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TECHNICAL REPORT AFATL-TR-73-111

**FLIGHT TEST RESULTS
FOR AN
INSTRUMENTED TER-9 BOMB RACK**

**Jack Hooton
MUNITIONS BALLISTICS AND DELIVERY DATA ANALYSIS BRANCH
WEAPON SYSTEMS ANALYSIS DIVISION**

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13. ABSTRACT This report documents the design, buildup, and flight test results of a TER-9 bomb rack instrumented to obtain aircraft/weapon separation data. Actual test results are presented for 43 MK82 bombs released from an F-4D aircraft during the Close Air Support System (CLASS) program conducted at Holloman AFB, New Mexico. Measured TER-9 release parameters are examined to determine possible separation abnormalities which might have significant effects on bombing accuracy.			

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PREFACE

This report is based on a concept originating at the Air Force Armament Laboratory to obtain aircraft/weapon separation data under dynamic conditions. The subsequent implementation of this concept was funded as a part of Project 670A, Task 08, Work Unit 001. Work was accomplished by the ADTC Engineering Division, Airborne Instrumentation and Physical Sciences Branches. Mr. Carlos T. Gallegos, Mr. Jerry A. Wright, Mr. Jerry C. Hattaway, and MSgt Joseph A. Tremblay of these organizations performed the major portion of the TER-9 design and buildup. Mr. Wright remained with the program throughout the flight test phase as the prime Eglin Test engineer.

This technical report has been reviewed and is approved.


THOMAS P. CHRISTIE

Director, Weapon Systems Analysis Division

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SECTION I

INTRODUCTION

A very limited body of data is presently available on the magnitude and variations of forces and delays inherent in an aircraft/weapon release system under dynamic conditions. These measurements must be made (or estimated) before the extent of associated weapon delivery errors and their contribution to system accuracy and weapon effectiveness can be determined.

A program was originated by the Air Force Armament Laboratory (AFATL) in August 1969 to design and build an instrumented triple ejector rack (TER) capable of measuring release timing and separation forces in a dynamic environment. In the early stages of buildup, a joint agreement was made among AFATL, the Air Force Avionics Laboratory (AFAL), and the Air Force Special Weapons Center (AFSWC) to include the resulting TER-9 as a subsystem of the Close Air Support System (CLASS), which was scheduled for flight testing at Holloman AFB, New Mexico.

The TER-9 was static tested at Eglin AFB (Project 69DFV008) during November and December 1970, and active flight testing began at Holloman AFB on 19 May 1971 and continued until 31 May 1972.

As interest in the instrumented rack concept increased and funds became available, a Munitions Delivery Accuracy Program (ADTC Project 670AG018) was established at Eglin AFB to compile and analyze all available munitions delivery accuracy information obtained as by-products of test programs at the Armament Development and Test Center (ADTC). Included as part of this project was the design, buildup, and flight testing of two additional bomb racks to supplement the TER-9. Both a MER-10A and a MAU-12B/A have subsequently been instrumented and will be available for operational use in mid 1973.

SECTION II

DISCUSSION OF TER-9 INSTRUMENTATION

In October 1969, formal approval was given for the design and buildup of the instrumented TER-9 bomb rack. The following requirements were levied for each of the three rack stations:

- (1) Measure forces on all four sway braces.
- (2) Measure forces on both hooks.
- (3) Measure pressure in ejection chamber.
- (4) Detect pickle, cartridge fire, hook opening, and mechanical linkage event times.
- (5) Measure ambient cartridge breech temperature.
- (6) Determine initial store movement both forward and aft.
- (7) Measure ejector foot piston displacement.
- (8) Time correlate all measured events and functions.

Special design criteria required that the completed configuration be suitable for recording 6 minutes of data per mission and be capable of measuring each of the following parameters to the desired accuracy.

- (1) Ejection chamber pressure, $\pm 5\%$.
- (2) Sway brace forces, $\pm 5\%$.
- (3) Hook forces, $\pm 5\%$.
- (4) Breech temperature, $\pm 2^\circ$.
- (5) IRIG B time, ± 1 millisecond.

All work performed on this program was accomplished in house on a low priority/low budget basis, and completion of the TER-9 required 13 months.

Physically, the TER-9 bomb rack (Figure 1) is composed of a rack housing which secures to the aircraft undercarriage and accomodates three Douglas 9610 bomb ejector units¹ (Figure 1). Power for rack release and ejection is provided by an electrically initiated ejector cartridge. Adjustable sway braces on each ejector unit provide a complete suspension system for bombs in carriage. Each sway brace has swivel pads which are attached to an adjusting screw to allow flexibility for varying store diameters and case rigidities.

Instrumentation of the TER-9 required very few structural modifications to the basic rack frame. The Class II modification package prepared for this configuration is contained in Appendix A. Sensors were mounted to each of the basic ejector units and wired internally whenever possible.

¹These ejector racks are described further in the following informal document available at AFATL (DLY): Standard Aircraft Armament Characteristics 9610 Bomb Ejector Rack, Douglas Aircraft Company Pamphlet, February 1965.

A primary design requirement for the instrumented rack was that it be an independent system capable of flying with a variety of aircraft. This was accomplished by designing an instrumentation pod (Figure 2) to house all recording and auxiliary equipment. This pod was fabricated from an empty bomb casing and reworked to conform to the physical and aerodynamic characteristics of a MK82 bomb. The dummy bomb was designed for carriage on either of the shoulder stations of the TER-9, thus limiting the release load to two bombs per mission. This was considered a worthwhile tradeoff for the flexibility attained. The Class II modification package for this configuration is contained in Appendix B.

Instrumentation in each ejector unit (Figure 3) of the TER-9 consists of strain gages mounted to each sway brace arm and hook, a pressure transducer within the ejection chamber, several contact switches, a linear potentiometer mounted beside the ejector foot piston rod, a thermister in the cartridge breech, and a 16mm downward-looking camera mounted within the rack housing itself. All rack sensors are wired through a signal conditioning unit in the rack housing and on to the dummy bomb instrumentation pod which contains an analog recorder, a VCO block, a control box, and an IRIG-B time code generator.

(1) The analog recorder is a Sanders Associates, Inc., Airborne Magnetic Tape Recorder - Model DS-4100.

(2) The IRIG B time code generator is a Mini-IRIG Time Code Generator, Model A, as developed by the ADTC Physical Sciences Branch.

(3) The strain gages (Semiconductor SR-4, Type SPS2-12-12, as manufactured by BLH Electronics, Inc.) are attached with an epoxy solution to each sway brace arm and hook mechanism to determine unidirectional forces acting on the store at release. After installation, all strain gages were calibrated under actual static loads using Type C2M1 load cells from BLH Electronics, Inc.

(4) A pressure transducer (ICP Piezotronics Model 102A03), is mounted in the top of the gun assembly within each cartridge ejection chamber to measure pressure buildup in the chamber. This required a small circular section at the top of each ejector unit to be removed and a threaded hole bored into the top of the gun for insertion of the transducer. Each transducer was factory calibrated and checked prior to installation in the racks. Specifications on these transducers are:

- (a) Sensitivity: 0.5 millivolt per psi \pm 0.03 millivolt.
- (b) Resolution: 0.1 psi.
- (c) Resonant Frequency: 500,000 Hz (suppressed ringing near non-resonant response).
- (d) Rise Time: 1 microsecond.
- (e) Low frequency (5% down): 0.0005 Hz.
- (f) Linearity: 1% full scale.
- (g) Time constant: 1000 seconds.

The pressure/time history measured in the chamber can be utilized to compute the resulting force applied to the bomb by the ejector piston rod throughout its function. Integrating this force curve over the time interval in which it acts yields what is commonly designated ejection velocity. By expanding this technique to include other known forces acting on the bomb during this time interval, such as normal force and gravitational force, the separation velocity, V_s , of the store can be computed from:

$$V_s = \int_{t_1}^{t_2} \left[\frac{F_e}{m} + g \cos(\theta + \alpha) \cos(\phi + \psi) - \frac{\rho V^2 C_n S}{2m} \right] dt$$

Where:

g = Gravitational constant (ft/sec²)

ρ = Air density (slug/ft³)

v = True airspeed (ft/sec)

m = Bomb mass (slugs)

S = Bomb reference area (ft²)

F_e = Ejector foot force (lbs)

C_n = Normal force coefficient

t_1 = Time of ejector foot first motion (sec)

t_2 = Time ejector foot bottoms out (sec)

θ = Aircraft pitch angle, nose up is positive (deg)

ψ = Aircraft roll angle, right wind down is positive (deg)

α = Aircraft angle of attack, nose up is positive (deg)

ϕ = Bomb rack ejection angle (deg)

Several contact switches are used within the TER-9, primarily to determine the mechanical and electrical release sequence within each rack as a function of time. These switches measure the following events:

- (1) Cartridge fire pulse (fire pulse received from aircraft).
- (2) First movement of mechanical linkage.
- (3) Store first motion both forward and aft.
- (4) Pickle pulse (if available from parent aircraft).

A rod and sleeve type linear potentiometer is affixed externally on each ejector unit and physically mated by means of a semi-rigid transition plate to the ejector piston rod immediately above the foot pad (Figure 4). With this design, the potentiometer can freely follow the ejector piston rod for the duration of its stroke (nominally 3-1/16 inches) and provide a displacement-time history for each unit. This displacement function yields a convenient second method of determining the separation velocity of the store by curve fitting the data immediately prior to the piston rod bottoming out. In turn, the instantaneous velocity at this point, or separation velocity, can be computed. The potentiometers are capable of measuring displacement within an accuracy of $\pm 0.5\%$.

A calibrated thermister is available for use within the cartridge breech of either of the shoulder station racks. The thermister replaces the cartridge within the ejector unit; thus, only the station assigned to carry the instrumentation pod can be utilized to measure breech temperature. This temperature is considered representative of the ambient conditions for the live cartridges in the two functional racks prior to ignition. No attempt was made to instrument the functional racks to determine temperature variations during burn.

A 16mm camera (Bell and Howell, Model No. LB-5A) with a 10 millimeter lens is mounted in the rear section of the TER-9 housing (Figure 2). This camera is oriented vertically down in relation to the bombs in carriage to determine separation characteristics, chiefly yaw and roll behavior. The camera is controlled in conjunction with the primary TER-9 instrumentation and is capable of recording on film 30 seconds of fallaway data. The camera is positioned directly above the centerline bomb fin transition section and permits data collection on this bomb from the instant of release. A short delay is inherent in shoulder station releases while awaiting the bomb to fall below the camera into the field of view. A variety of lens filters can be utilized to maintain optimum contrast between bomb and background to facilitate film reduction.

