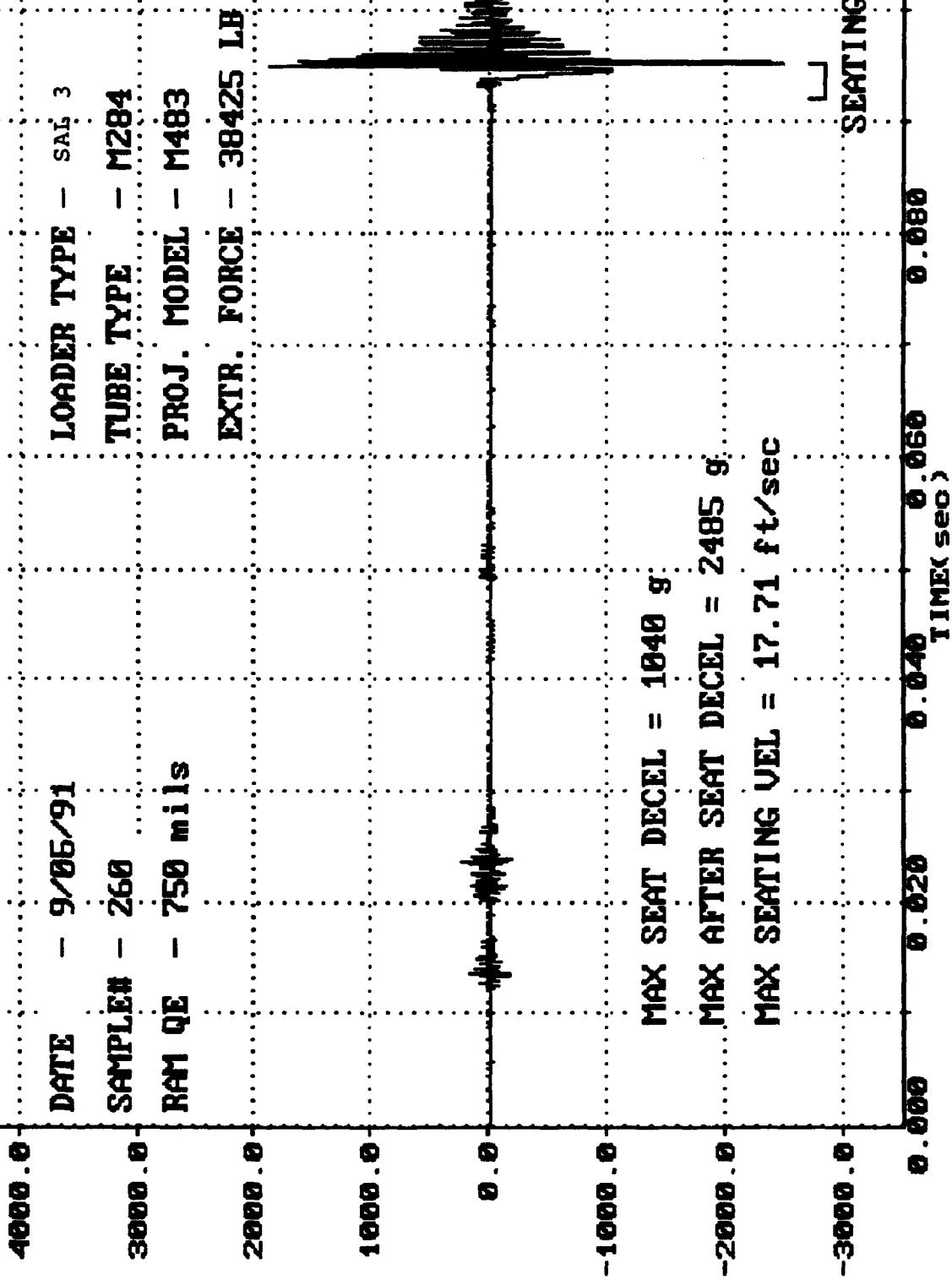


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

LONGITUDINAL ACCELERATION



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

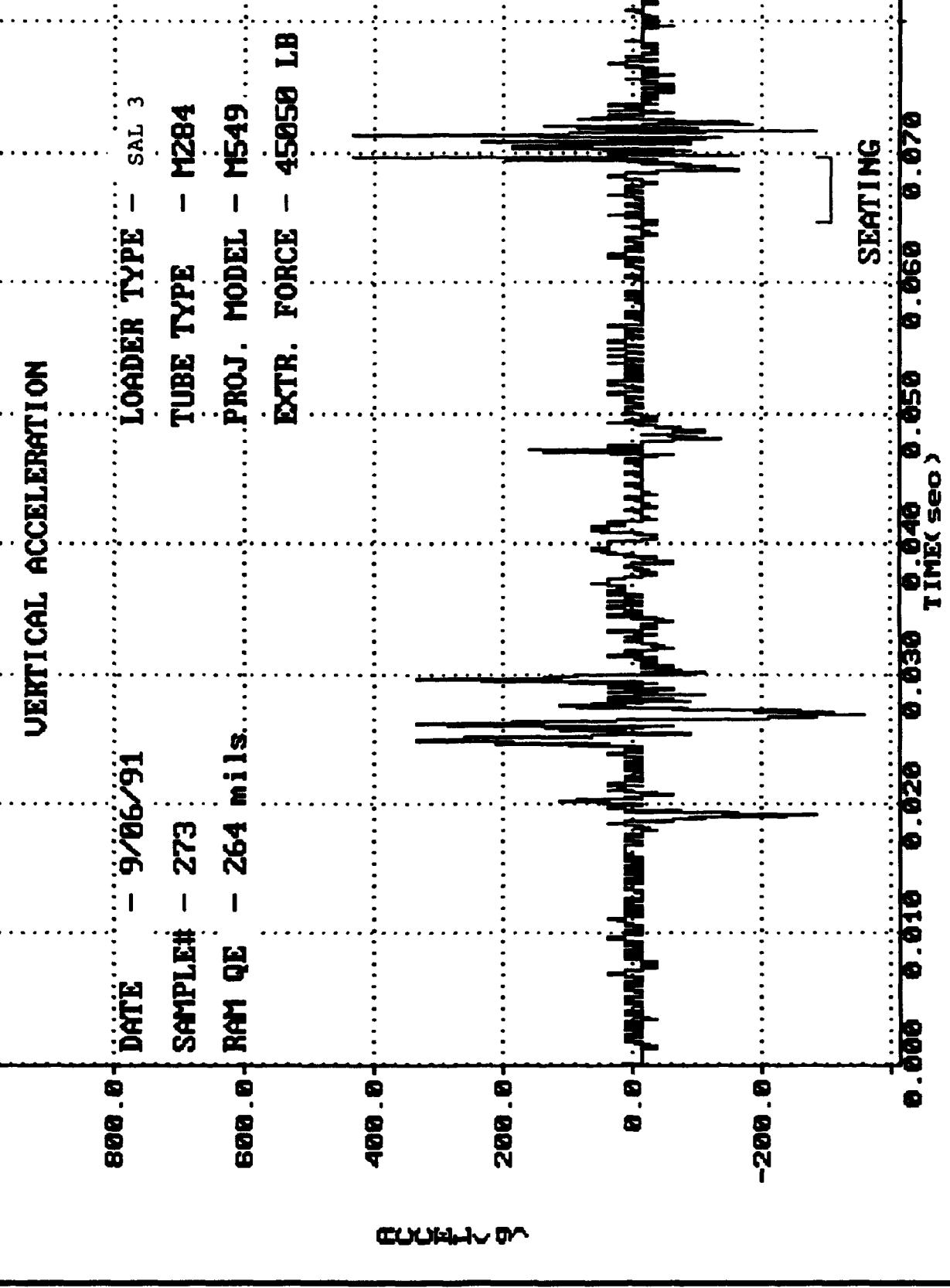
TRANSVERSE ACCELERATION

