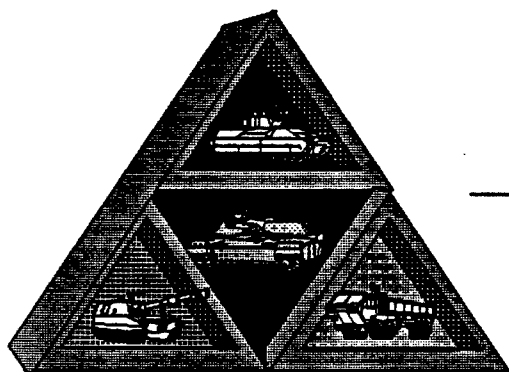


ADA 260717
2243

1306

TARDEC



Technical Report

No. 13572

MANNED DEMONSTRATION OF TARDEC's
CREW STATION/TURRET MOTION BASE SIMULATOR,
CUSTOMER DAY 1992

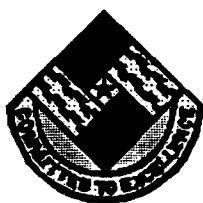
NOVEMBER 1992

20040106039

Alexander A. Reid
U.S. Army Tank-Automotive Command
ATTN: AMSTA-RYA
Warren, MI 48397-5000

By

APPROVED FOR PUBLIC RELEASE:
DISTRIBUTION IS UNLIMITED



U.S. Army Tank-Automotive Command
Research, Development, and Engineering Center
Warren, Michigan 48397-5000

NOTICES

This report is not to be construed as an official Department of the Army position.

Mention of any trade names or manufacturers in this report shall not be construed as an official endorsement or approval of such products or companies by the U.S. Government.

Destroy this report when it is no longer needed. Do not return it to the originator.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE		3. REPORT TYPE AND DATES COVERED	
4. TITLE AND SUBTITLE Manned Demonstration of TARDEC's Crew Station/Turret Motion Base Simulator, Customer Day 1992				5. FUNDING NUMBERS	
6. AUTHOR(S) Alexander A. Reid					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Tank-Automotive Command ATTN: AMSTA-RYA Warren, MI 48397-5000				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES					
12a. DISTRIBUTION / AVAILABILITY STATEMENT				12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) This is a report documenting all manned tests done for Customer Day using the Crew Station/Turret Motion Base Simulator. This report details each test and is prepared for the Human Use Committee as part of the test protocol.					
14. SUBJECT TERMS				15. NUMBER OF PAGES 35	
				16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT		

TABLE OF CONTENTS

Section		Page
1.0	INTRODUCTION.	5
2.0	OBJECTIVE	5
3.0	CONCLUSION.	5
4.0	RECOMMENDATIONS	5
5.0	DISCUSSION.	5
APPENDIX A.	Data Plots of the Scenarios	A-1
DISTRIBUTION LIST.		.Dist-1

1.0. INTRODUCTION

The U.S. Army Tank-Automotive Research, Development and Engineering Center (TARDEC) has temporary safety certification from the U.S. Army Test-Evaluation Command (TECOM) for the Crew Station/Turret Motion Base Simulator (CS/TMBS). This certification allows the use of test subjects in the turret during simulation. For Customer Day (Sep. 16, 1992), the first simulations using test subjects were conducted at TARDEC on the CS/TMBS.

Prior to conducting a simulation using test subjects, approval for the test plan must be obtained from the Human Use Committee (HUC) and the commander of TARDEC. After approval was obtained, the test was conducted and this report, summarizing the test results, will be submitted to the HUC to finalize this test.

2.0. OBJECTIVE

The objective of this report is to summarize the results of the first manned simulation using the CS/TMBS. This report will be submitted to the Human Use Committee and describes the tests conducted, results and comments of the test subject. The tests were performed as part of TARDEC's Customer Day, held on September 16, 1992. The tests also include trial runs conducted during the week prior to Customer Day.

3.0. CONCLUSION

The tests were completed without incident to the test subject. A minor hardware problem was identified and fixed during the first preliminary run. No other problems were incurred.

4.0. RECOMMENDATIONS

The CS/TMBS is safe for human use. The large amount of safety precautions taken during the conception of the simulator has made it virtually hazardproof. The simulator can be used for a wide variety of testing ranging from light crew stations to heavy combat turrets. It provides an excellent alternative to field testing in certain cases.

5.0. DISCUSSION

All trial runs and the actual customer day test are listed below.

TEST #1

Date: 9/2/92

Time: 1300 hrs

Test Subject: Alexander Reid

Test Protocol: A simulation of the M1A1 traversing the cross-country course Leternou 4 located at the Waterways Experiment Station in Vicksburg, MS at 20 mph was used as the input signal to the CS/TMBS.

Comments: The test was not conducted because of a failure of the motion enable switch located in the turret. The switch was replaced, but no testing occurred this day.

TEST #2

Date: 9/8/92

Time: 0900 hrs

Test Subject: Alexander Reid

Test Protocol: A simulation of the M1A1 traversing the cross-country course Leternou 4 located at the Waterways Experiment Station in Vicksburg, MS at 20 mph was used as the input signal to the CS/TMBS.

Comments: The test went smoothly. It was run for about 10 minutes with no problems. The scenario is a little dull, so for the next test, a different scenario will be used.

TEST #3

Date: 9/14/92

Time: 1000 hrs

Test Subject: Alexander Reid

Test Protocol: A simulation of the M1A1 traversing the cross-country course APG IV located at the Aberdeen Proving Grounds at 10 mph was used as the input signal to the CS/TMBS.

Comments: This test also went smoothly. It was run for about 15 minutes with no problems. The scenario is a bit more exciting and challenging.

TEST #4

Date: 9/16/92

Time: 1000, 1030 and 1100 hrs

Test Subject: Alexander Reid

Test Protocol: A simulation of the M1A1 traversing the cross-country course APG IV located at the Aberdeen Proving Grounds at 10 mph was used as the input signal to the CS/TMBS.

Comments: These were the Customer Day runs. Each run lasted about three minutes and there were no problems encountered. The occupant remained atop the turret during the time in between runs.

TEST #5

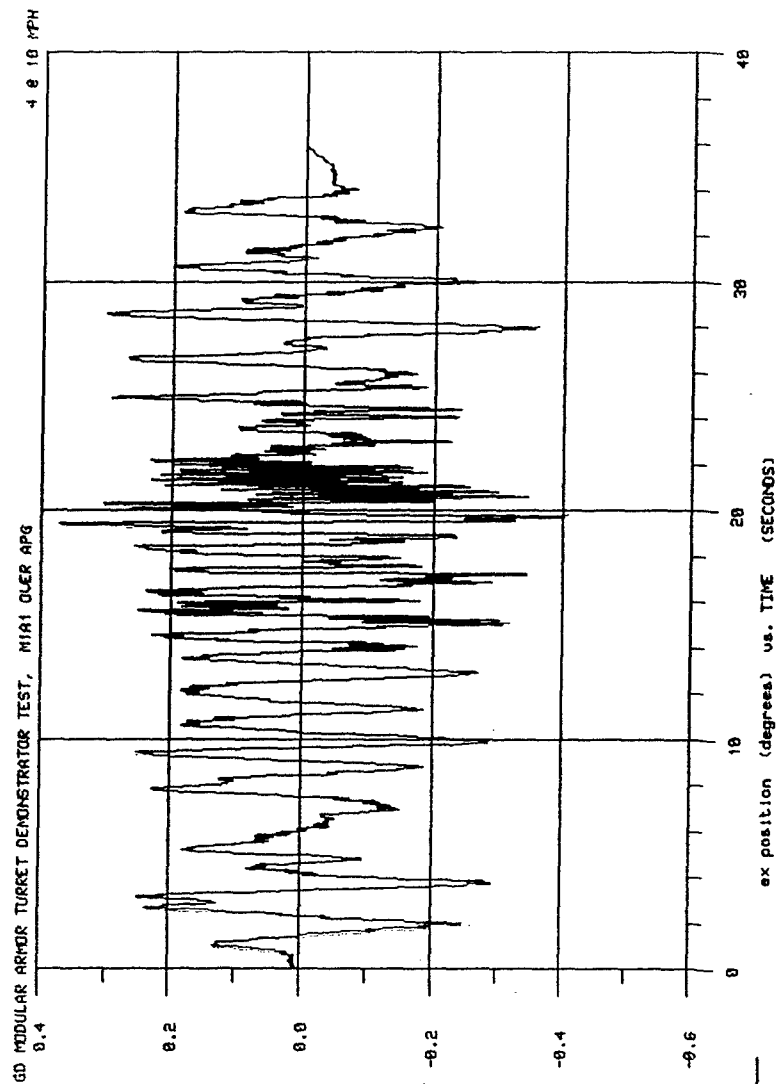
Date: 9/30/92

Comments: This was for a videotape made as part of the Customer Day runs. The run lasted about eight minutes and there were no problems encountered.