SECTION III

DISCUSSION OF CLASS/TER-9 FLIGHT TEST PROGRAM

A close air support weapon delivery system (CLASS) mechanized around the measurement of range and range rate between an airborne UHF interrogator and a ground based UHF transponder has been developed by Litton Systems, Inc., for AFAL under their advanced development program 698DF. The CLASS was tested at Holloman AFB under the direction of AFSWC. Sufficient data were obtained from preliminary sled and airborne testing, to indicate that these range and range rate measurements would result in improved bombing accuracies, thereby making bomb rack and ballistic errors extremely important parameters when evaluating the contribution of component errors to overall system accuracy. AFATL furnished the TER-9 instrumented bomb rack and analysis support for the unit during the CLASS test program. AFSWC provided operational maintenance support for the TER-9 system.

The primary objectives of the TER-9 system within the CLASS flight testing program were:

(1) To enhance the understanding of the dynamic interaction of TER bomb releases and bomb ballistic behavior (AFATL).

(2) To aid in conducting a thorough analysis of the CLASS system capabilities (AFAL).

(3) To use experimental flight data to measure the magnitude and variances of TER-9 release variables.

(4) To determine the significance of the TER-9 variables in terms of accuracy and their effects on a MK82 bomb.

(5) To utilize these measured parameters in conjunction with range reference and aircraft release data to predict flow field phenomena acting in the vicinity of the bomb at release and the impact coordinates of the bomb.

Objectives (1), (2), and (3) were met as expected. Some work was accomplished toward meeting Objective (4) as described in Section V. The amount of data collected was less than 50% of the anticipated total, consequently, the necessary data base was not available for an adequate assessment of this objective. Objective (5) could not be accomplished. Range reference data (phototheodolite) were collected from only four of the 43 bombs released from the TER-9, and of these four, only two provided sufficient data on the free fall bomb to be useable. Only those test procedures which are of specific importance to the TER-9 system will be discussed within this report¹.

All CLASS bombing missions were flown on the same F-4D aircraft (S/N 65-0670), and the load configurations for each mission were the same: full fuel, standard TER with three MK82 on left inboard, CLASS instrumentation pod on centerline (Figure 5). The TER-9 instrumentation pod was carried on the left shoulder position in all CLASS missions. Bomb release sequence was as follows:

1. Left inboard rack, centerline position.
2. Right inboard rack, centerline position (Eglin instrumented AFATL TER-9 rack).

¹The CLASS flight test program is documented in detail in the following document available at AFAL (NVA) : Close Air Support System (CLASS) F-4D Flight Test, Litton Guidance and Control Systems, February 1973.

3. Left inboard rack, left shoulder position.
4. Right inboard rack, right shoulder position (Eglin instrumented AFATL TER-9 rack).
5. Left inboard rack, right shoulder position.

Figure 6 shows the TER-9 in the loaded configuration for a CLASS bombing mission. Prior to flight, the following data were compiled for each MK82 bomb: (These data for each bomb dropped from the TER-9 are tabulated in Appendix C)

- (1) Center of gravity.
- (2) Moments of inertia.
- (3) Weight.
- (4) Maximum circumference.
- (5) Ejector foot relative to center of gravity.
- (6) Anomalies, if any.

Several aircraft delivery conditions were used during the test program; however, the majority were made from a level attitude at 5000 feet above ground level (AGL) (8910 feet above sea level (ASL) and 450 KTAS). The target consisted of a wooden DAY GLO orange pyramid with a 20 foot square base.

All MK82 bombs used in the CLASS program were painted to facilitate the determination of free fall attitude behavior. Each bomb body was painted white with DAY GLO orange markings, and the tail fins were systematically painted black and white (Figure 7). Each bomb and tail fin assembly was pre-fit, numbered, and as a set, randomly selected for flight.

Range instrumentation consisting of phototheodolite, telescope, meteorological, bomb survey, and camera coverage was determined and scheduled on an individual basis for each mission.

A data flow schedule was established so that each participating organization would have the necessary test data for their respective analysis effort. The following information, in addition to the TER-9 rack analysis, was required by AFATL to perform the TER-9 rack analysis:

- (1) Outboard camera film for bomb pitch estimates.
- (2) Aft strike camera film for initial bomb dynamics.
- (3) Bomb release signal from CLASS analog tape.
- (4) Avionics data from CLASS digital tape.
- (5) Meteorological data.
- (6) Range reference (phototheodolite, etc.) data on bomb from release to impact.
- (7) Bomb physical data.
- (8) Bomb impact coordinates.

However, items (1), (2), and (3) were not supplied for any of the bombs dropped from the TER-9, and Item (6) was available on only four bombs. The remaining items were supplied on all missions.

The TER-9 data flow schedule is presented in Figure 8.

A major problem area for the TER-9 system became apparent during the CLASS program: operational maintenance for the instrumented rack. The TER-9 was designed to withstand the extreme shocks, vibrations, and forces normally subjected to suspension equipment on an airframe; hence, it is not a delicate piece of equipment. Because it is highly instrumented, the TER-9 requires regular preventive maintenance to assure it can satisfactorily perform a data gathering function.

Higher priority work and manpower shortages were continuing problems throughout the 13 month test program; as a result, the TER-9 had a low priority during the test and frequently failed to receive the necessary operational maintenance it required for peak performance. Except for the analog recorder having to be replaced after one mission, no other major system failure occurred in the TER-9. Nor did any system failure occur which, taken singly, would have impaired the overall data gathering function of the rack. Because of the limited on-site maintenance, failures were not detected until the raw data were transmitted to Eglin and reduced (up to 2 months later). By that time, the failures were repetitive and in several cases had become compounded, yielding useless results.

On four occasions, engineers from Eglin AFB repaired and completely calibrated the TER-9 instrumentation. The last such repair was accomplished in mid-May 1972. These personnel remained on-site for 11 days to provide support during the final phase of CLASS testing. During this period, 19 bomb drops (44% of the total recorded for the 13 month program) were successfully recorded. This implies that with proper maintenance the TER-9 system could be expected to perform at close to a 100% success rate, rather than the 55% rate actually achieved during the CLASS program.

To assure consistency during the test program, each TER-9 ejector unit was assigned a pre-numbered pressure transducer and careful attention was given not to switch them between missions. The ARD-863 ejector cartridge was used on all missions in the elongated type chamber assembly.

Midway through the program, it was found that the chamber pressure curves being recorded were falling off after peak more rapidly than had been anticipated. During the initial investigation into this phenomenon, each pressure transducer was replaced with a new unit and tested under static conditions. No appreciable differences resulted. Next, the time constant built into the electronic circuit was modified to counteract any premature bleed-off problems, and after this modification, slight differences are evident in the recorded pressure curve functions. These data more closely resemble previous work accomplished in this area and are considered to be more representative of the actual pressure/time history within the ejection chamber.

Some binding of the potentiometer rods within their sleeves occurred sporadically throughout the program. Initially, this was attributed to the bomb loading crews interchanging the specially machined TER-9 ejector piston rods with standard rods, thereby creating a severe binding within the potentiometers. This resulted in considerable dropout in the recorded data. The subsequent utilization of proper piston rods helped but did not eliminate the problem. Although the potentiometer performed correctly in ground tests, dropout continued to occur in flight. Aerodynamic forces acting on this externally mounted assembly in flight apparently effect a binding action on the potentiometer mechanism.

Fallaway film from the TER-9 was recovered on 20 of the 43 recorded bomb drops. Film breakage within the magazine cartridge was a continuing problem throughout the test program. Many futile efforts were made to correct this problem, but no certain method was found except to discard the MB-1 cameras and replace them with another model (which was not feasible due to space limitations within the rack assembly).

For analysis purposes, an important part of the TER-9 loading procedures required that the rack system instrumentation be turned on for 10 seconds both prior to and immediately following each CLASS mission. The pre-mission data are recorded on the ground with all bombs in place and provide information pertaining to sway brace torques and baseline data for the determination of aerodynamic loading effects in flight. Post-mission data are recorded on the ground after all bombs are expended and provide a means to determine the zero baseline for all sensors. Extra loading time is required to perform these tasks, and they were accomplished only on the final 19 bomb drops.

SECTION IV

RESULTS

Data on 43 useable bomb drops were received at Eglin AFB for reduction. The TER-9 analog tape was digitized and formatted on a PDP-15 computer. Calibrations were applied during the digitization process to convert each of the measured rack parameters into engineering units. A program was established for the CDC-6600 digital computer to edit and process the TER-9 data into meaningful form. These results are presented in Appendix D for the 43 bombs dropped during the CLASS program. The reduced data consist of a bomb release data sheet, force plots for all sway braces and hooks, displacement of the ejector foot, chamber pressure, and the force applied to the bomb during the release sequence.

On those missions where the TER-9 test and calibration procedures were rigidly followed, the data collected consists of both pre-mission and post-mission measurements for each rack parameter in addition to the flight data. As is illustrated in Figure 9, these pre-mission and post-mission system calibrations (A and D) are extremely important in assessing the TER-9 flight results. On missions for which post-mission calibrations were not taken, the zero baseline load is not obtainable, hence the word relative precedes each of the sway brace and hook plots (Appendix D) for missions in this category. The forces shown on these missions are adjusted relative to the zero aerodynamic load (Figure 9, Item c). On missions for which pre-mission system calibrations were taken, this loading is superimposed on each of the sway brace and hook plots as a series of integral signs (/ / / /) prior to bomb release.

All items appearing on the bomb release data sheet (Appendix D) are self-explanatory or have been discussed in previous sections of this report with the exception of the ejector moment arm and the mission code. The ejector moment arm is the distance the ejector foot acts behind the center of gravity of the bomb, thus inducing a nose-up pitch to the bomb during ejection. Each mission code number is followed by either C or S to denote the station from which the bomb was released: centerline or right shoulder, respectively.

The results for each of the 43 bombs dropped from the TER-9 are arranged by mission in the following order:

- (1) Bomb release data sheet.
- (2) Left forward sway brace strain.
- (3) Left aft sway brace strain.
- (4) Right forward sway brace strain.
- (5) Right aft sway brace strain.
- (6) Forward hook reaction.
- (7) Aft hook reaction.
- (8) Ejector foot displacement.
- (9) Ejection chamber pressure.
- (10) Ejector foot force.

When insufficient data were available, the plots are not included in Appendix D. Asterisks (*) appearing on the bomb data sheets indicate that valid event times are not available or that insufficient data were available for calculations.

Each of the plots presented in Appendix D represents unedited measured data. No smoothing process was used in their generation. Bomb downrange and crossrange impact coordinates have been deleted from the release data sheets in order to keep this report unclassified. The headings were purposely retained to allow handwritten entries if desired. If this is done, the classification of this report must be upgraded to Confidential.

SECTION V

DISCUSSION OF RESULTS

The impact coordinates of each bomb released during the CLASS flight test program were carefully surveyed with respect to the center of the target pyramid. These results were extremely important in assessing the worth of the system. Litton Systems, Inc., conducted the post-mission analysis work on the CLASS program to isolate all known error contributors such as pilot, aircraft, rack, and system errors. Individual bomb sensitivity to these and all other known errors was determined, and the measured miss distance of each bomb was adjusted accordingly. This adjusted miss distance could then be attributed to all unknown errors (commonly called ballistic errors).