DATE - 9/06/91
SAMPLE# - 273
RAM QE - 264 mils
LOADER TYPE - SAL 3
TUBE TYPE - M284
PROJ. MODEL - M549
EXT. FORCE - 45050 LB

ACCELERATION

169

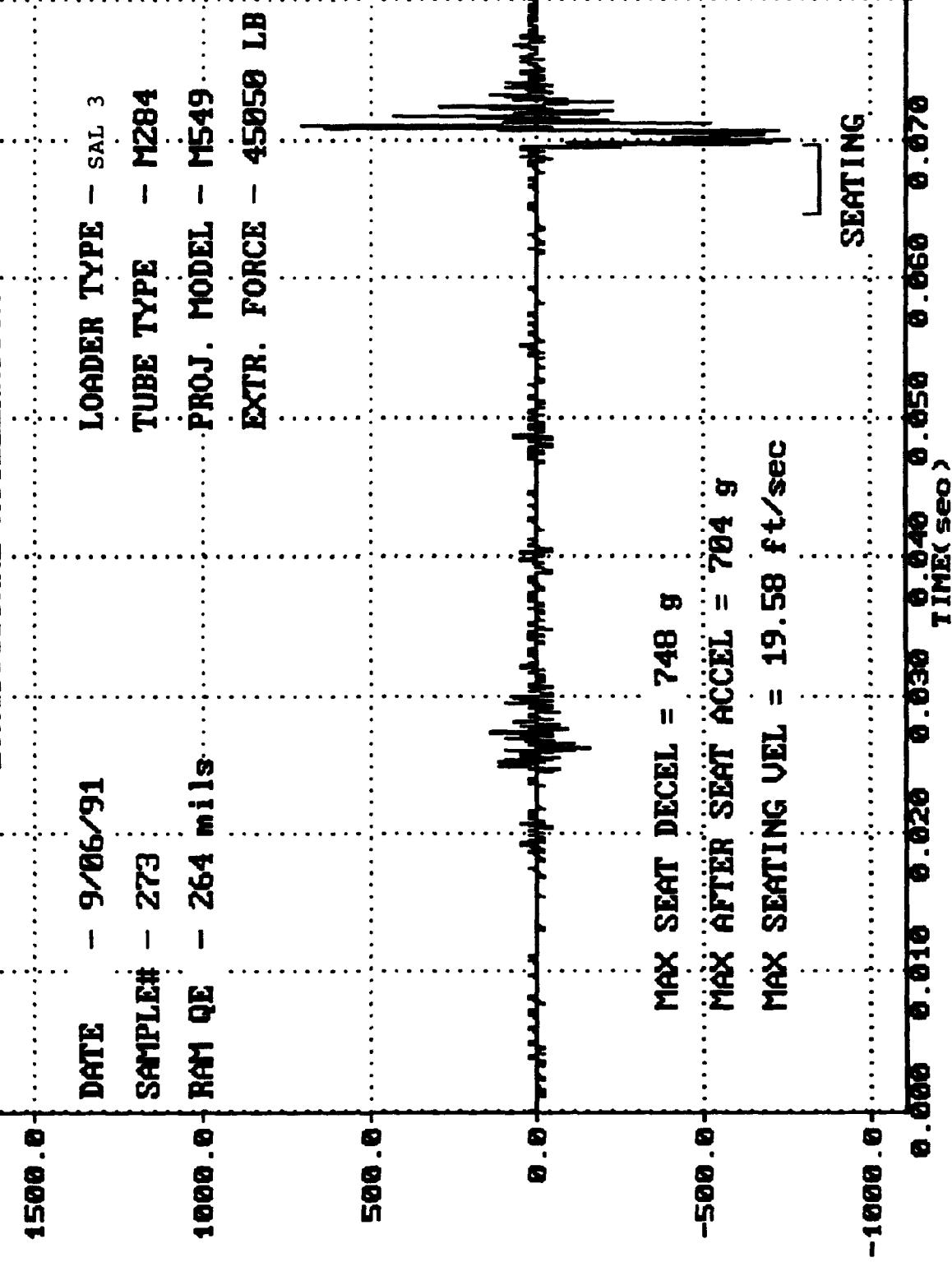
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