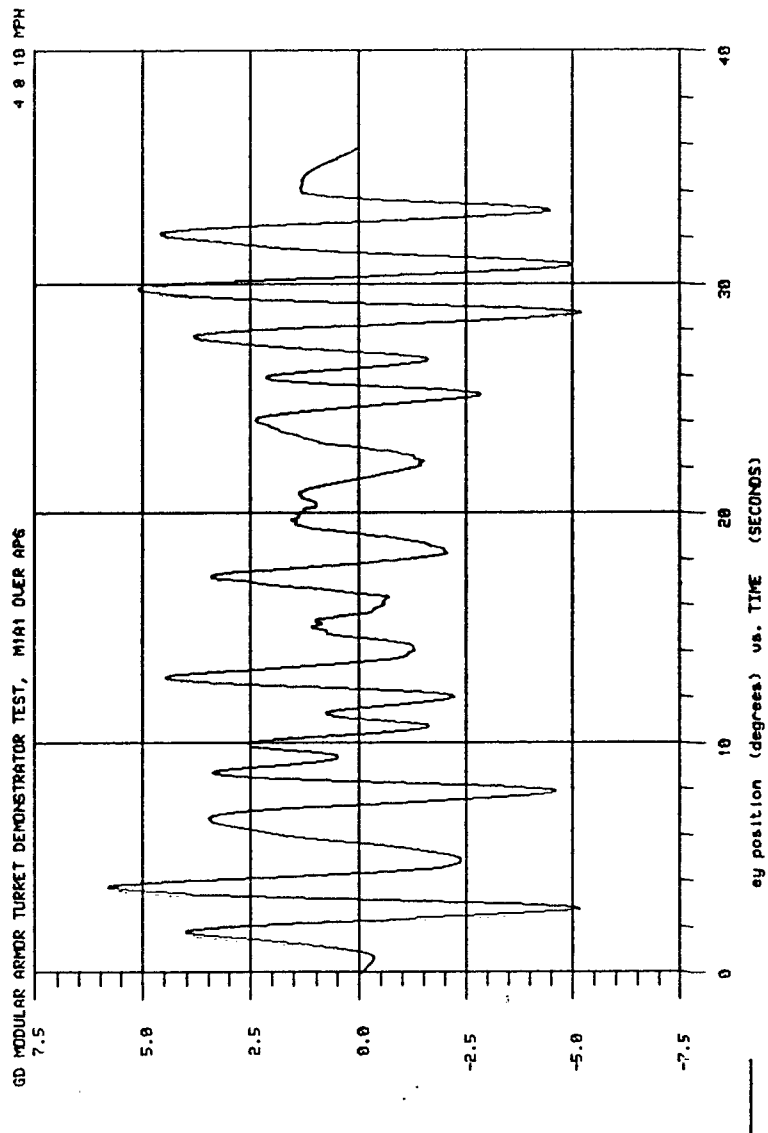
Appendix A contains position and acceleration plots of the dynamic scenarios used. As you can see, even the harsher APG IV courses at 10 mph only pulled 0.5 Gs of acceleration in vertical. In summary, through all testing, no problems were incurred. The test subject reported no ill effects from the runs and rather enjoyed himself during the testing.