The detailed breakout of error contributors for the CLASS bombs was not available for this report, and an alternate approach was undertaken to provide a measure of the unknown, or ballistic error, for the 43 bombs released from the instrumented TER-9 rack. Aircraft position, velocity, and attitude profiles were obtained from a combination of available aircraft phototheodolite and onboard avionics data, and, in conjunction with the known bomb physical and aerodynamic characteristics, were utilized to compute a six-degree-of-freedom theoretical bomb trajectory for each drop. The actual bomb downrange and crossrange travel was determined by obtaining the difference between the aircraft/bomb position at release and the known impact coordinates. The resulting average impact error between the actual and theoretical bomb trajectories was found to be significantly larger than the preliminary CLASS results were showing.

For this type analysis, however, the results are extremely dependent on precise knowledge of the bomb release point, which in many cases had to be derived from a best estimate of the release time due to the unavailability of the actual data.

It is generally believed that the centerline bomb on a TER-9 bomb rack tends to immediately pitch-down upon release from the parent aircraft, thus resulting in a downrange bias short of the intended target. This pitch-down motion is not so characteristic of a shoulder station release. Sideview fallaway photography has substantiated this phenomenon in a number of test programs; however, no such film coverage was successfully accomplished in the CLASS program. The first motion switches on the TER-9 rack did, however, provide forward and aft bomb release timing information. This is shown in Figure 10 for each bomb, grouped according to release condition. The data indicate that the initial motion of the CLASS centerline bombs, when released in level mode, was to separate from the rack, aft end first in the majority of cases. This motion evidently results from the ejector foot nominally acting 3 inches behind the center of gravity of the bomb. This same moment arm acts on the shoulder station as well, but as Figure 10 shows, these bombs tend to separate more cleanly.

Thus, at first glance, the TER-9 rack data appear to be contradictory to observed fallaway data. However, the largest contributor to this phenomenon, the aircraft induced flow field effect, is unknown. For lack of additional data, it must be assumed that this effect overpowers that of initial rack ejection as measured on the TER-9 to produce the pitch-down motion normally observed. Had sufficient phototheodolite or other tracking of the bombs been successfully accomplished, this would have provided the data base necessary to examine the flow field problem.

In terms of effect on delivery accuracy, the most significant bomb rack contributor found in the CLASS test program was separation velocity, i.e., the total velocity with which the bomb leaves all contact with the aircraft/rack directed along the line of ejection. The centerline ejector unit operated fairly consistently throughout the program as can be seen in Figure 11. An average separation velocity for this station by both the displacement and pressure methods was found to be 7.1 ft/sec. Neglecting the effect of gravity acting during a nominal 67.5 millisecond ejector

stroke, the ejector unit itself imparted an average velocity of 5.0 ft/sec to the bomb. The standard deviation about the mean value (STD) was calculated to be 0.7 ft/sec. Some inconsistency was noted in the right shoulder releases. This is evident from Figure 11 on missions 98, 101, 108, 109, and 113, where the displacement method yields only about 50% of the velocity computed by the pressure method. The reason for this discrepancy can be seen in Figure 12 where the ejector foot displacement and corresponding chamber pressure history measured on a correlated mission (106S) is overlaid on the plots generated from one of the missions in question (108S). Note that although the two pressure curves are nearly identical, that the slope of the corresponding displacement curves tend to deviate for the last 1 inch of the ejection stroke. The slope of the curve in this region is indicative of the instantaneous velocity of the ejector foot at the end of its stroke, or in other terms, the separation velocity of the bomb as computed by the displacement method.

Although it is possible that the ejection chamber might have experienced a bleed-off problem prior to the bottoming-out of the piston, two similar missions in the same time frame did not experience this problem nor could any correlations be found to tie this phenomenon to any other rack or release parameters. It is highly probable that these shoulder station bombs experienced the effect of an induced aerodynamic force acting to retard the release. Again, if the CLASS program had produced bomb phototheodolite and fallaway film coverage, the data would have provided some insight into this problem area. Using all available data, the average separation velocity measured on the right shoulder station was found to be 4.9 ft/sec by the displacement method; whereas, the pressure method yielded 5.7 ft/sec. Eliminating the five questionable drops results in a much closer match. The separation velocity (V_s) computations are as follows:

	Centerline		Right Shoulder	
	Mean	Standard	Mean	Standard
Pressure V_s (ft/sec)	7.0	0.7	5.7	0.8
Displacement V_s (ft/sec)				
All ^a	7.2	0.6	4.9	1.5
Partial ^b	--	--	5.9	0.9
Ejection Stroke (msec)	67.5	3.6	73.2	2.3

^aAll missions.

^bNeglects five questionable shoulder missions

Relating these errors to bomb miss distance, a 0.9 ft/sec error in ejection velocity contributes to approximately a 20 foot error in ground impact point (Reference 1). Ejection velocity is the initial velocity imparted by the rack ejector foot only directed along the axis of ejection.

The TER-9 instrumentation was designed to provide simultaneous monitoring of centerline and shoulder stations. This design permits recording the parameters not only from the release station but also from the off-station. When the centerline bomb is released, the off-station data (shoulder) provides a rough measure of any resulting reaction to the rack frame itself. Because the centerline bomb is first to release, the off-station data during a shoulder release is far less valuable as a source of data. A tendency was noted in the off-station data during a centerline release for the left sway braces to load up an additional 200 to 300 pounds starting approximately 13 milliseconds after

Reference:

1. Trajectory Sensitivity of the MK82 Low Drag Bomb to Pertinent Delivery Parameters. AFATL-AMR-69-20, December 1969.

cartridge fire. A corresponding unloading of the right sway braces was also evident. Subsequent motion appeared to be oscillatory. The period of the first and most severe oscillation was found to be 40 to 45 milliseconds, with the motion damping out 0.3 to 0.4 second after release.

Prior to each CLASS flight, both the TER-9 instrumented rack and the CLASS system time code generators were synchronized to IRIG-B range time. From the limited data obtained, an attempt was made to determine the time delay from the CLASS computer release signal recorded on the avionics analog tape to cartridge fire initiation recorded by the TER-9. The results showed extremes ranging from 14 to 129 milliseconds, with the mean falling at 67 milliseconds. The reliability of these numbers is questionable, however, because the data on which they are based were gathered on two independent systems, each experiencing a different factor of drift from the norm after synchronization.

The TER-9 downward looking camera mounted in the aft end of the rack frame provided 16mm film coverage of bomb release. Usable photographs were obtained from 24 centerline and 10 shoulder bomb drops. A film reader was utilized to obtain quick estimates of yaw and roll behavior. In all but one case (16 March 1971 C/L), the bombs were found to begin their initial yawing counter-clockwise with respect to the aircraft heading. All shoulder station bombs yawed to some degree; whereas, no measurable yaw could be detected on three centerline bombs. The initial yaw angles for the bombs are as follows:

Release Station	Mean, degree	Standard Deviation, degree	Range, degrees	
			Minimum	Maximum
Centerline	4.8	2.9	0	12
Shoulder	9.0	3.6	2	15

On the average, the period of the yaw oscillation was 0.95 second. Over half on the downward-looking film received was either not identified by data and mission or the corresponding TER-9 rack data were not obtained. Thus, only a small sample remained for comparison and analysis with other test parameters. As would be expected, it was found that the observed yawing motion contributed to the bomb falling short of its predicted trajectory. This effect was most pronounced on four bombs with initial yaw angles exceeding 10 degrees.

Bomb roll behavior was much more difficult to reduce from the film because this required the film reader to identify and record the position of one fin from frame to frame. This was accomplished on only a sampling of missions. Based on an assumption of a constant camera frame rate it was determined that the bombs linearly increased in roll for the first 2 seconds after release, achieving a typical roll rate of 6.5 rev/sec at this time. Roll data could not be assessed after the bomb dropped more than 75 feet below the aircraft; this point is reached approximately 2 seconds after release.

Trajectory calculations and resulting predictions of ground impact for unguided bombs, whether produced by a digital computer or from an on-board avionics solution, are determined using the best available data for average bomb, atmospheric, and separation parameters. The TER-9 instrumented rack compiled data not only on the magnitude of these parameters but also on their variability. These data for the 43 CLASS bombs and the associated impact errors on the ground are summarized as follows: (The miss distance was determined from Reference 1 based on a nominal level release, 450 KTAS from 5000 feet AGL.)

Parameter	Measured Value	Miss Distance, ft
Release Time Delay:		
Cartridge fire to piston 1st motion (msec)	12.9	9.9
Piston 1st motion to end of stroke (msec)		
Centerline Rack	67.5	51.5
Shoulder Rack	73.2	56.0
Release Time Delay Variation, 1σ (msec)		
Centerline Rack	3.6	2.7
Shoulder Rack	2.3	1.7
Initial Yaw Angle (deg)		
Centerline Rack	4.8	8.8
Shoulder Rack	9.0	34.0
Mass Variation, 1σ (lb)	5.6	2.5
Diameter Variation, 1σ (in)	0.03	1.4
Transverse Moment of Inertia Variation, 1σ (slug/ft ²)	1.0	2.0
Separation Velocity Variation, 1σ (ft/sec)		
Centerline Rack	0.65	14.0
Shoulder Rack	0.85	18.0
Center of Gravity Variation, 1σ (in)	0.30	7.0

Some indications are evident from the sway brace and hook plots obtained on each mission that last minute aircraft maneuvers may be detected in the loading and/or unloading of the sensors. There are also indications of hooks momentarily hanging-up prior to bomb release. No attempt was made to interpret all of these data. To do so would, in most cases be only conjecture until such time that a sufficient data base is established upon which conclusions can more validly be made. It should be noted that the results presented in this report are the first of their kind and represent measurements taken under controlled conditions utilizing one bomb rack mounted on only one pylon position of one aircraft. The applicability of these results to other conditions remains unknown at this time. Future plans call for the instrumented TER-9 to be reconditioned and all existing strain gages replaced with load cells for direct force and load measurements.