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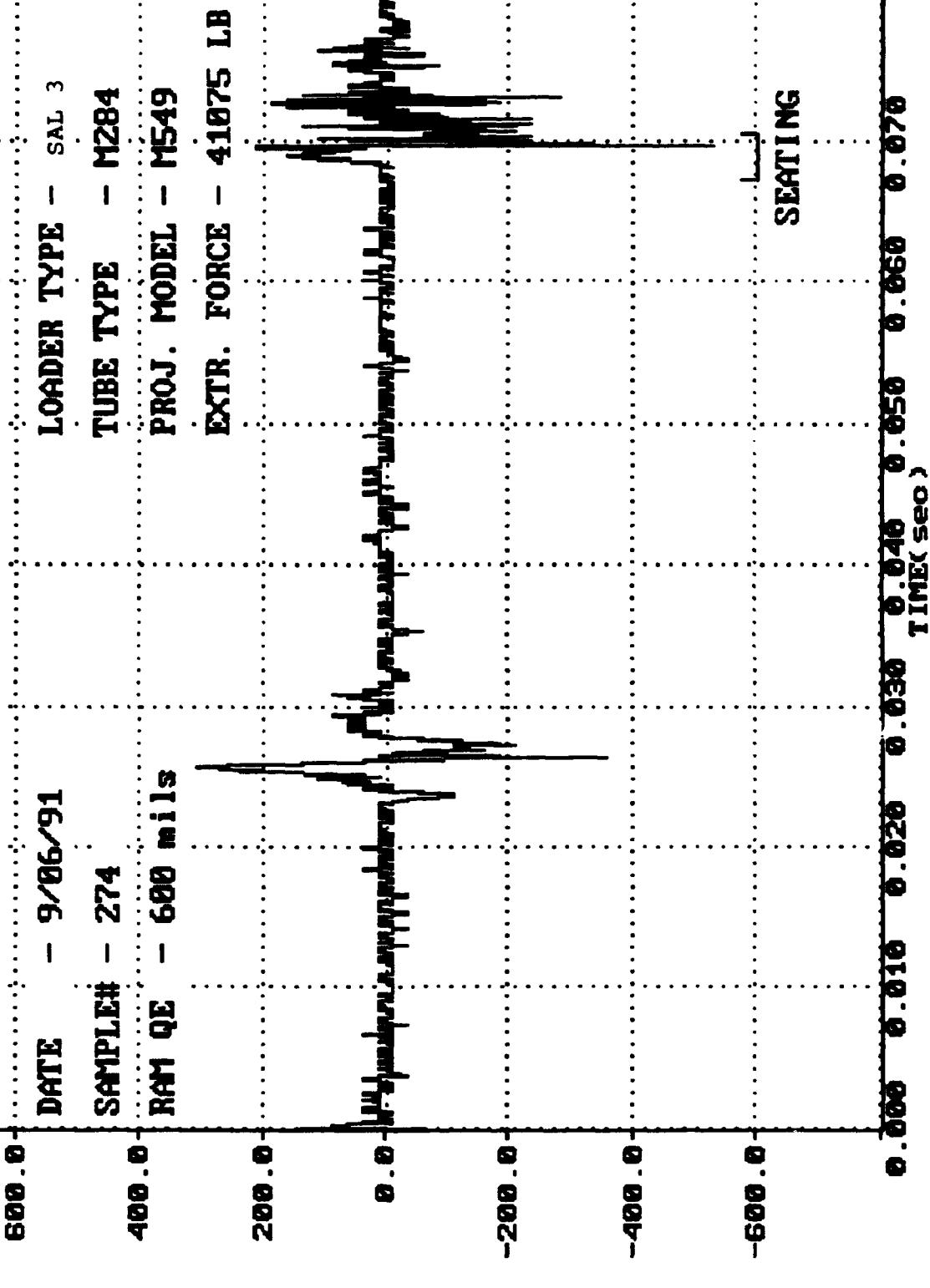
FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