APPENDIX A

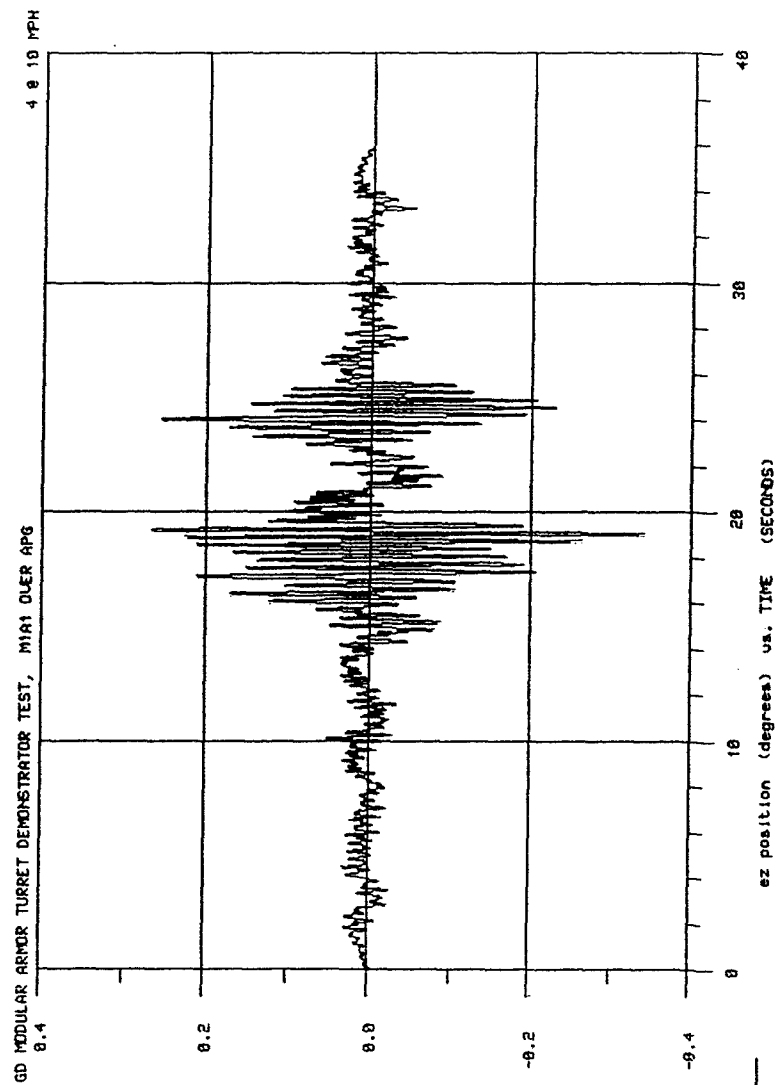
SCENARIO PLOTS



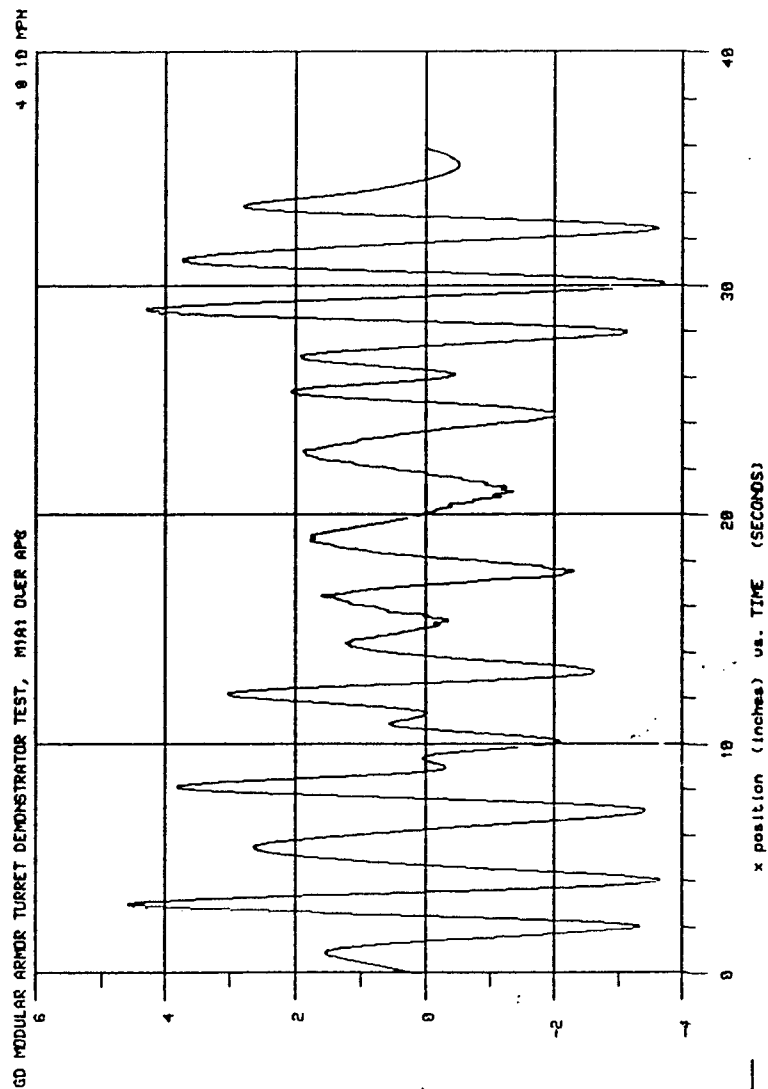
APG IV at 10 mph
ROLL position



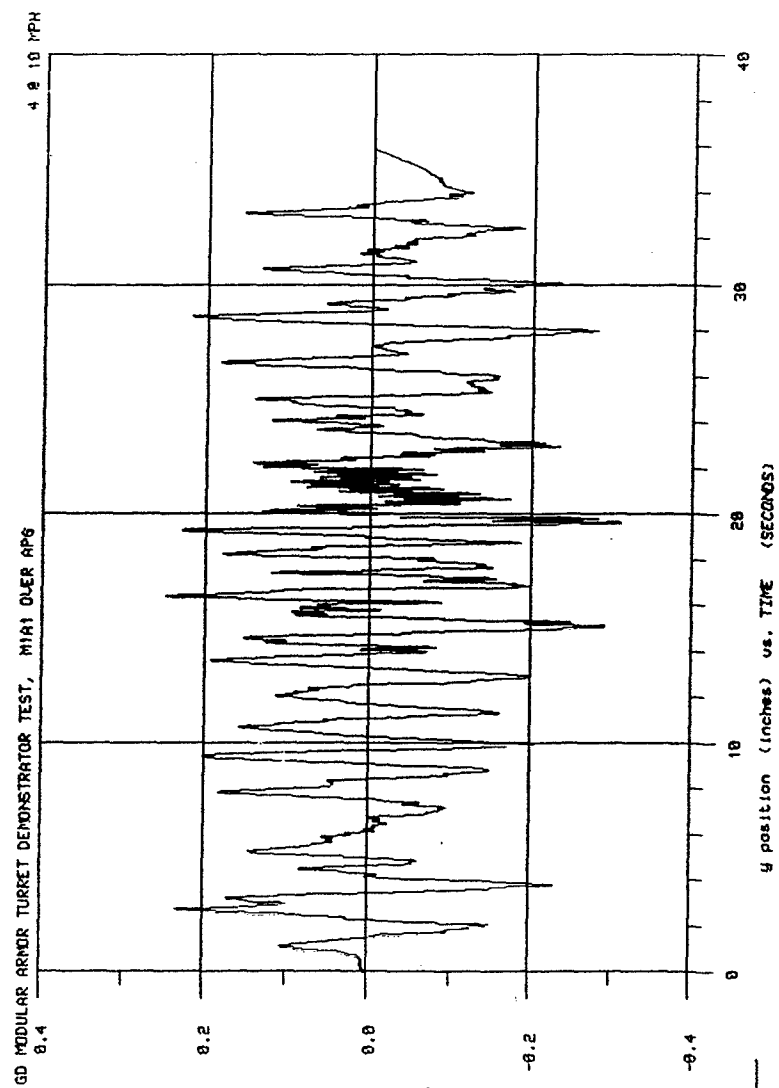
APG IV at 10 mph
PITCH position



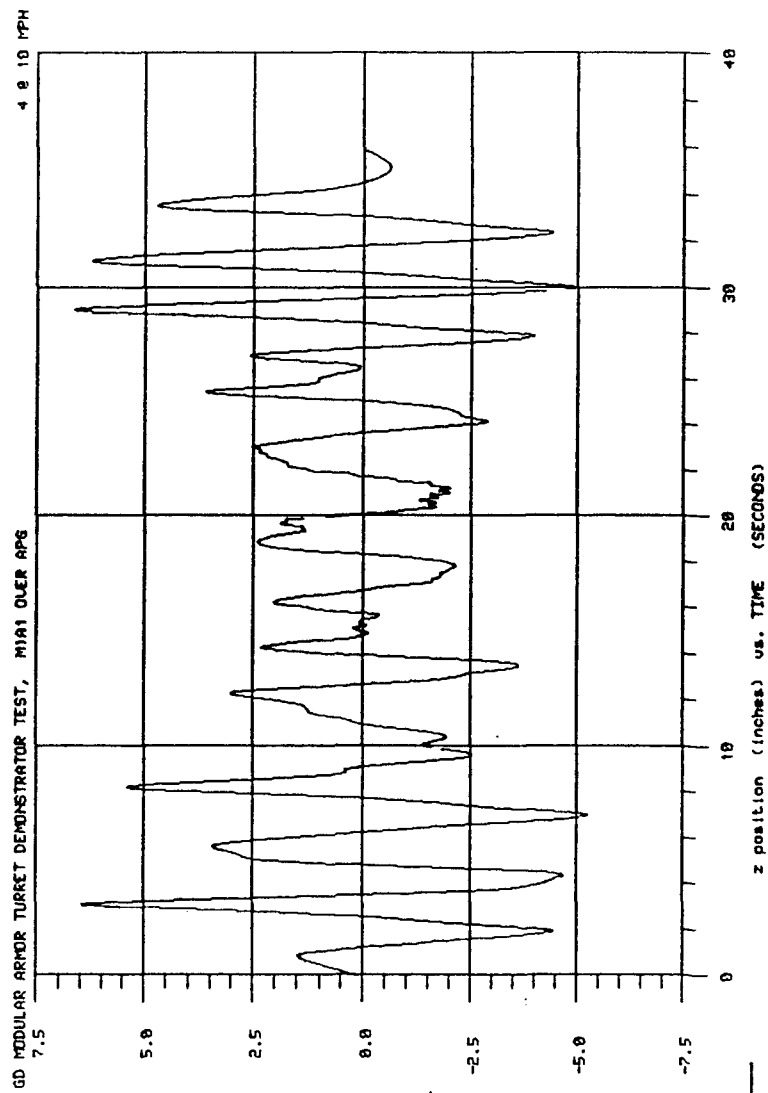
APG IV at 10 mph
YAW position



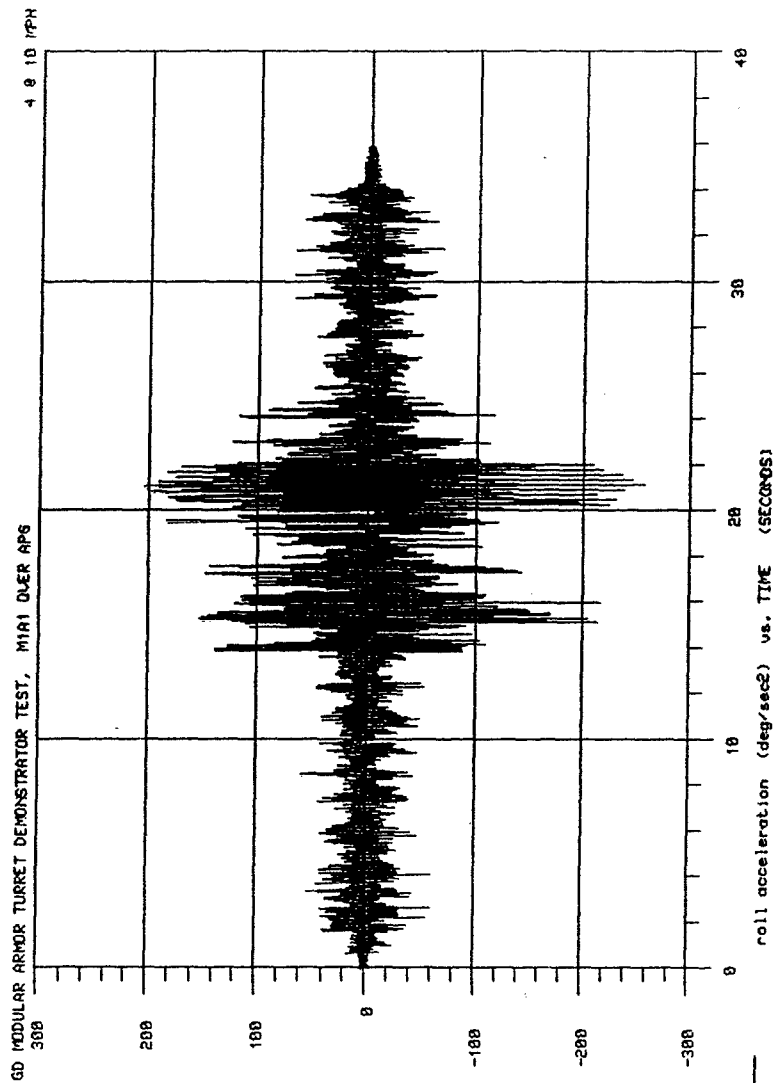
APG IV at 10 mph
X position



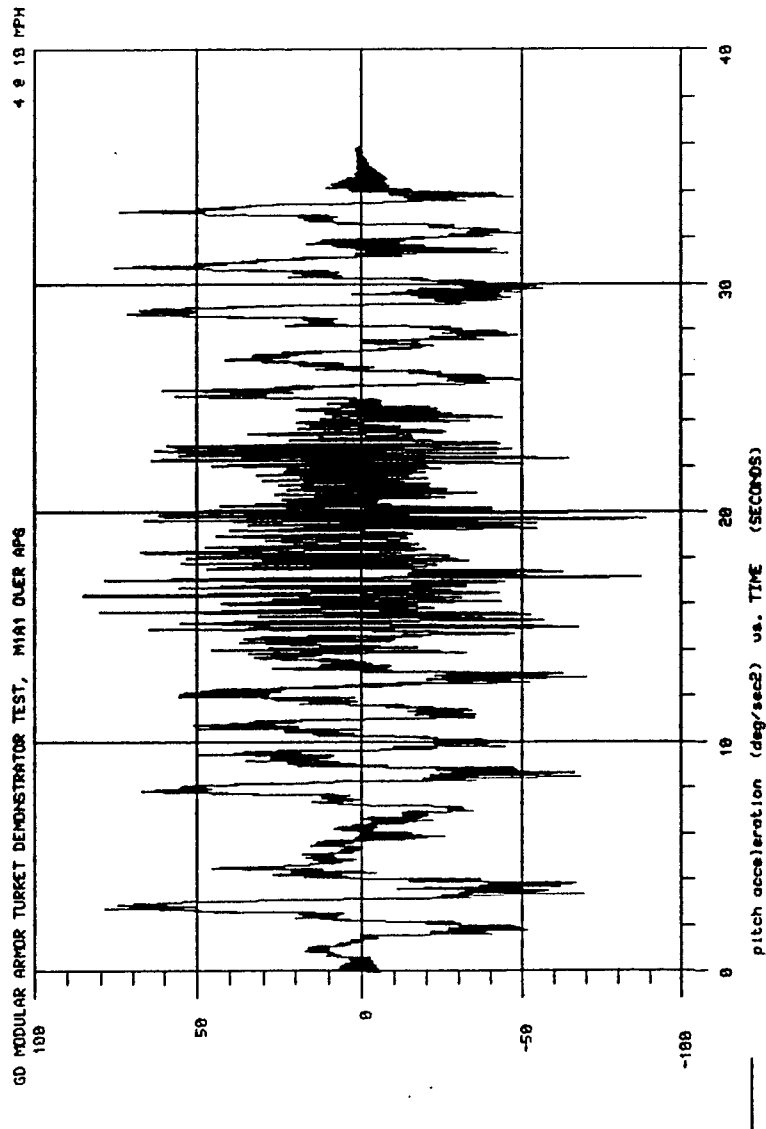
APG IV at 10 mph
Y position