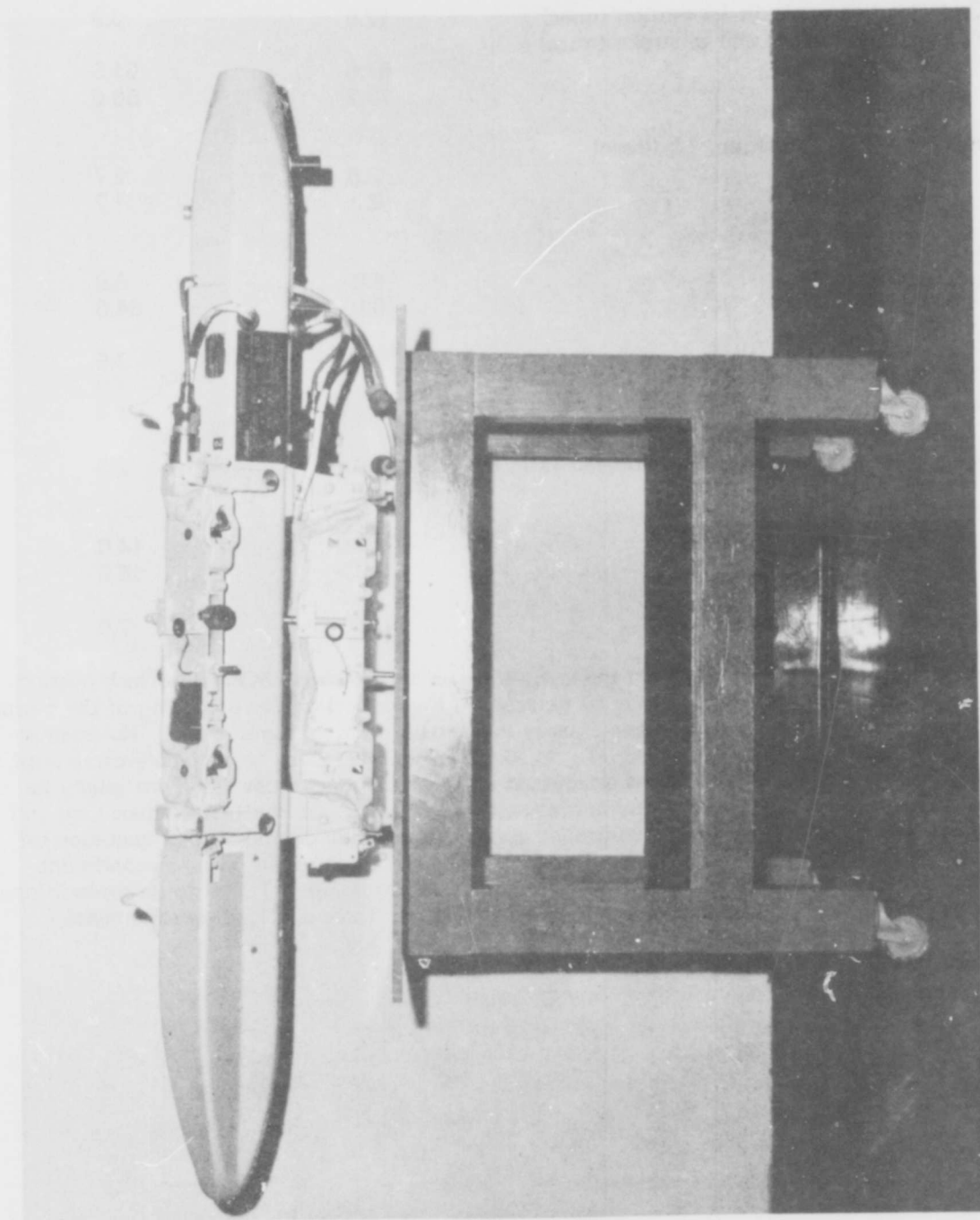


Figure 1. TER-9 Bomb Rack

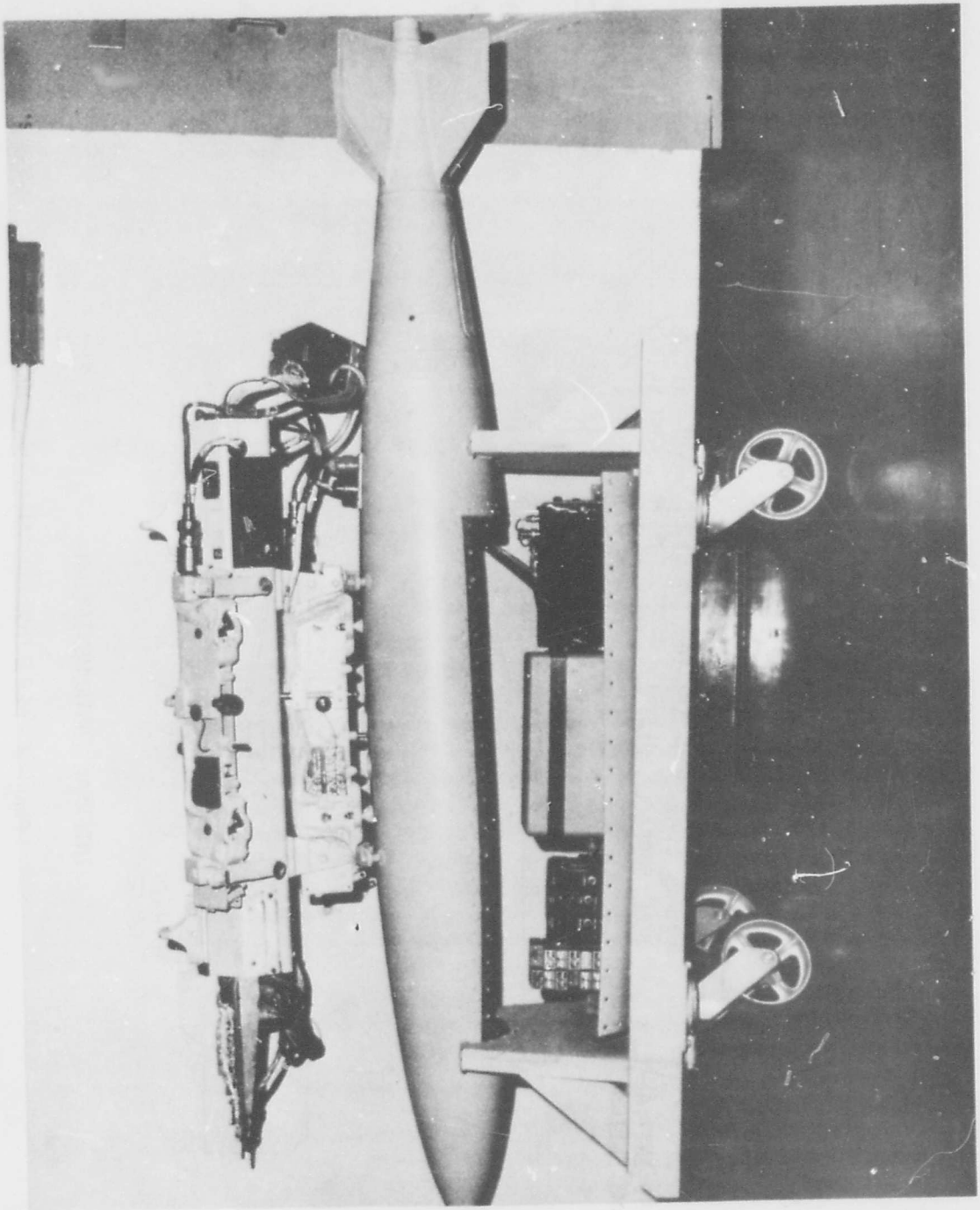
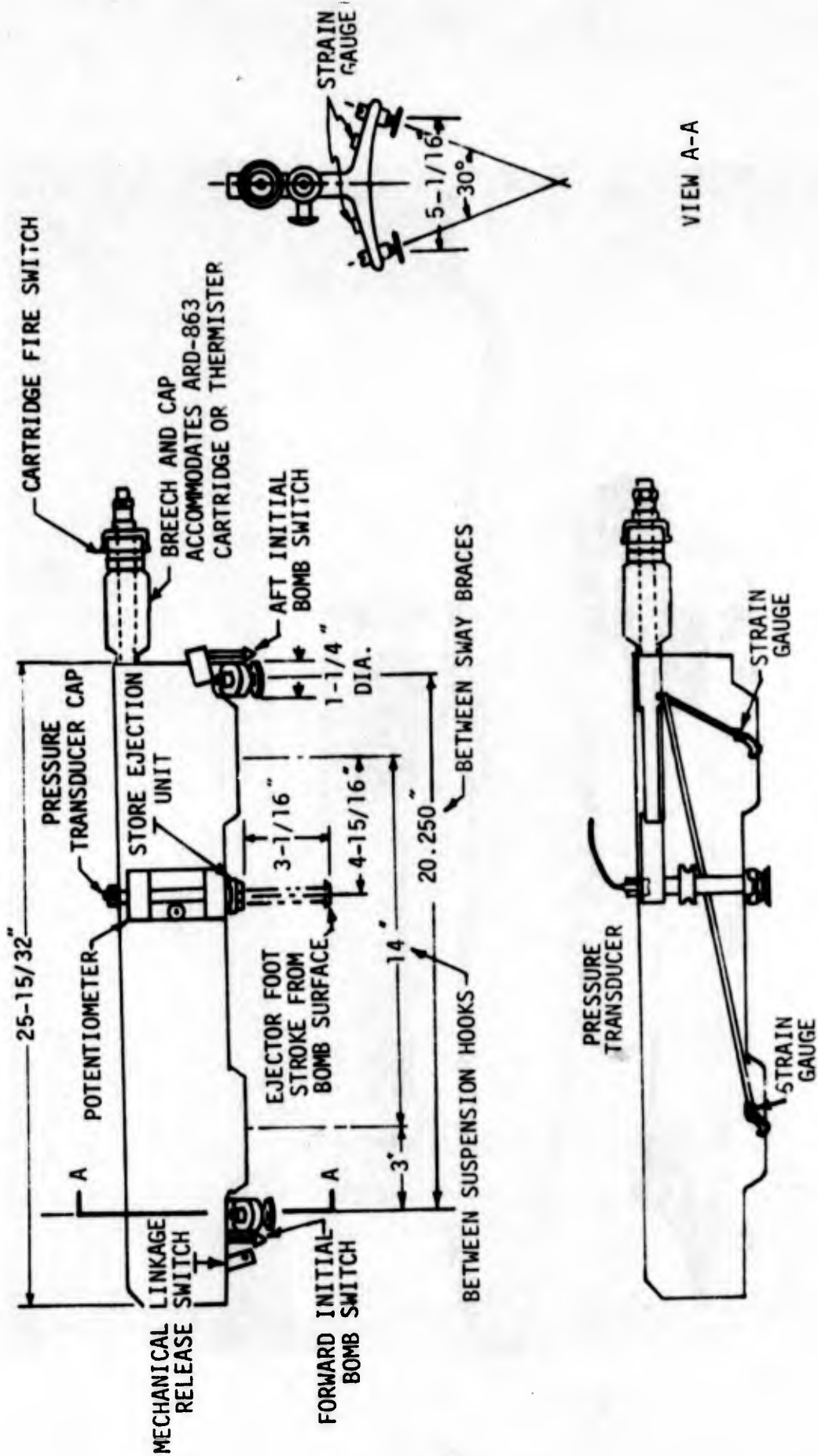