LONGITUDINAL ACCELERATION



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

VERTICAL ACCELERATION

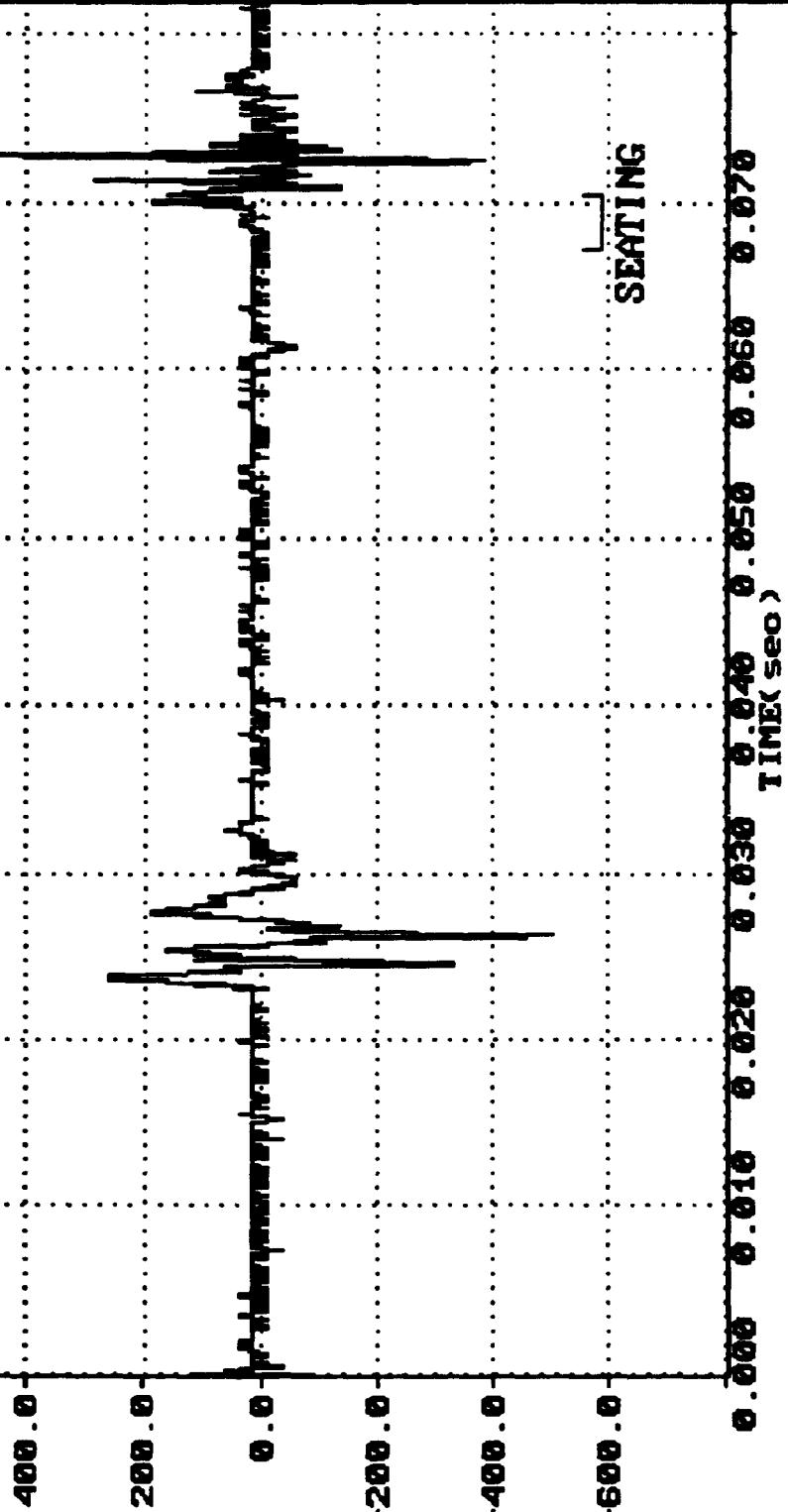
DATE - 9/06/91
SAMPLE - 274
RAM QE - 600 mils
EXTR. FORCE - 41075 LB