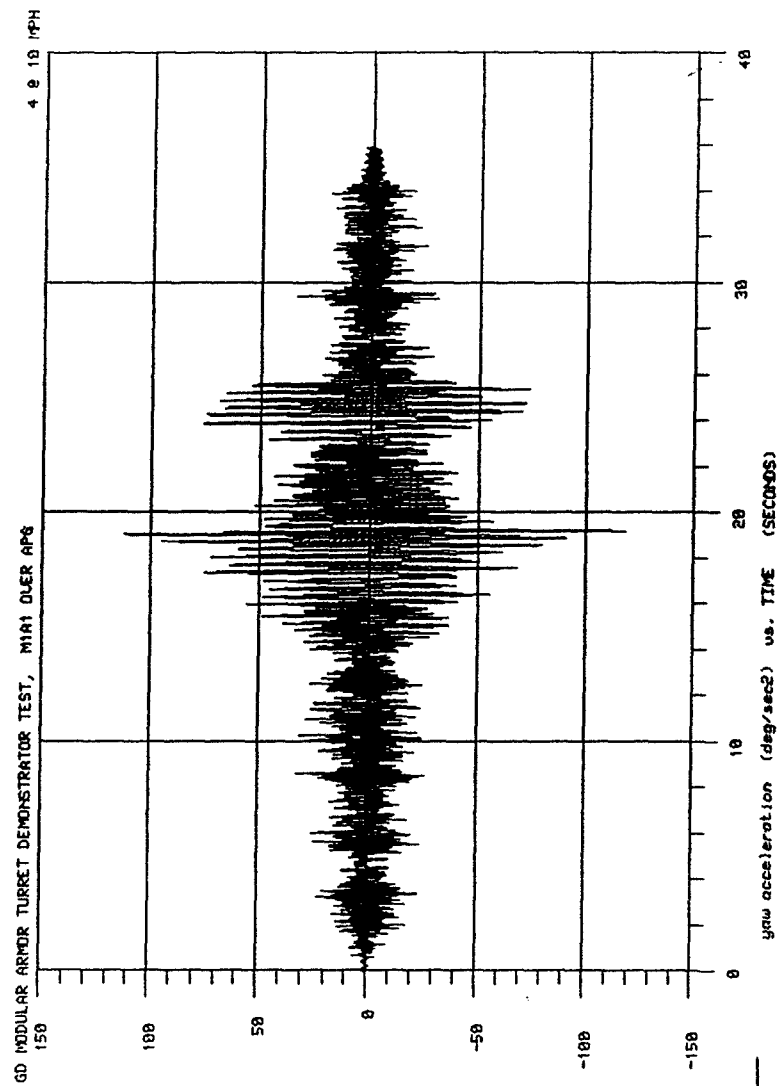
APG IV at 10 mph
z position



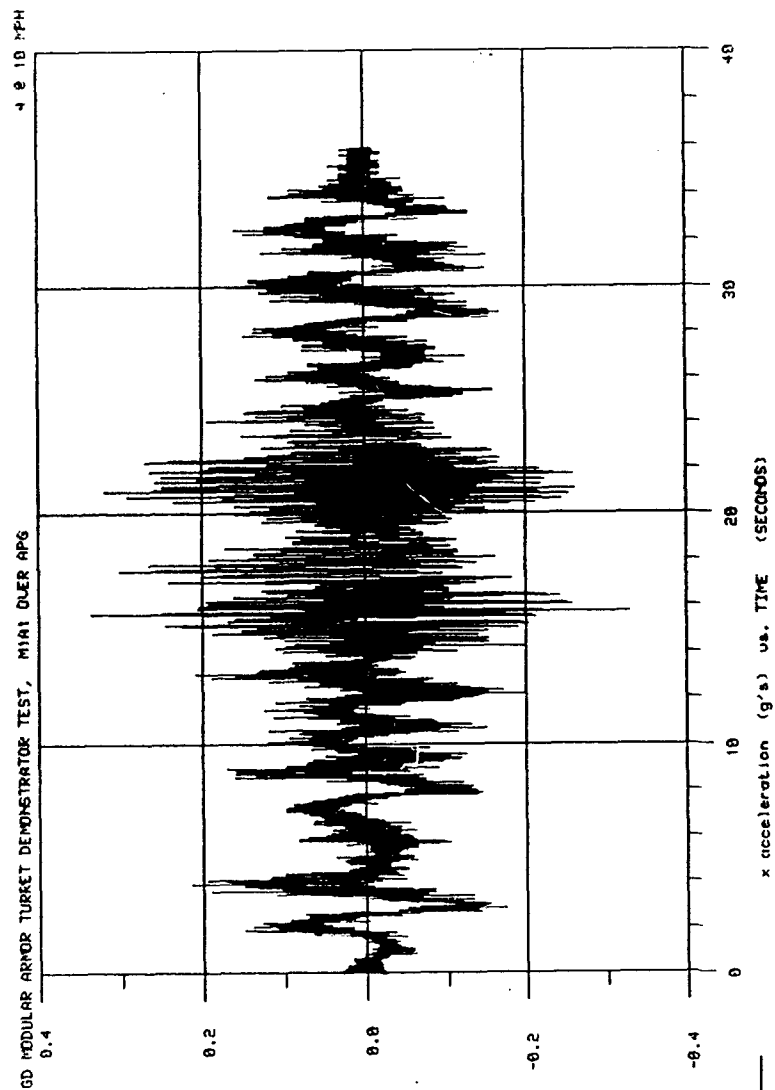
APG IV at 10 mph
ROLL acceleration



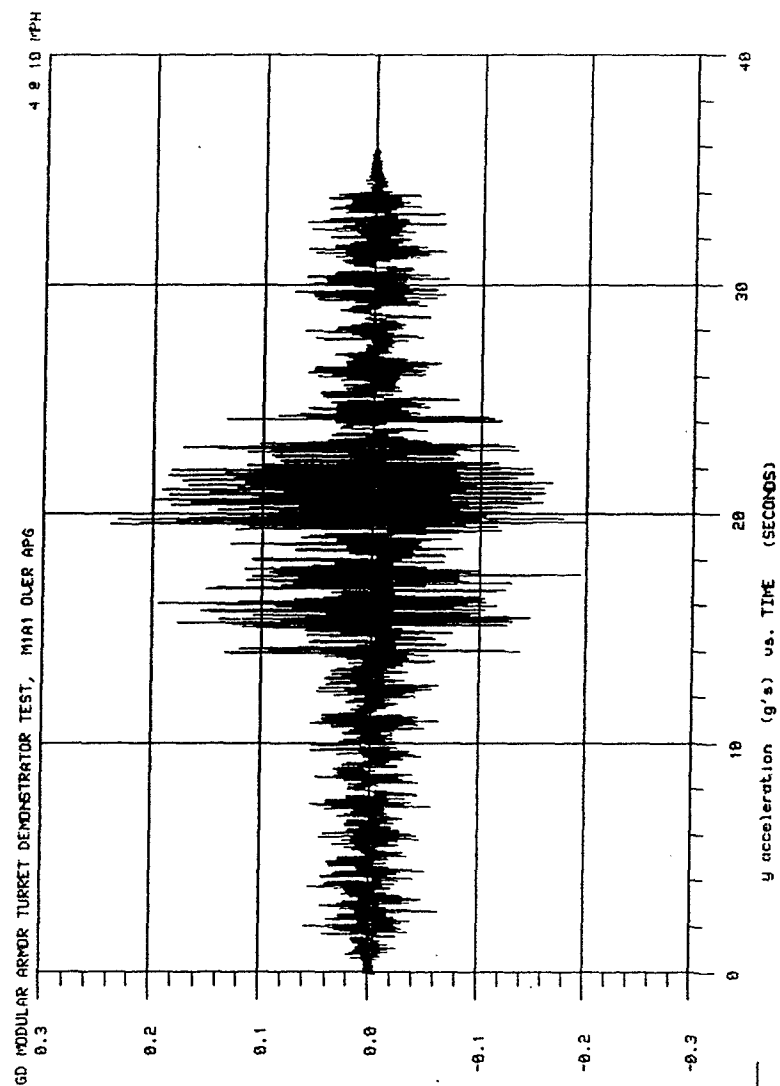
APG IV at 10 mph
PITCH position



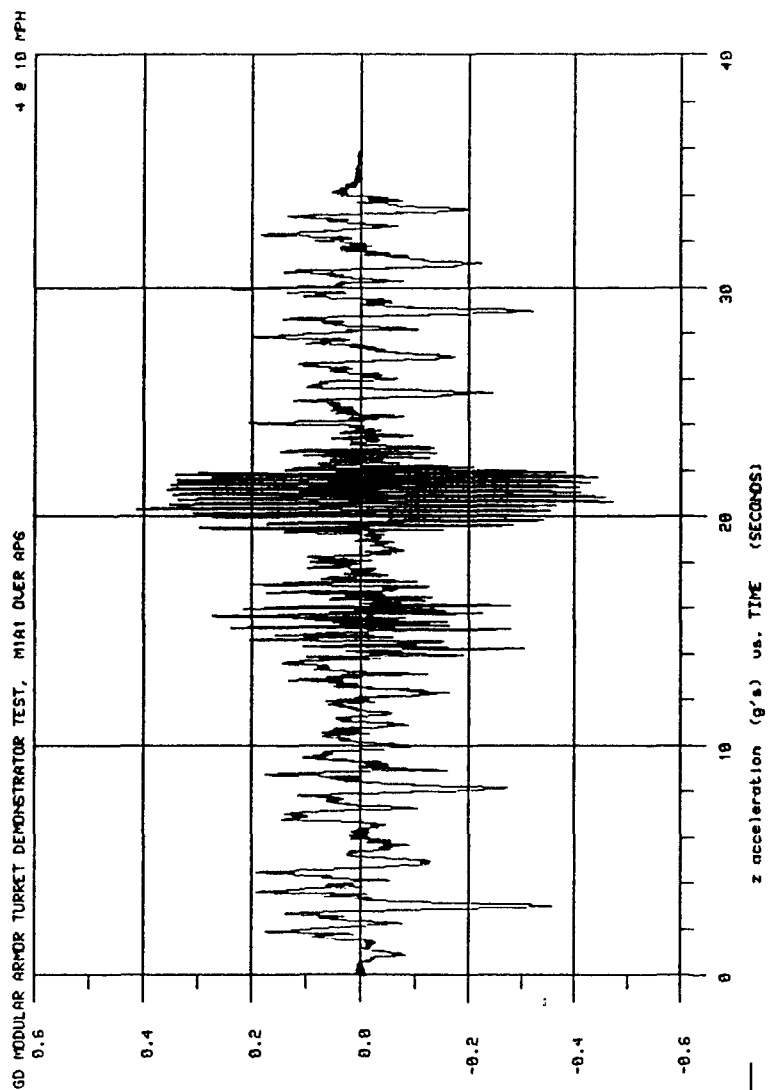
APG IV at 10 mph
YAW acceleration



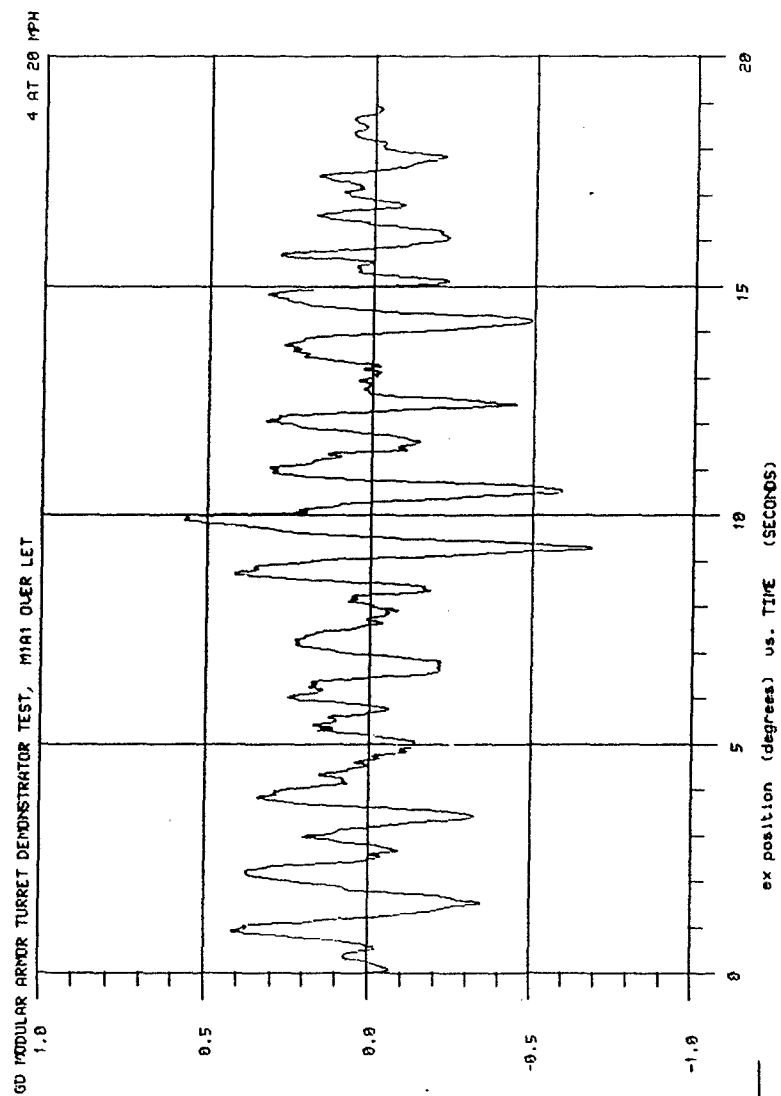
APG IV at 10 mph
x acceleration



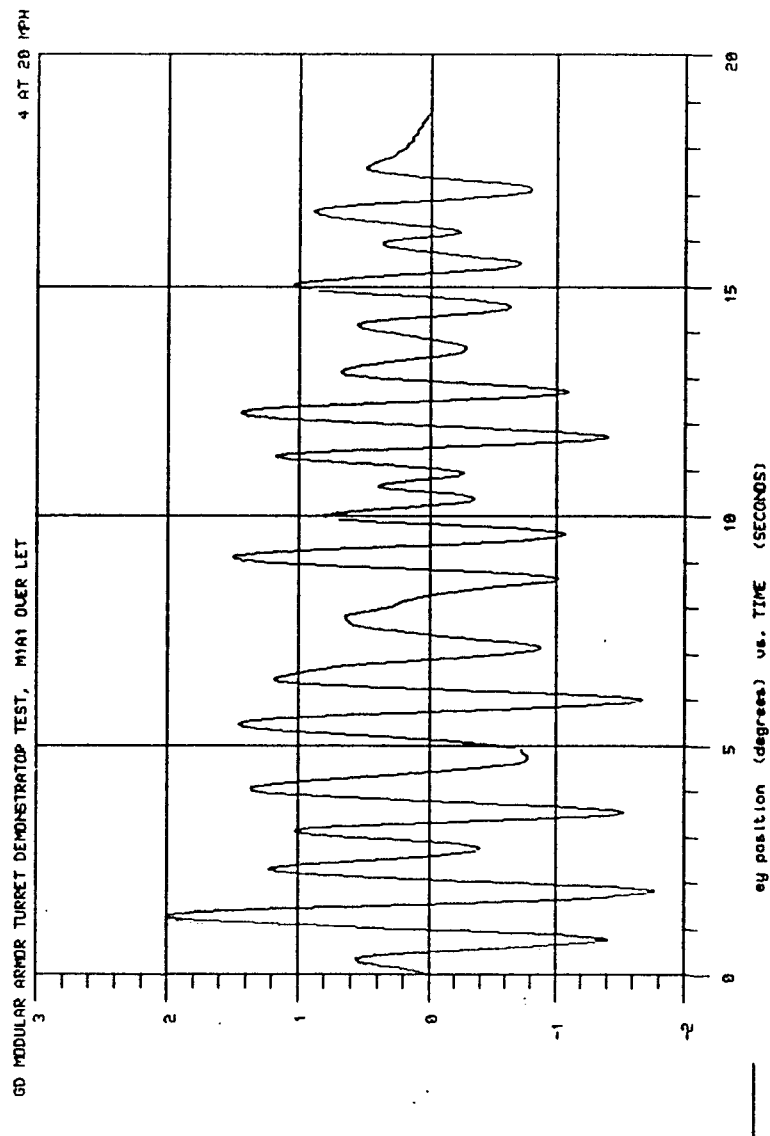
APG IV at 10 mph