Figure 2. TER-9 Internal Instrumentation and Recording Pod

EXTERNAL INSTRUMENTATION



INTERNAL INSTRUMENTATION

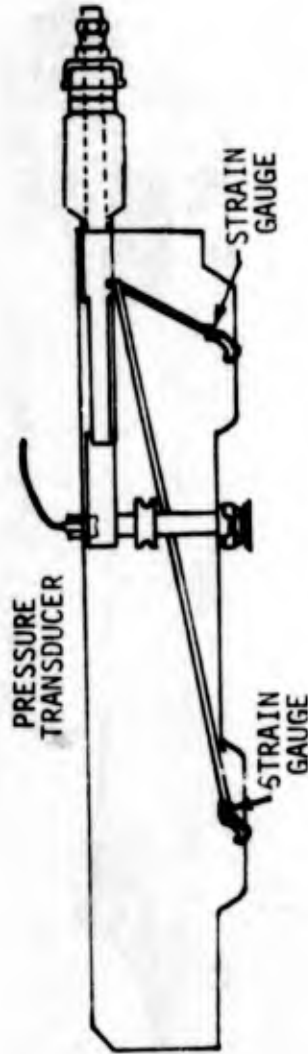


Figure 3. TER-9 Instrumentation Schematic

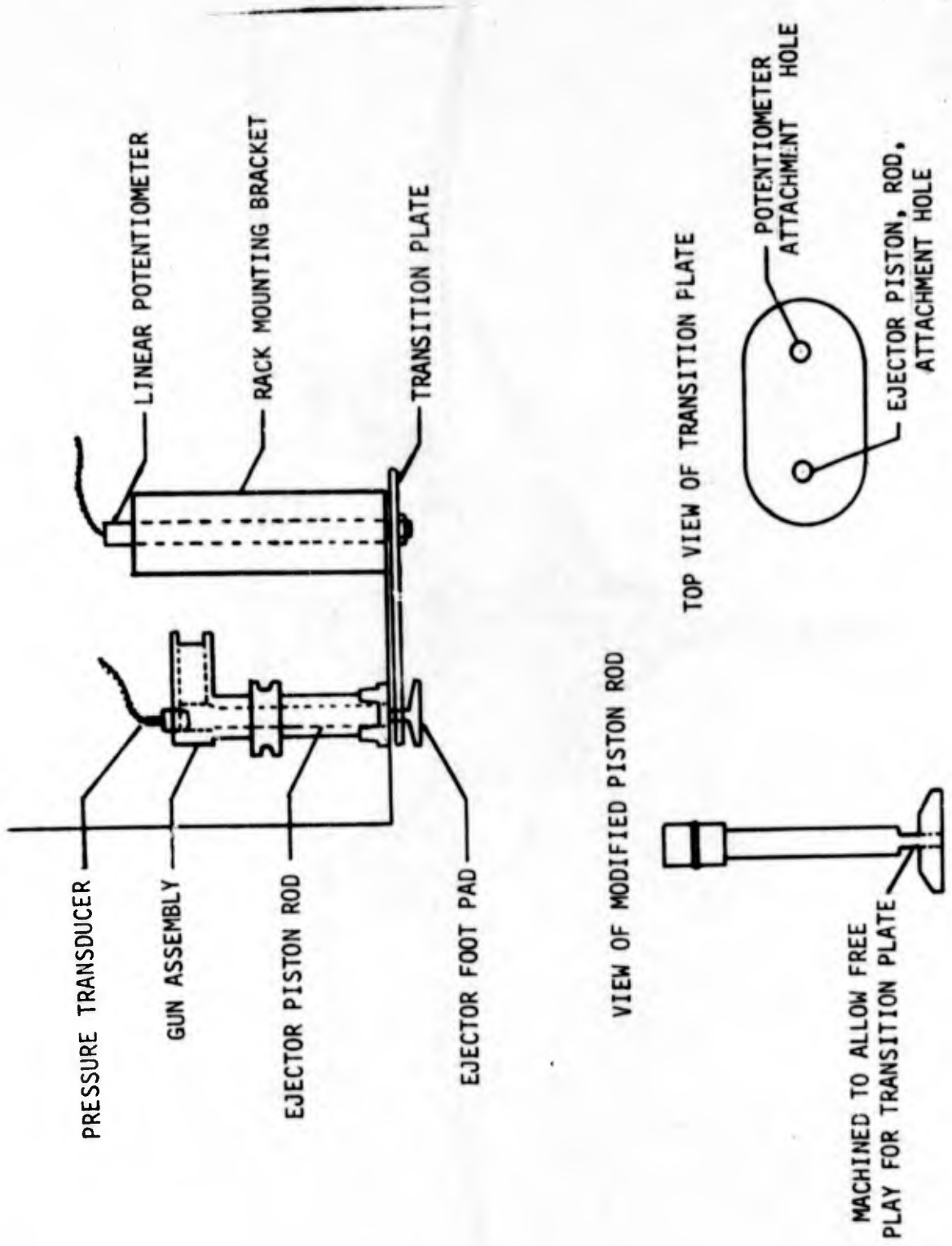


Figure 4. Ejector Piston and Potentiometer Assembly

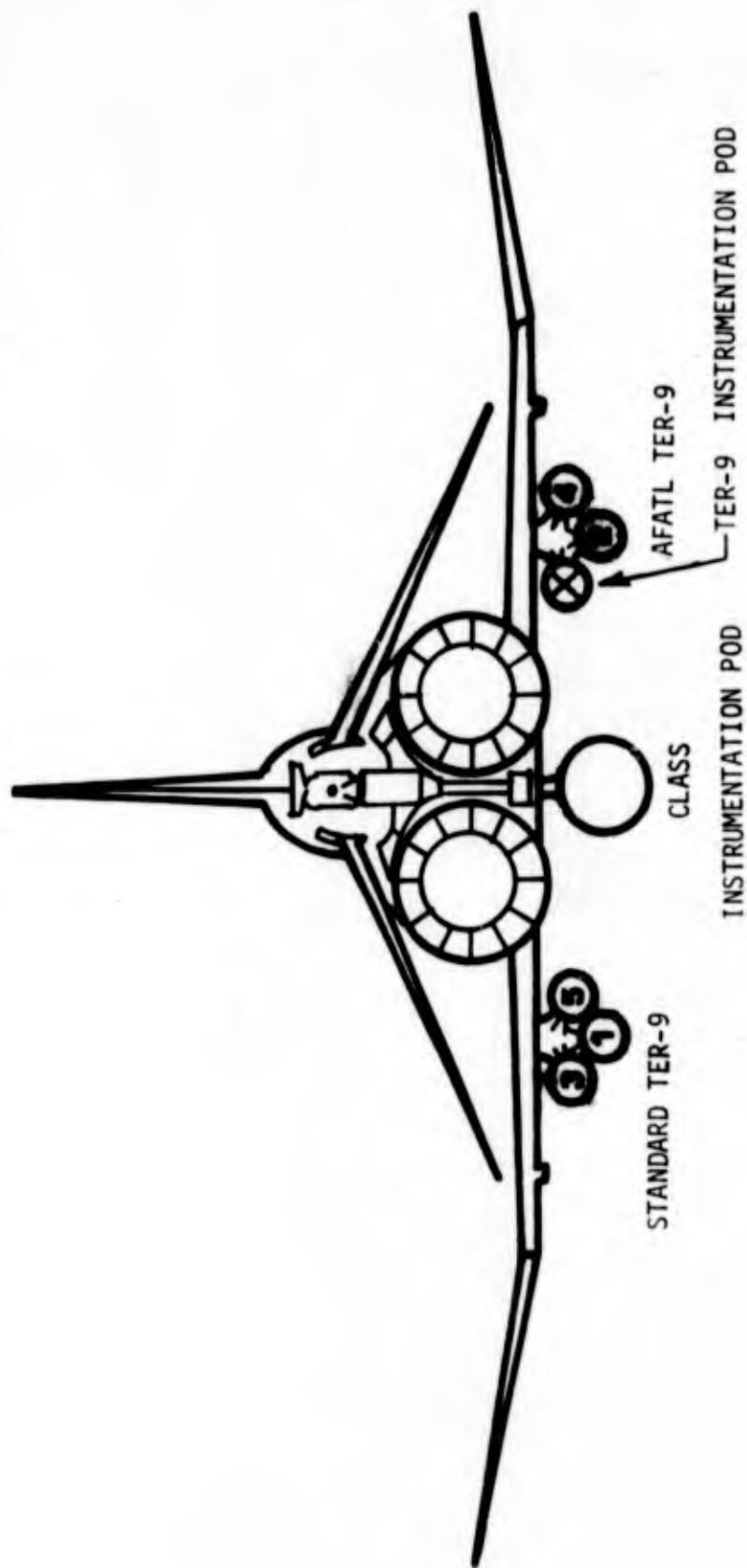


Figure 5. TER-9/Class Load Configuration

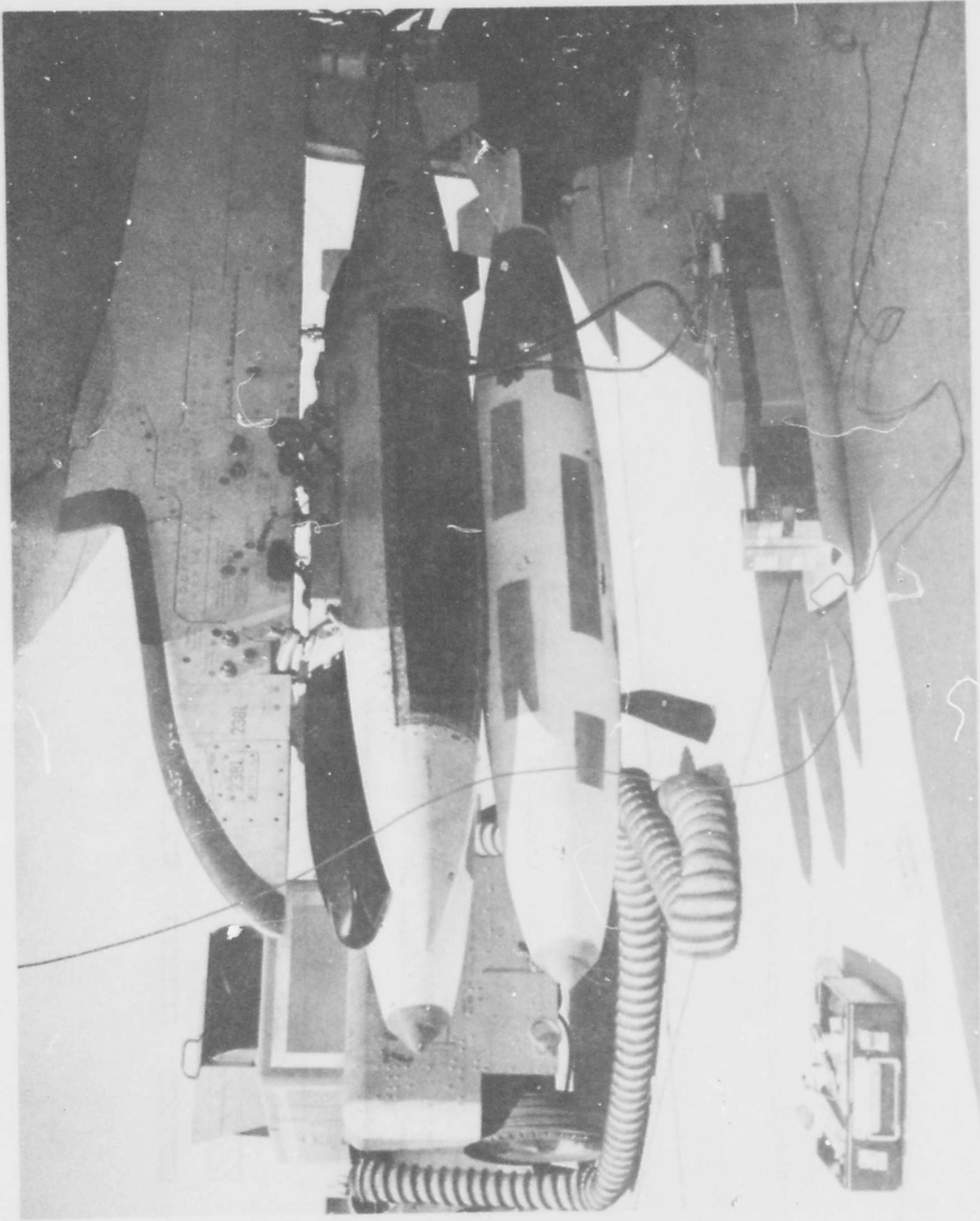
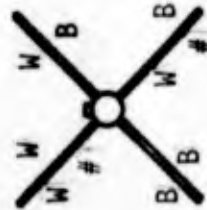
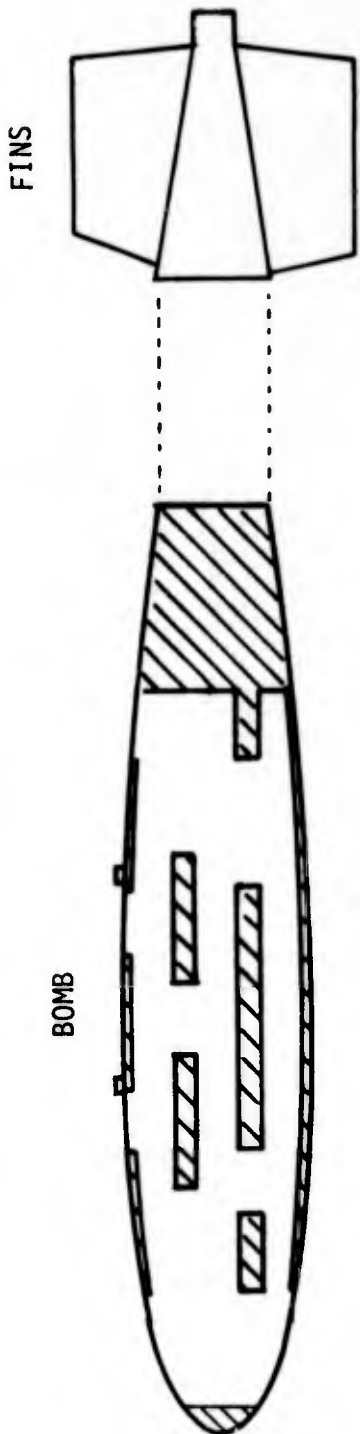