LOADER TYPE - SAL 3

TUBE TYPE - M284

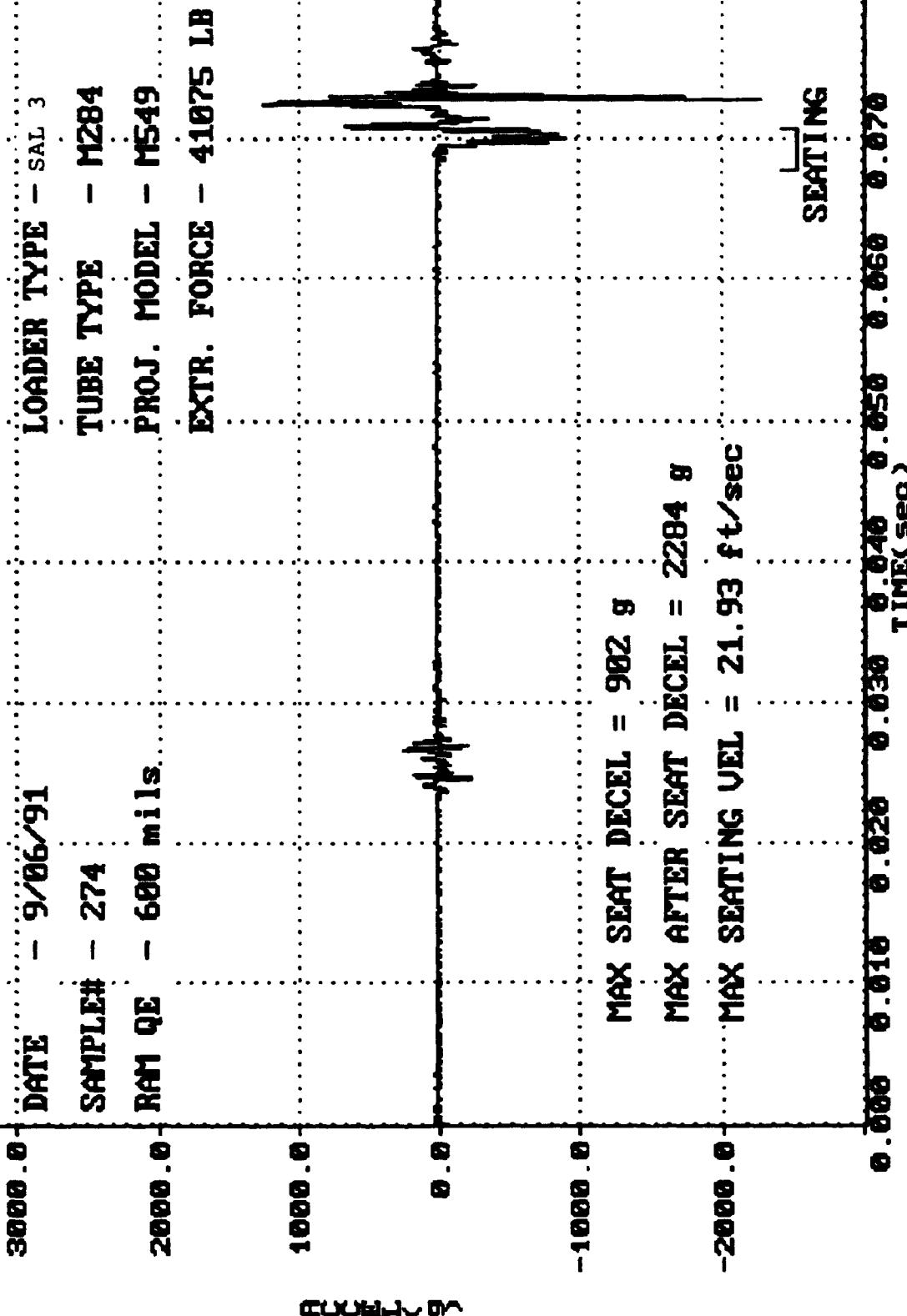
PROJ. MODEL - M549

ACCELERATION



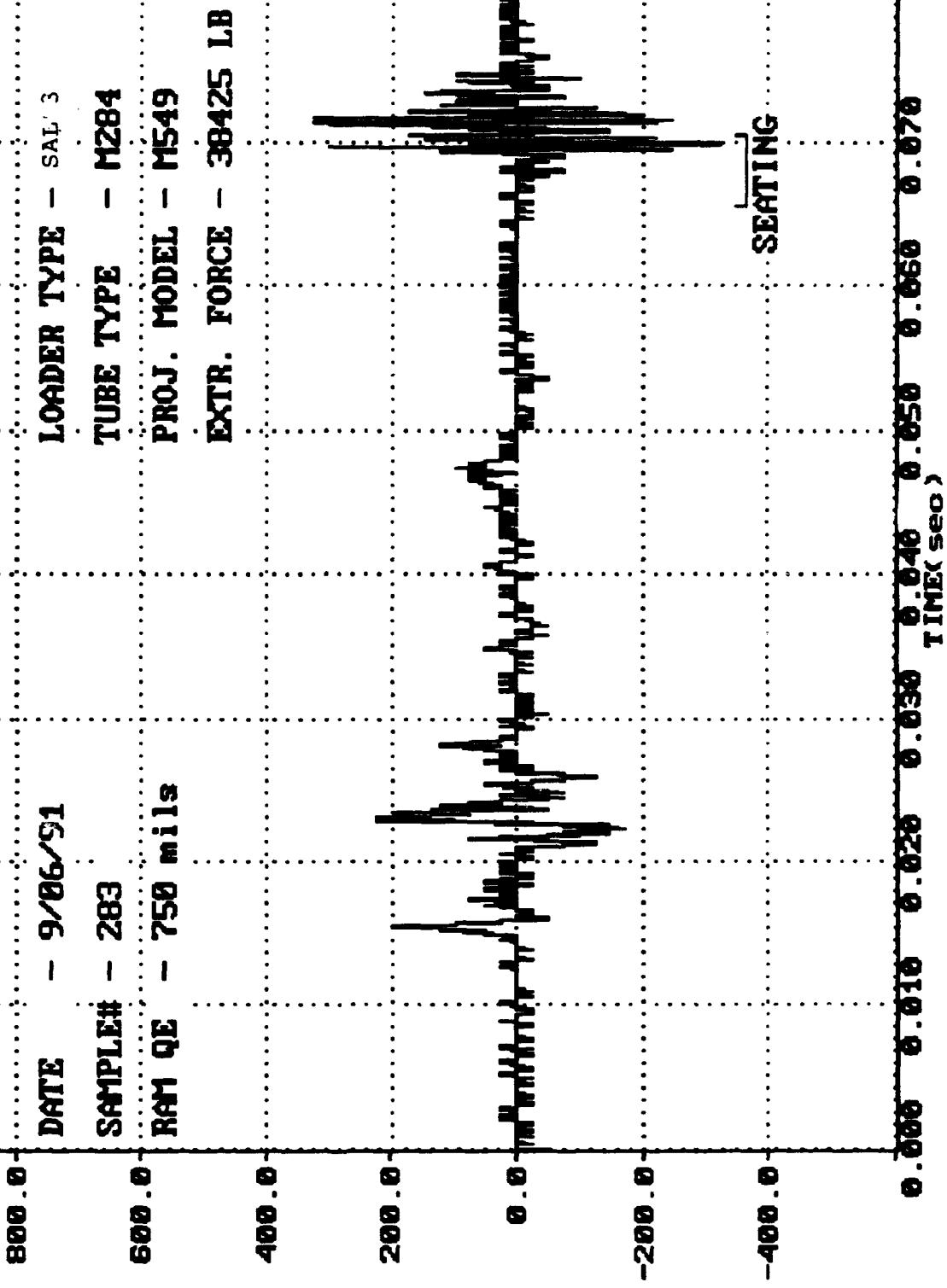
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LONGITUDINAL ACCELERATION