y acceleration



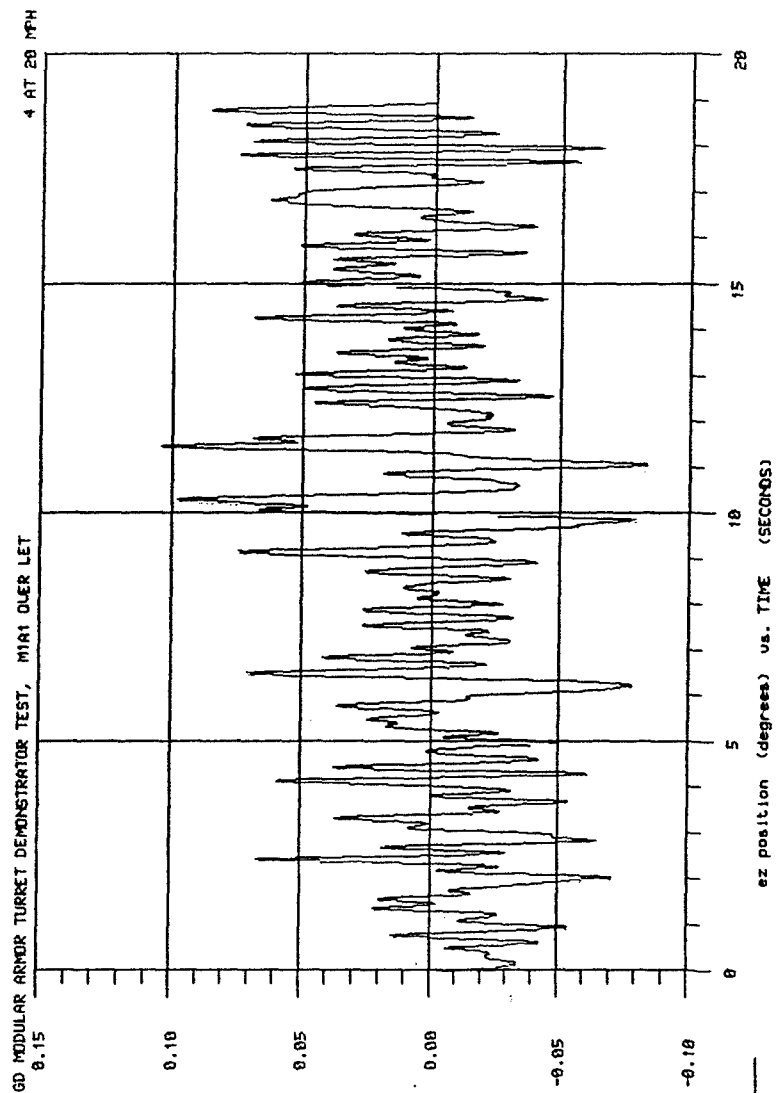
APG IV at 10 mph
Z acceleration



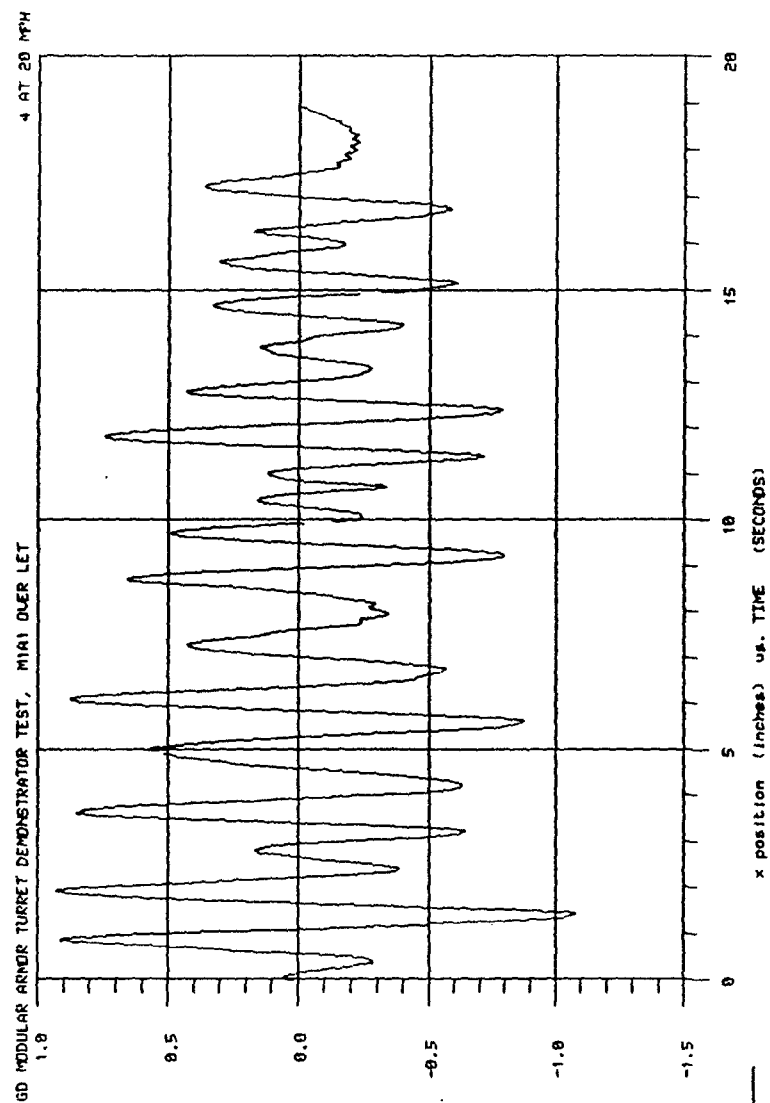
LETENOU 4 at 20 mph
ROLL position



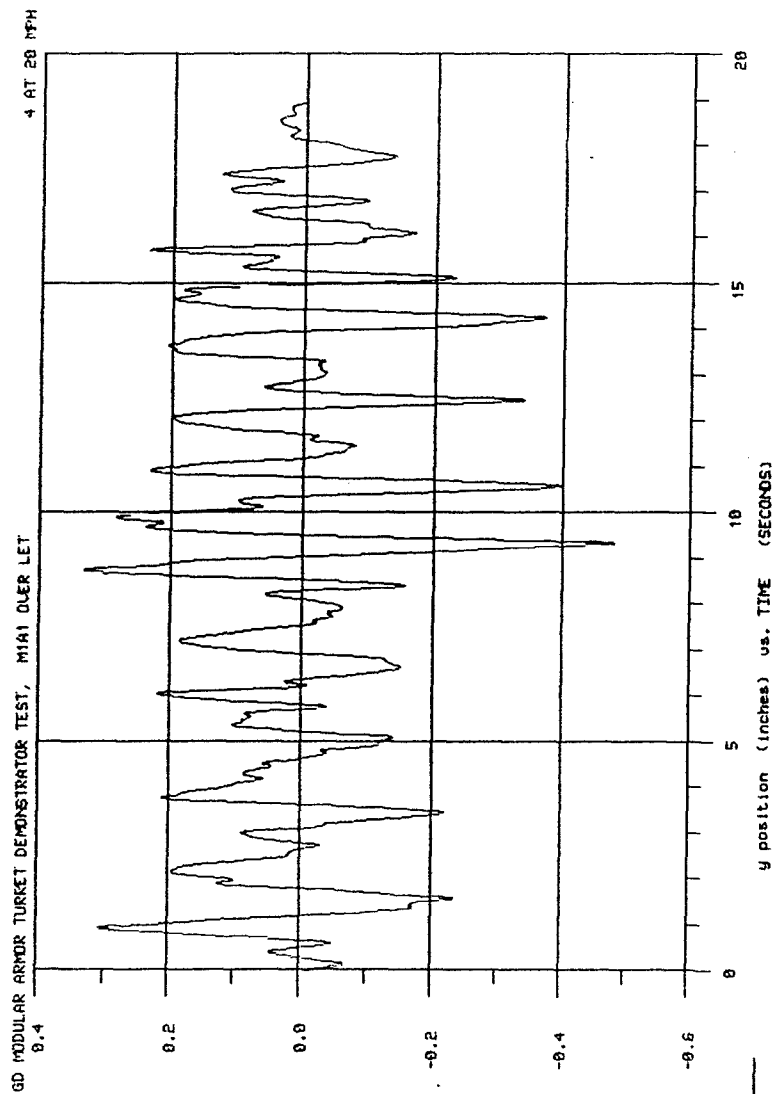
LETTERNOU 4 at 20 mph
PITCH position



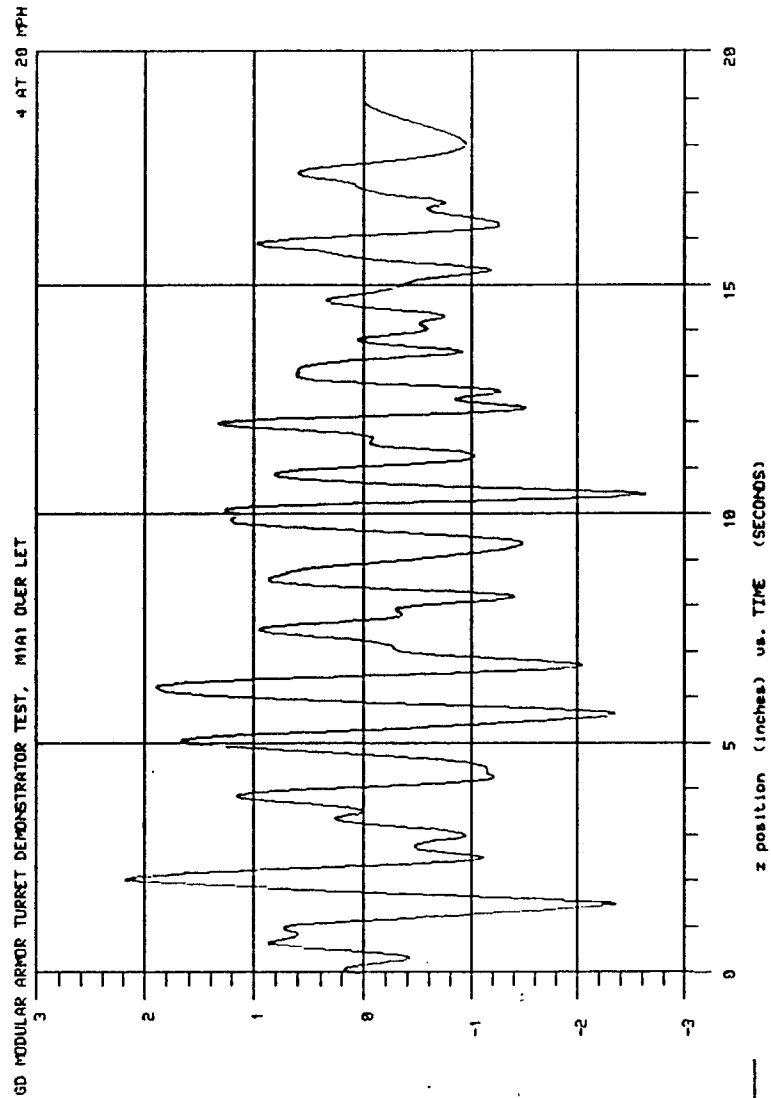
LETENOU 4 at 20 mph
YAW position



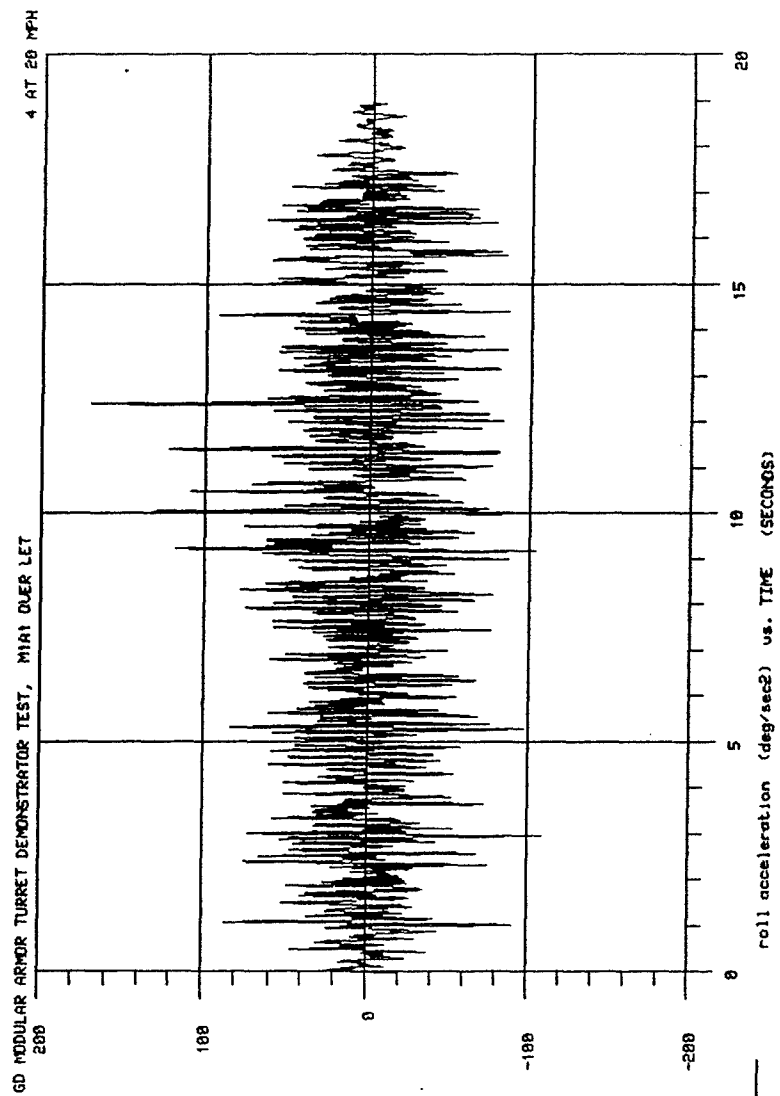
LETTERNOU 4 at 20 mph
X position



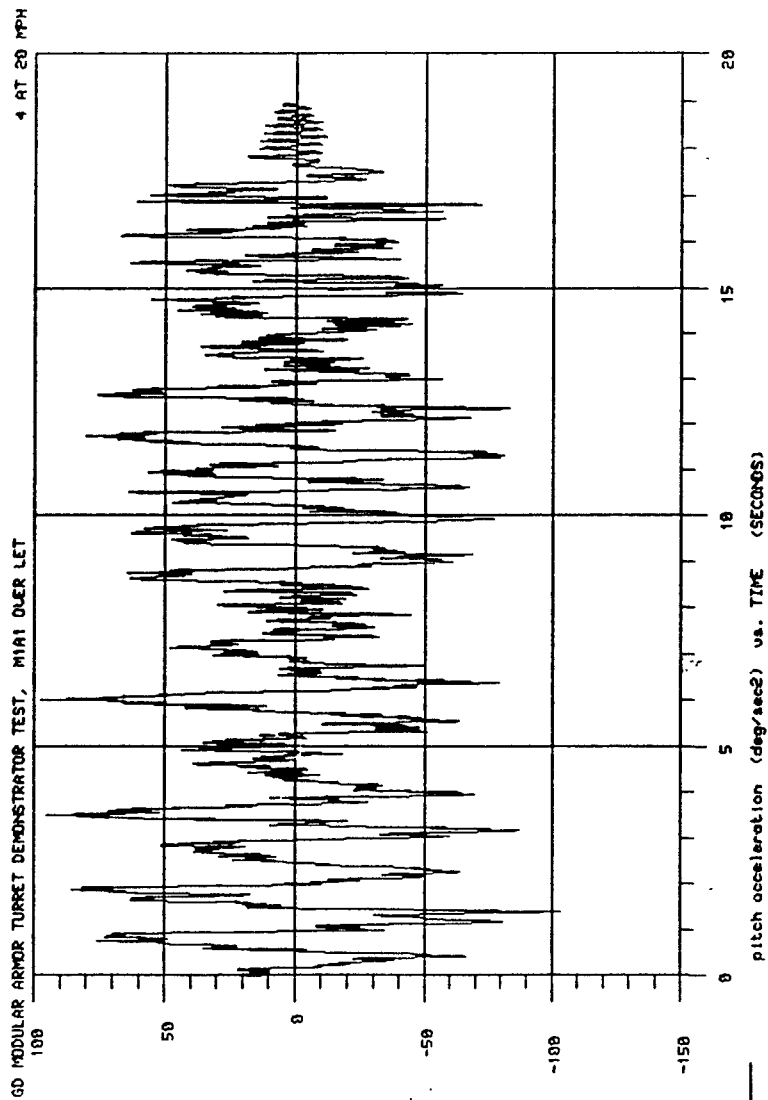