Figure 6. TER-9 Loaded for a Class Bombing Mission



LEGEND
= FIN NUMBER

B = BLACK

W = WHITE

□ = WHITE

▨ = ORANGE

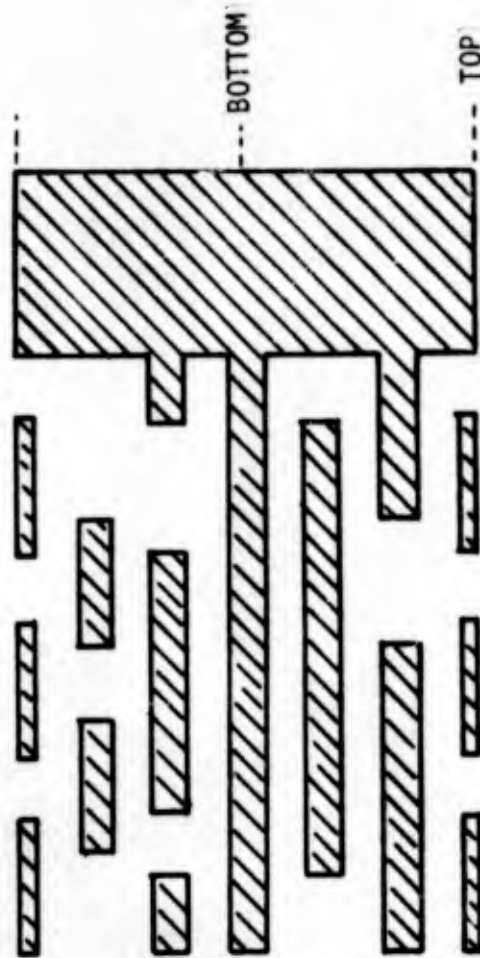
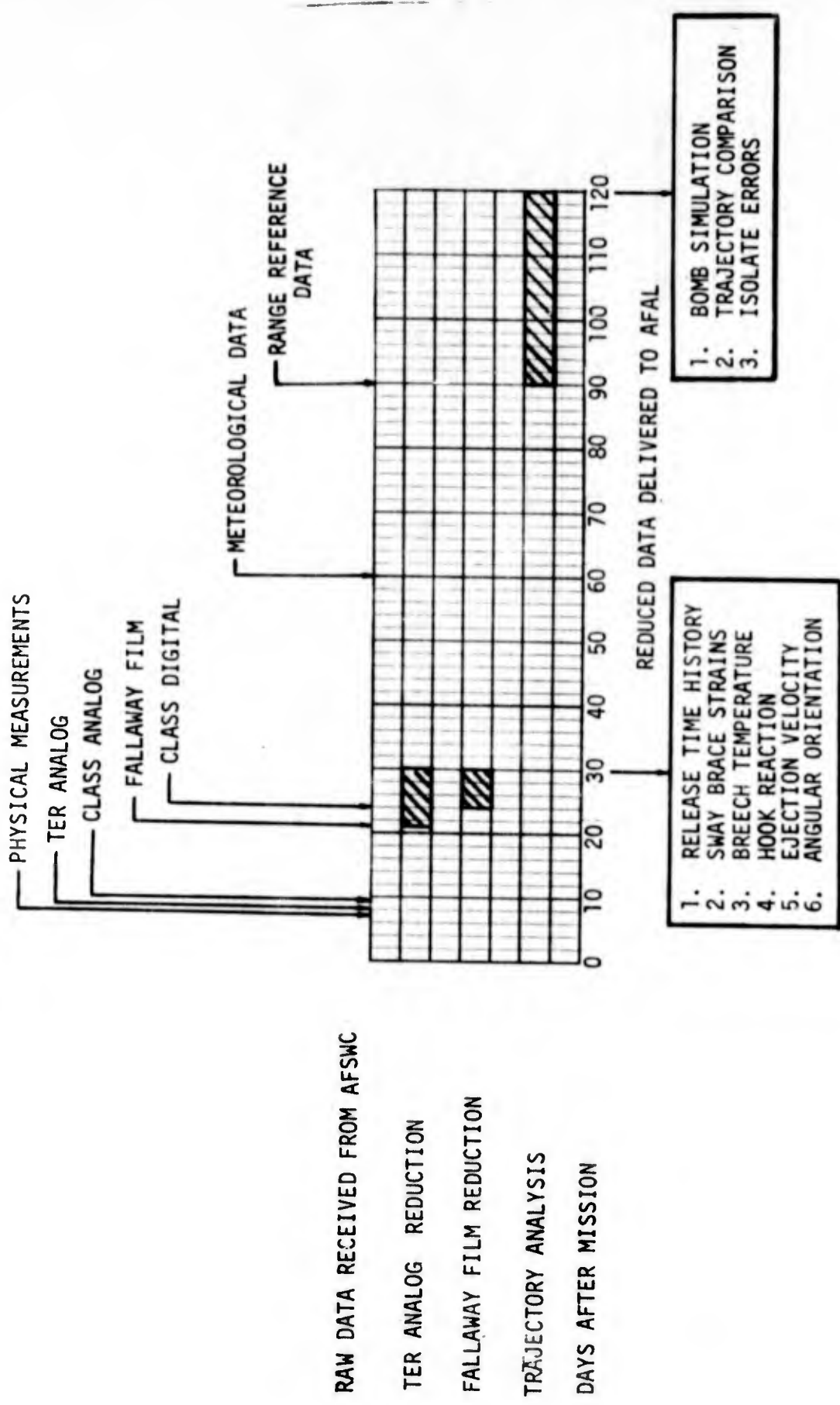


Figure 7. MK82 Bomb Painting Scheme



RAW DATA RECEIVED FROM AFSWC

TER ANALOG REDUCTION

FALLAWAY FILM REDUCTION

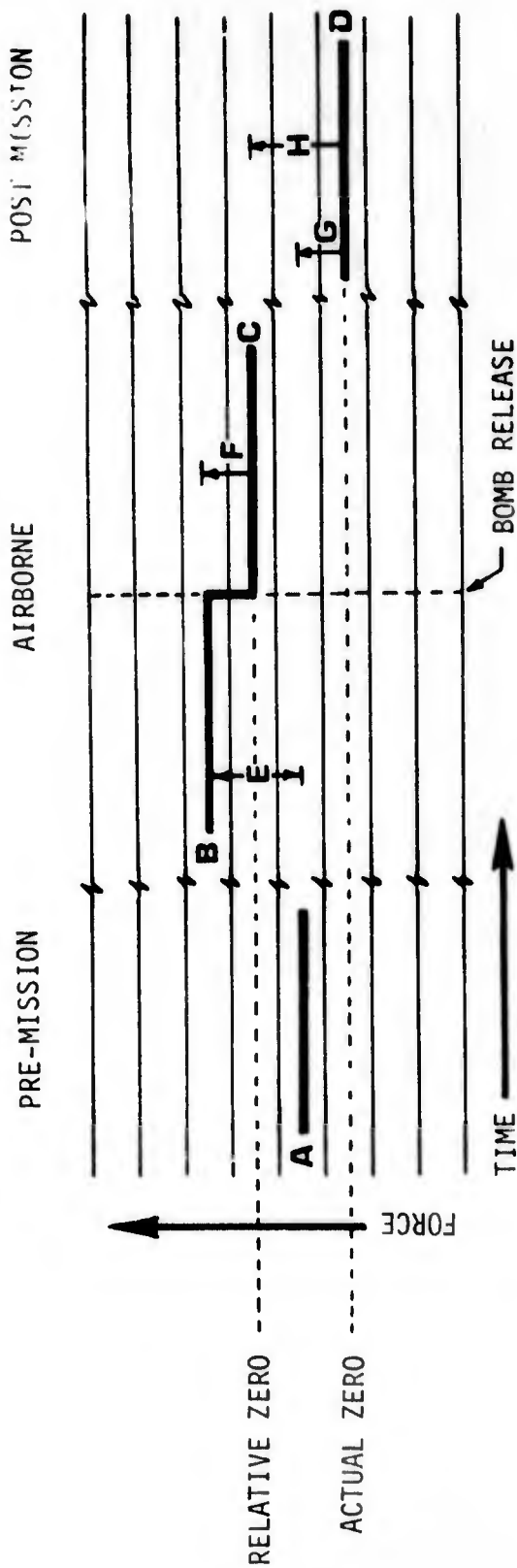
TRAJECTORY ANALYSIS

DAYS AFTER MISSION

- 1. RELEASE TIME HISTORY
- 2. SWAY BRACE STRAINS
- 3. BREACH TEMPERATURE
- 4. HOOK REACTION
- 5. EJECTION VELOCITY
- 6. ANGULAR ORIENTATION