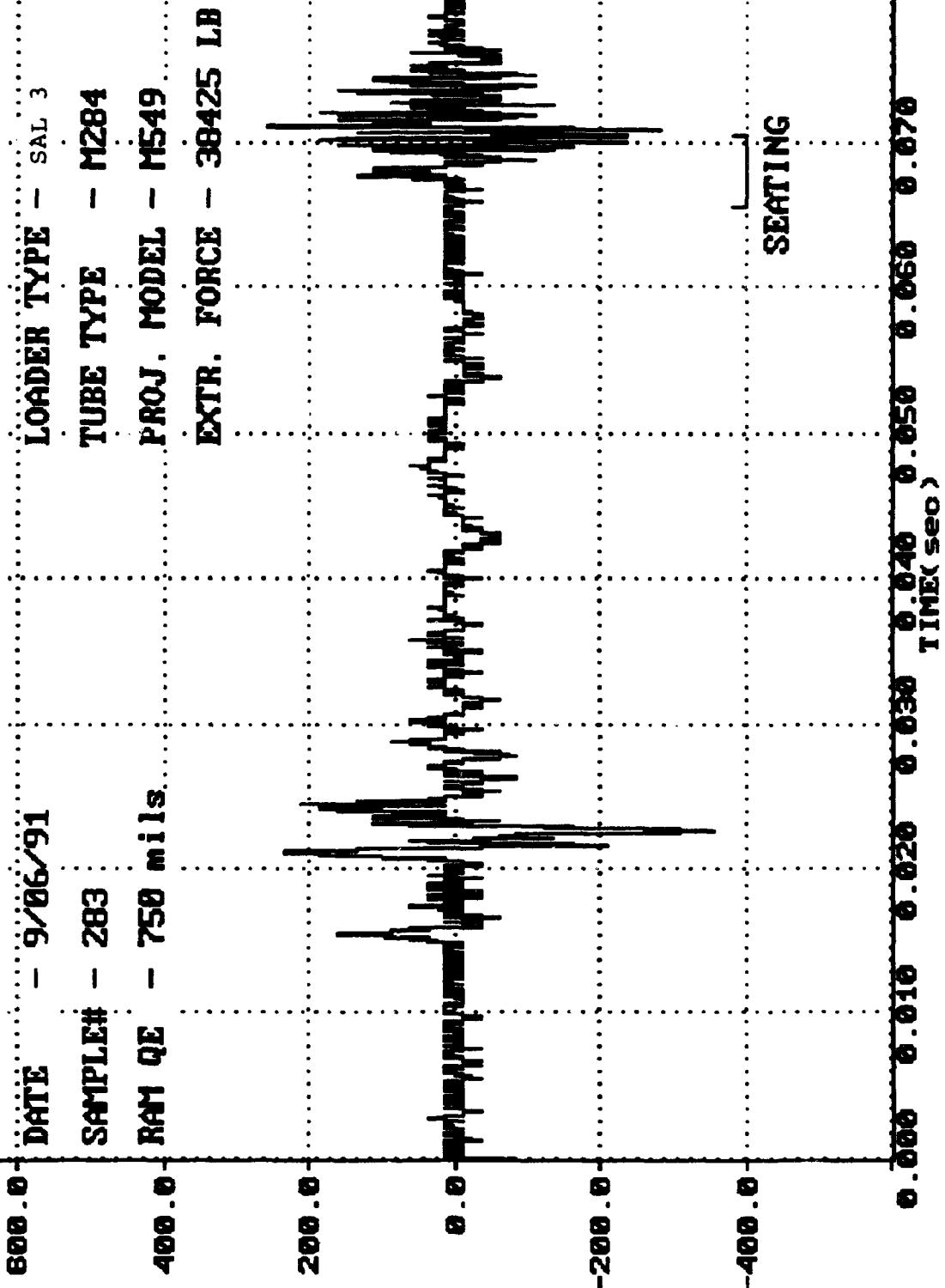
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TRANSVERSE ACCELERATION