LETTERNOU 4 at 20 mph
Y position



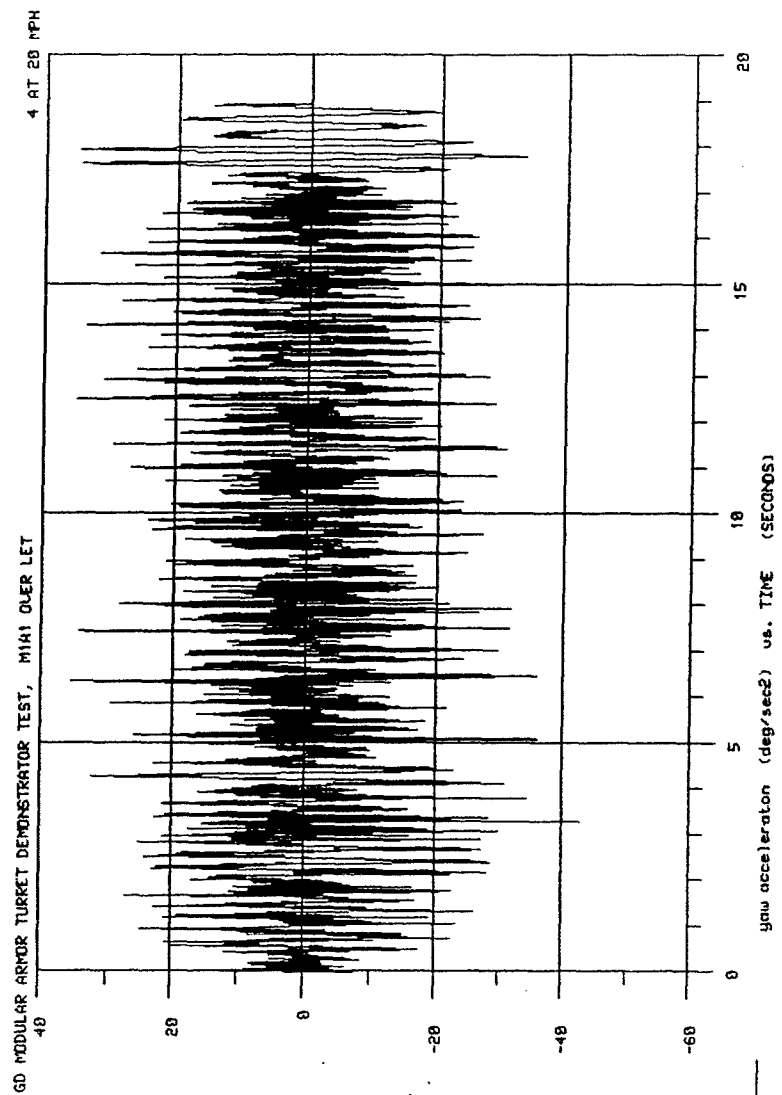
LETTERNOU 4 at 20 mph
Z position



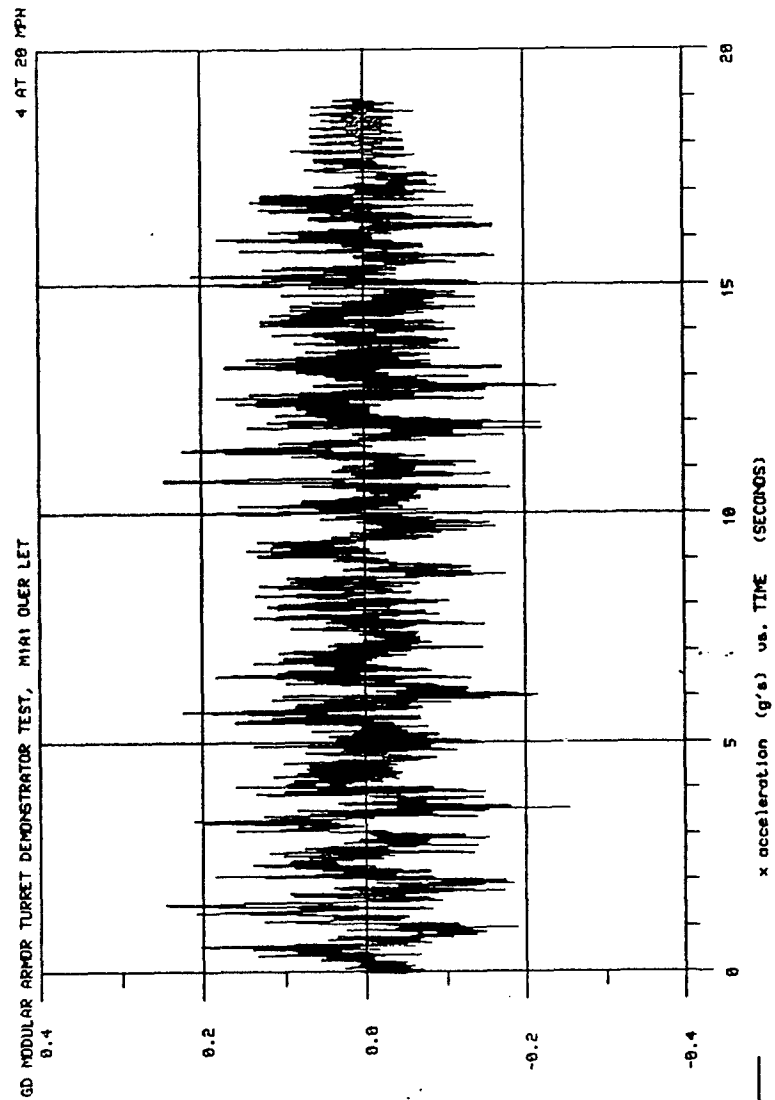
LETENOU 4 at 20 mph
-ROLL acceleration



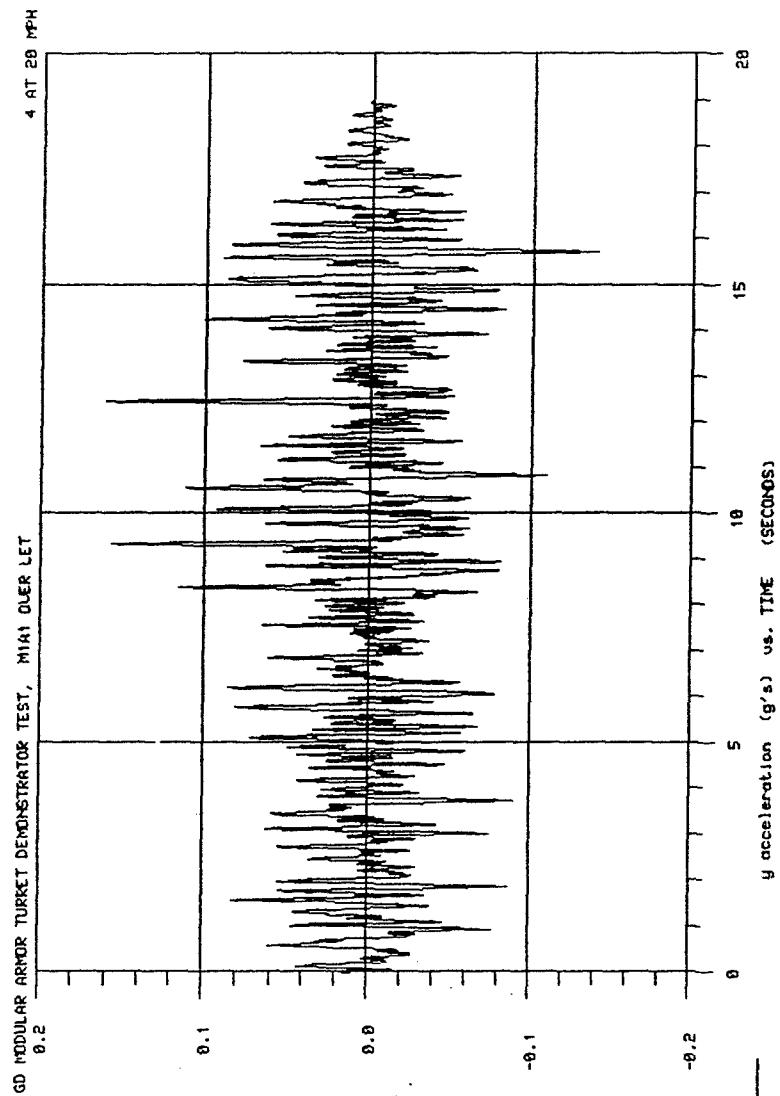
LETTERNOU 4 at 20 mph
PITCH acceleration



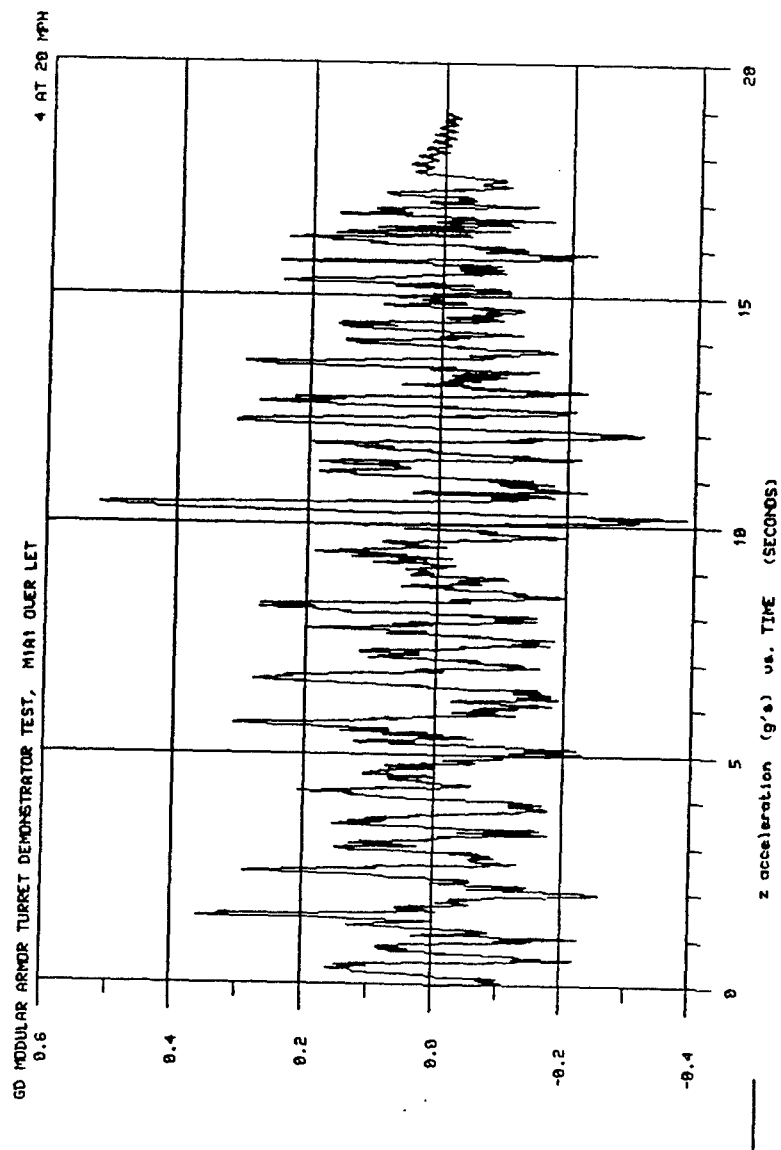
LETERNOU 4 at 20 mph
YAW acceleration



LETENOU 4 at 20 mph
x acceleration



LETTERNOU 4 at 20 mph
y acceleration