- 1. BOMB SIMULATION
- 2. TRAJECTORY COMPARISON
- 3. ISOLATE ERRORS

Figure 8. TER-9 Data Flow Schedule



- A - PRE-MISSION LOAD--AIRCRAFT ON GROUND, BOMB IN PLACE
- B - PRE-DROP LOAD--AIRCRAFT IN FLIGHT, BOMB IN PLACE
- C - POST-DROP LOAD--AIRCRAFT IN FLIGHT, NO BOMB--ZERO AERODYNAMIC LOAD
- D - POST-MISSION LOAD--AIRCRAFT ON GROUND, NO BOMB--ZERO BASELINE LOAD
- E - AERODYNAMIC LOADING WITH BOMB IN PLACE
- F - UNLOADING AT BOMB RELEASE
- G - STATIC HOOK LOADS, LOADING TORQUE APPLIED TO SWAY BRACES
- H - AERODYNAMIC LOADING EFFECT ON SENSOR AFTER BOMB RELEASE

Figure 9. Pre- and Post Mission System Calibration Utilization

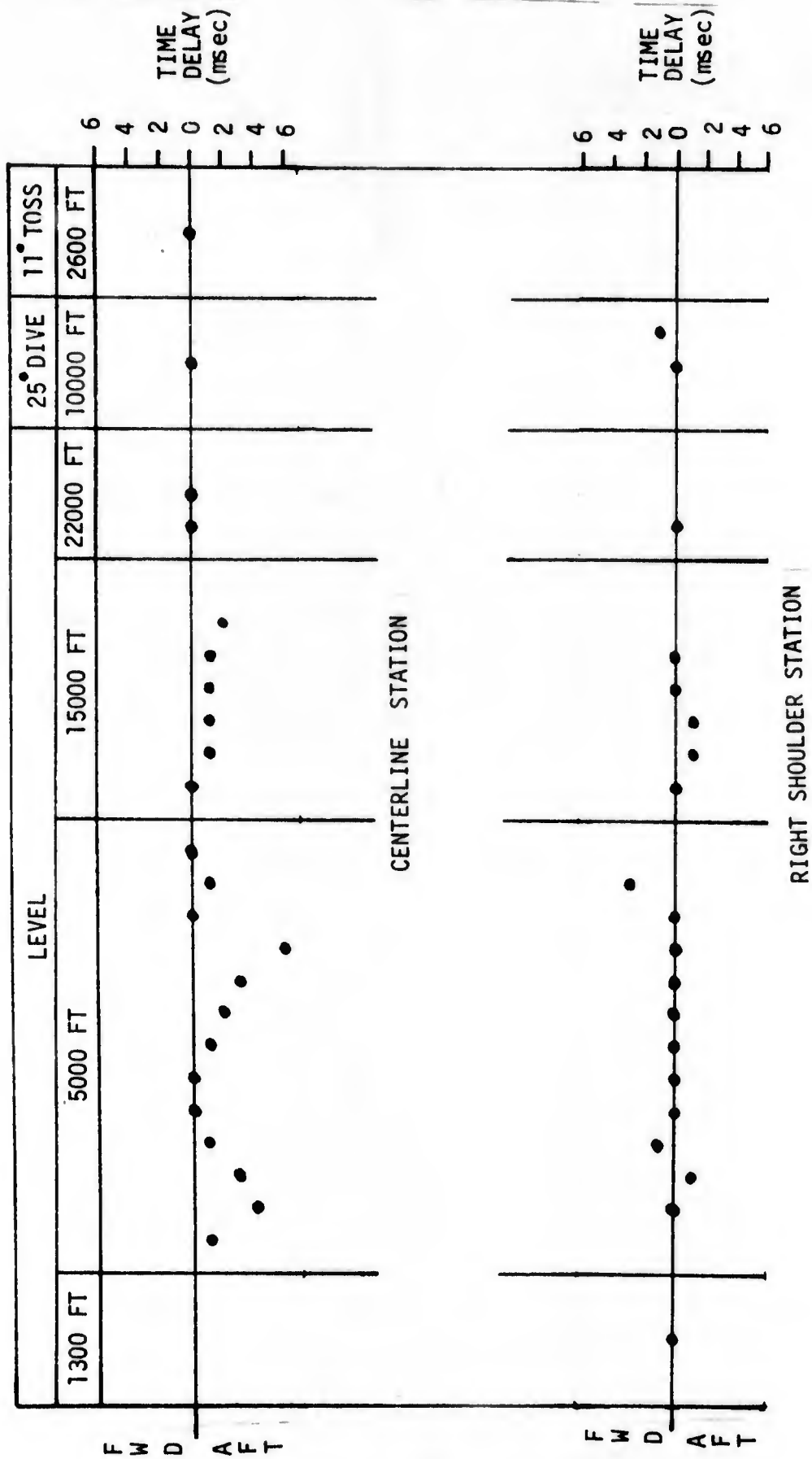


Figure 10. Bomb First Motion Timing

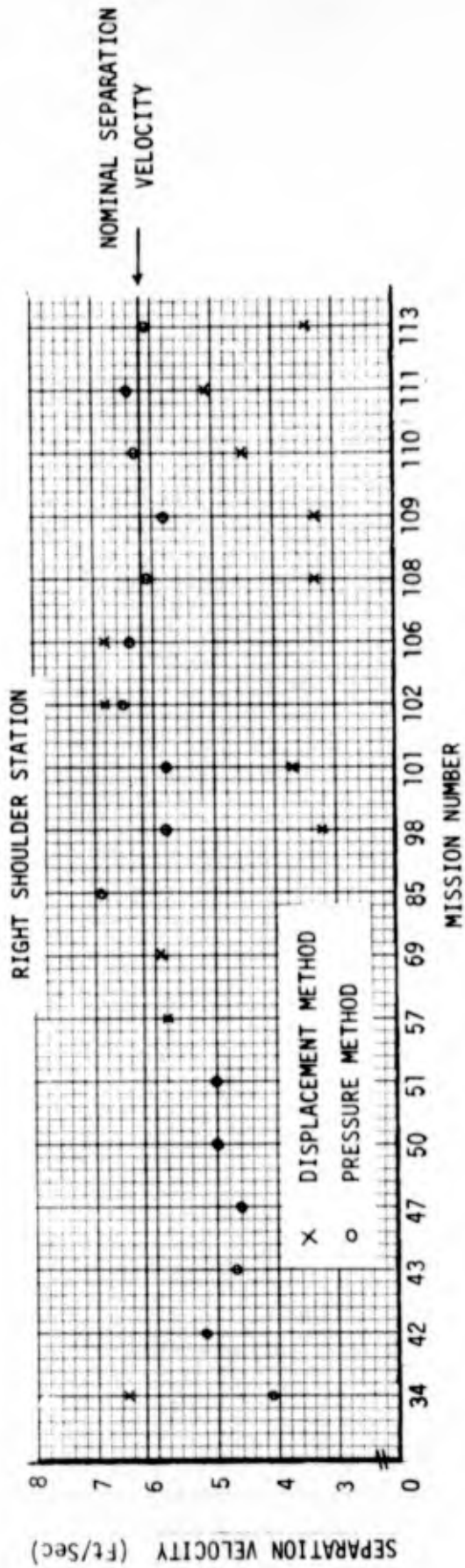
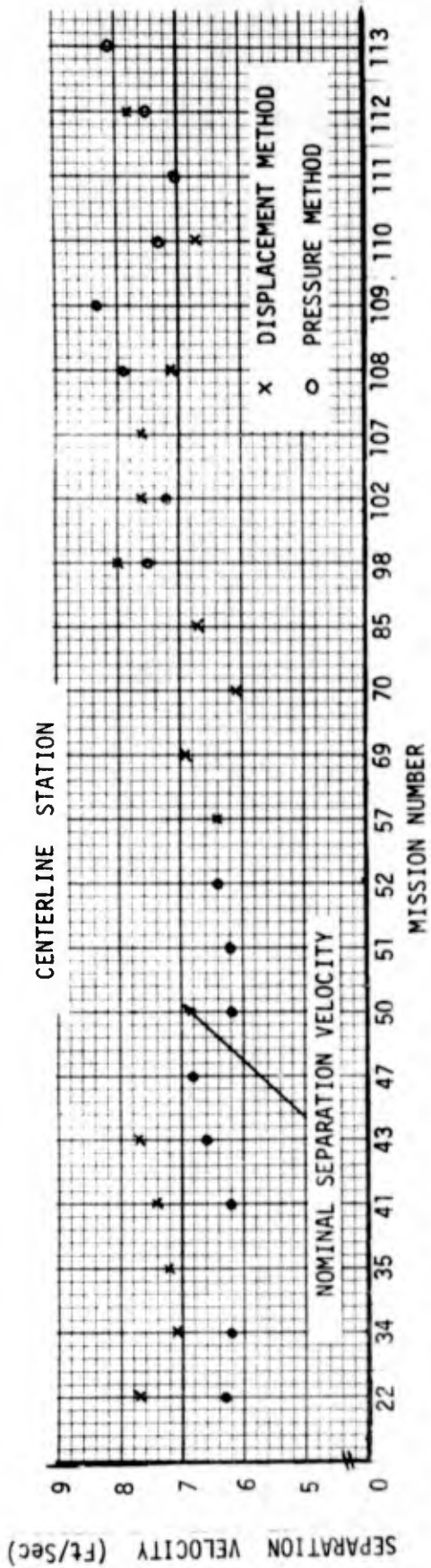
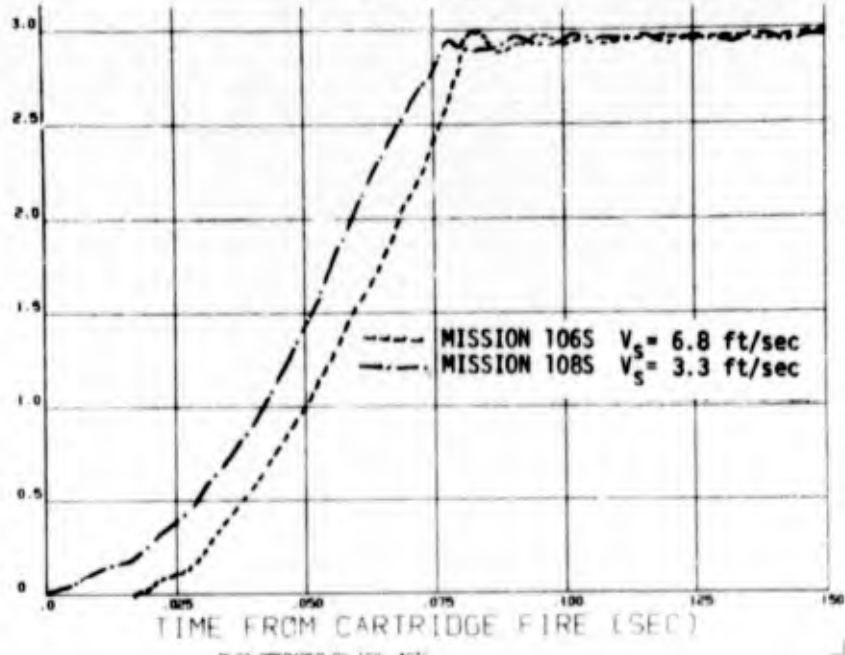