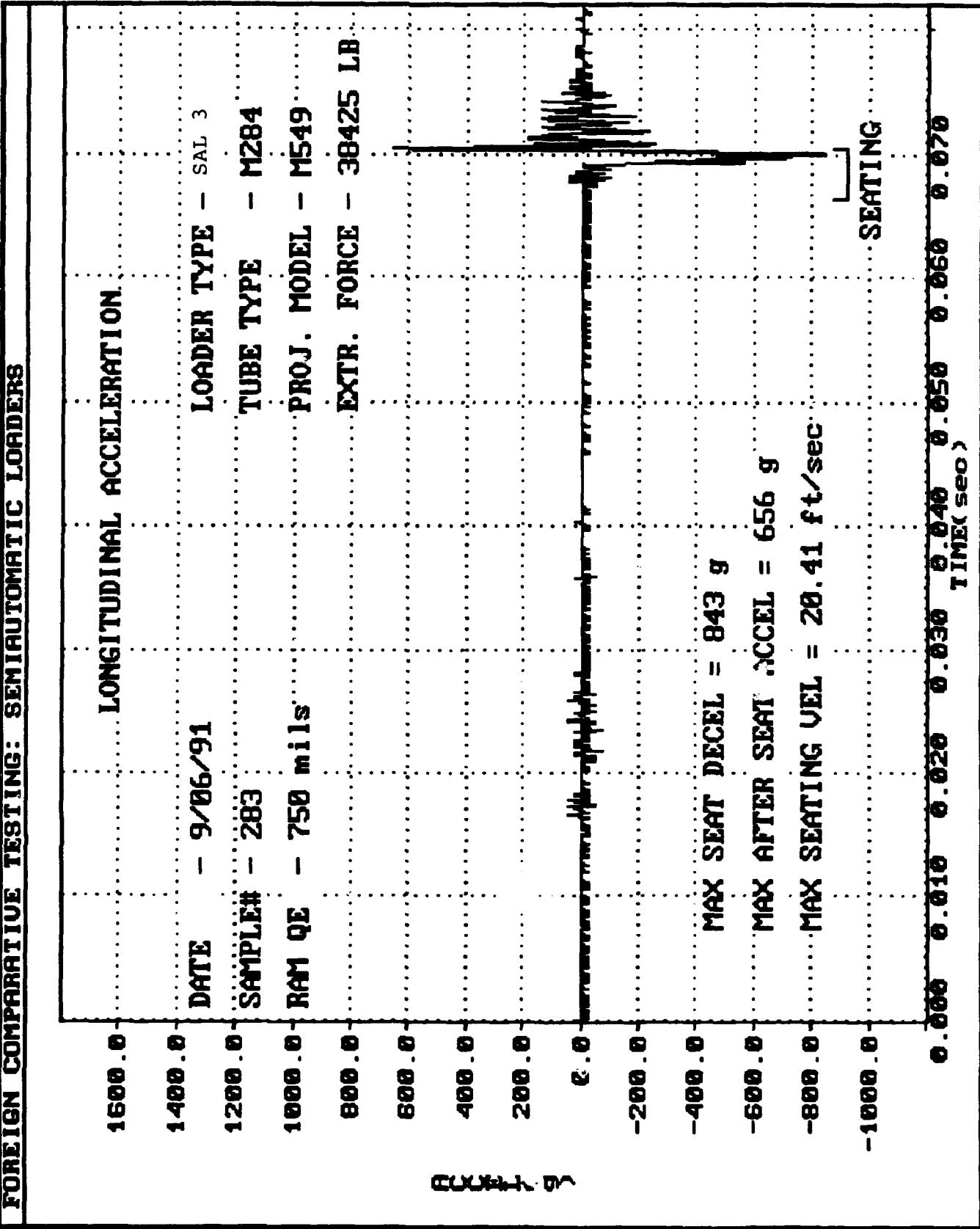


FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

VERTICAL ACCELERATION



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

TRANSVERSE ACCELERATION

DATE - 9/06/91

SAMPLE# - 284

RAM QE - 0 mils

600.0

LOADER TYPE - SAL 3

TUBE TYPE - M284

PROJ. MODEL - M549

EXTR. FORCE - 39750 LB

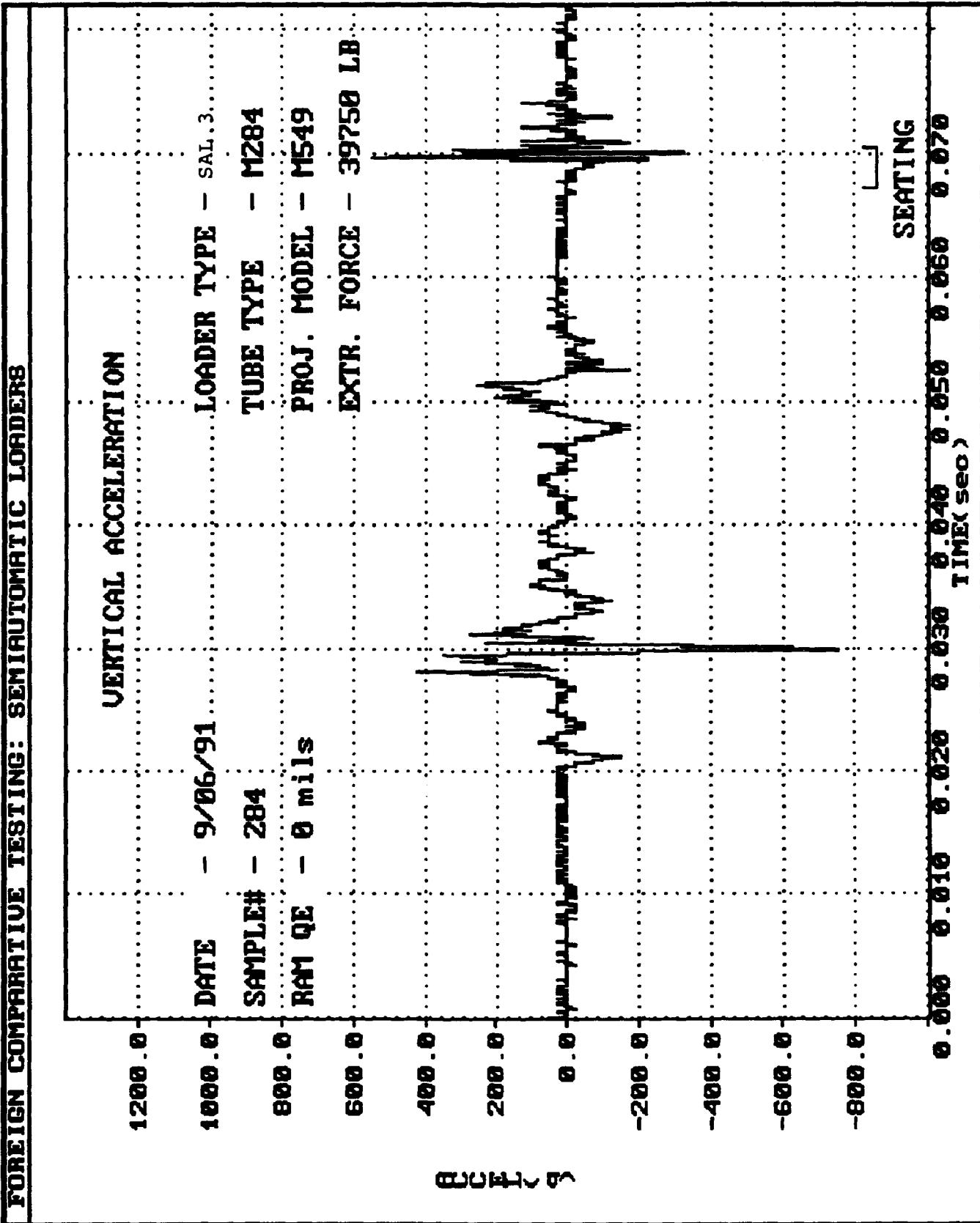
EXTR. FOR.