LETTERNOU 4 at 20 mph
Z acceleration

DISTRIBUTION LIST

Copies

Commander Defense Technical Information Center Bldg. 5, Cameron Station ATTN: DDAC Alexandria, VA 22304-9990	12
Commander U.S. Army Test and Evaluation Command ATTN: AMSTE-TA-R Aberdeen Proving Ground, MD 21005-5055	2
Manager Defense Logistics Studies Information Exchange ATTN: AMXMC-D Fort Lee, VA 23801-6044	2
Commander U.S. Army Tank-Automotive Command ATTN: ASQNC-TAC-DIT (Technical Library)	2
AMSTA-CF (Dr. Oscar)	1
AMSTA-T (Mr. Culling)	1
AMSTA-RYA (Mr. Janosi)	1
AMSTA-RY (Dr. Beck)	1
AMSTA-RYA (Mr. Reid)	5
AMSTA-TB (Mr. Kirby)	1
AMSTA-LP (Mr. David Kuhn)	1
AMSTA-CZ (Mr. Patrick Kelley)	1
AMSTA-TA (Mr. Mohsin Singapore)	1
HSXM-PM-W (Mr. Kenneth Bonkowski)	1
Warren, MI 48397-5000	
Director U.S. Materiel Systems Analysis Activity ATTN: AMXSY-MP (Mr. Cohen) Aberdeen Proving Ground, MD 21005-5071	1