178

0 .005 0 .010 0 .025 0 .030 0 .040 0 .050 0 .060 0 .070

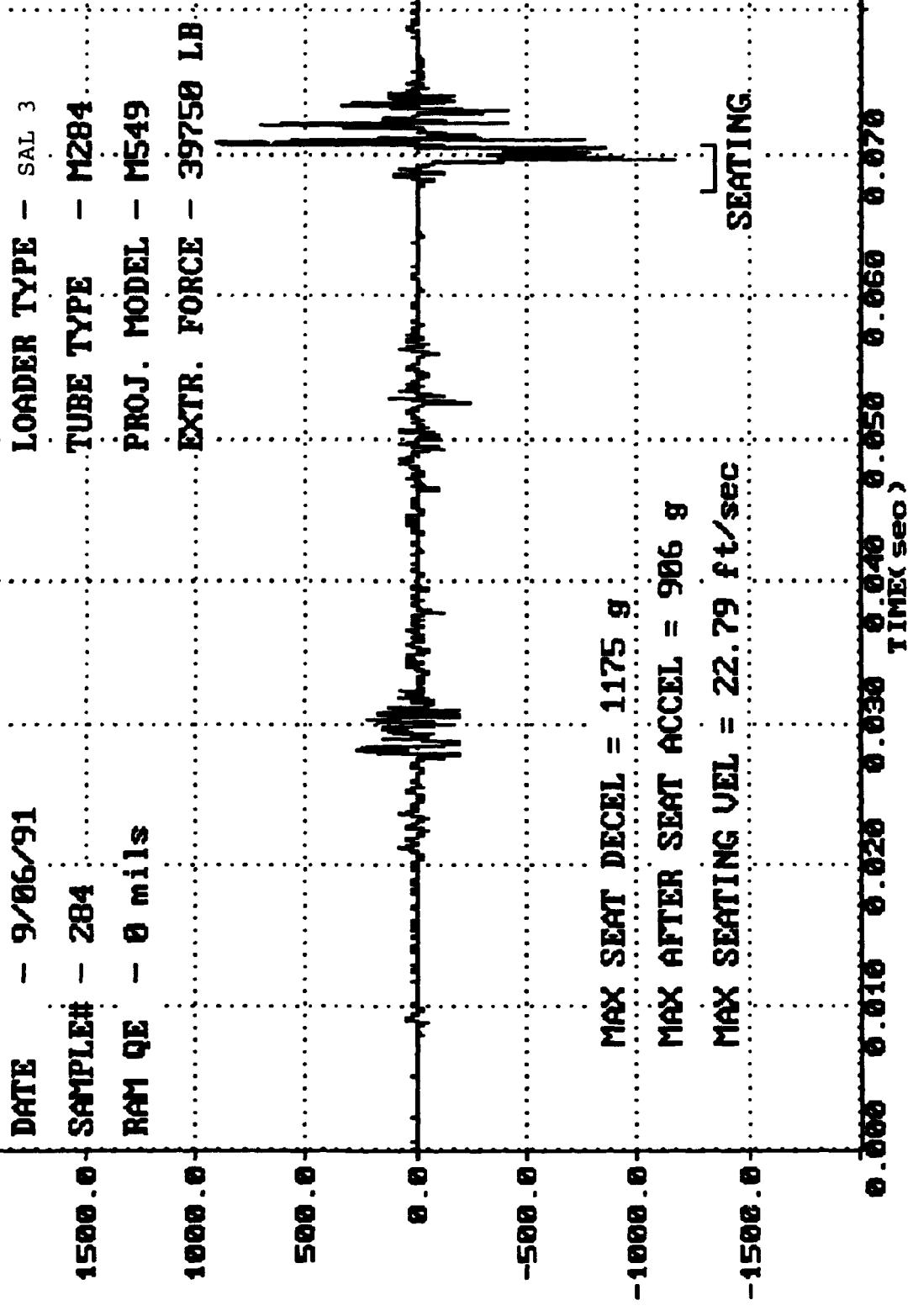
SEATING

FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS



FOREIGN COMPARATIVE TESTING: SEMIAUTOMATIC LOADERS

LONGITUDINAL ACCELERATION



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SUPPLEMENTARY

INFORMATION

ERRATA

Technical Report ARAED-TR-93026

INSTRUMENTATION FOR THE FOREIGN WEAPONS
EVALUATION PROGRAM

Joseph Petrellese, Jr.

April 1994

Approved for public release; distribution unlimited.

Replace the table of contents and the appendix cover sheets with the attached pages.

The author requests that you return the replaced pages to him instead of discarding them. An envelope is provided for your convenience.

May 1994

ERRATA AD A219128

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Testing Results	3
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SAL 1 RAMS**

**APPENDIX C
SAL 2 RAMS**

APPENDIX D
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