Figure 11. TER-9 Measured Separation Velocities

EJECTION
CHAMBER
POSITION
(INCHES)



PLOT PREPARED BY ISX, AOTC

EJECTION
CHAMBER
PRESSURE
(PSI)

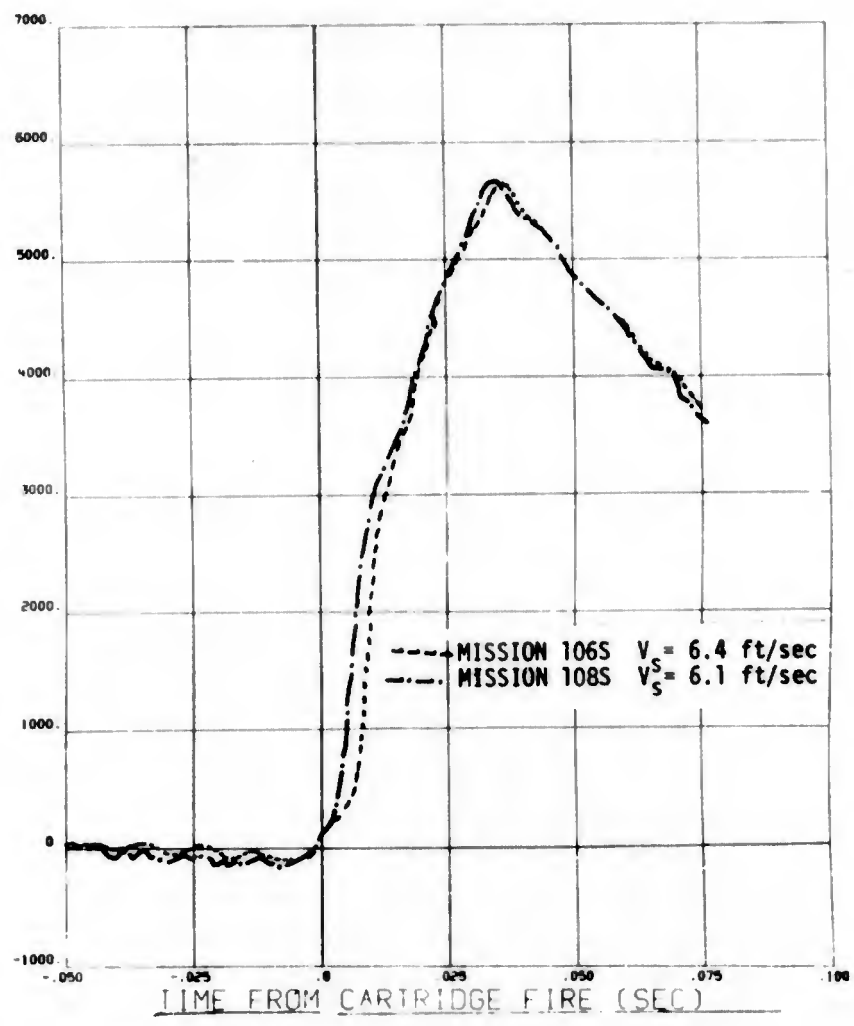


Figure 12. Separation Velocity Comparison

APPENDIX A
TER-9 CLASS II MODIFICATION PACKAGE
AND STANDARD OPERATING
PROCEDURES

AEROSPACE VEHICLE MODIFICATION APPROVAL AND CONTROL

SECTION I - PREPARING AGENCY

1. MOD. NO.	2. MOD. CLASS	3. VEHICLE ITEM NAME & N.	4. WORKING DRAWING NO.	5. PROJECT NAME	6. DATE	7. SUBMITTER
1069-13	EE	TER-9A	AFS	60007/001	1735	AAZ BV

Mr. Gallegos/ADIVE-31/2 2095

TER-9A WITH INSTALLED SECURITY AIRWAY INSTRUMENTATION


This class II Modification package provides a capability for benign and readable data concerning aircraft store ejection parameters.

8. REQUIRED FOR MEDICAL DATA	
9. REQUIRED FOR RESEARCH	
10. REQUIRED FOR ANALYSIS	
11. REQUIRED FOR ANTI-TAKEOFF	XX
12. REQUIRED FOR LAUNCH REGION	
13. REQUIRED FOR LAUNCH	X

13. COST ANALYSIS	DOLLARS
DESIGN & PREP. PREPARATION	6870.00
GROUP "A" COMPONENTS	
GROUP "B" COMPONENTS	

14. REMARKS (For Preparing Agency)	YES	NO	15. REMARKS (For PGL and PGMM)	YES	NO
SOP'S REQUIRED AND ATTACHED		X	CONFIG CONTROL BOARD REQUIRED		
MODIFICATION KIT IS REQUIRED	X		FLIGHT SAFETY BOARD REQUIRED		
FLIGHT RESTRICTIONS ARE IMPOSED		X	FCF REQUIRED		
AIRBORNE OPS CHECK REQUIRED		X	AFTO 26 CARDS REQ. AND ATTACHED		

16. APPROVAL: This modification provides the facilities required for project support. Documentation included is adequate to provide for installation, removal, maintenance, and operation of the systems affected. Design is in accordance with applicable standards and specifications. There are no known ground or flight safety hazards attributable to the design of this modification. The design of this modification has been coordinated with the project pilot.


HAROLD G. WISE, 8 May 1970
 Chief, Preparing Agency

SECTION II - VALIDATION AND SAFETY OF FLIGHT REVIEW

This modification has been reviewed for compatibility with the aircraft and systems affected and an initial safety of flight review has been performed. Modification is required for project support and is approved for accomplishment.

Approved:

MODIFICATION INSTRUCTIONS AND CERTIFICATION

Page 1 of 2 pages

MODIFICATION NUMBER

1069-13

AIRCRAFT CENTER ACTION

TER 9/MK-82 Bomb

PROJECT NO

69DFV008

1. INSPECTION REQUIREMENTS.

a. Preflight. Preflight will be accomplished after the instrumentation is hung on the aircraft. The preflight SOP will be provided with modification package No. M0170-5.

b. Postflight. None

c. Phase or Hourly Inspection. Inspect electrical wiring for loose connections and frayed or chafed wires and the mounting bracketry for mechanical integrity.

(1) A/C Work Area: TER-9/MK-82 Bomb

(2) Item No. on APGC Form 15A: All

(3) Time: 1 Hour

(4) Phase or Hourly Inspection: Every Twenty-Five Flight Hours

(5) Responsible Section/Phone No: ADTVE-31-1, 882-2611

d. Special Inspection: None required

2. The Electrical Power requirements will be outlined in the modification package No. M0170-5 which will authorize carriage on the F-4D, #8698.

3. Upon completion of this modification and a determination that the item is operational and safe for flight, the System Engineer will sign-off the modification on the APGC Form 15C.

4. At the time that the Class II Modification is signed off, the ADTVE-31 Dock Chief will provide ADTVE-33 with a copy of the Class II Mod Package and a set of drawings marked to show any deviations that occurred during the physical installation in the aircraft. The information should include weights and station locations that were to be established at the time of installation.

5. INSTALLATION NOTES: None

6. MODIFICATION INSTRUCTIONS: None

7. AIRBORNE OPERATIONAL CHECKOUT: None required

8. FLIGHT LIMITATIONS: Flight limitations on carriage and jettison will be specified in the Class II MOD M0170-5. Carriage of MK-82 bombs only is permitted on this modified TER.

CERTIFICATION

We certify that the modification described herein has been installed in accordance with the modification control system known flight and ground test procedures and that the aircraft is safe for flight.

MODIFICATION NUMBER

DATE COMPLETED

MODIFICATION NUMBER

APGC Form 15B

MODIFICATION INSTRUCTIONS AND CERTIFICATION Page _____ of _____ pages

MODIFICATION NUMBER 1069-13	AIRCRAFT IDENTIFICATION TER 9/MK-82 Bomb	PROJECT NO 69DFV008
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MODIFICATION INSTRUCTIONS AND GENERAL INFORMATION (Use additional sheets as required)

9. **SECURITY CLASSIFICATION (of Equipment or Mod Attachments): UNCLASSIFIED**

10. **SPECIAL WEIGHT AND BALANCE DATA:**
 - a. If items are removed from TER or bomb, then the Measurement of inertia and CG must be determined to be certain they are in limits.

 - b. On the MK-82 Bomb the actual weight, CG, and moment of inertia in pitch and yaw must be determined for use in establishing flight limitations in Class II MOD MO170-5.

11. **SPECIAL INSTRUCTIONS:** None

CERTIFICATION

We, the undersigned, certify that within the scope and limits of our responsibility this modification contains no known flight or ground safety hazard which can be attributed to the modification design.

NAUTICAL ENGINEER <i>[Signature]</i>	PROJECT ENGINEER <i>George Adams Jr.</i> <i>W.A. Skinner</i>	MODIFICATION ENGINEER <i>[Signature]</i>
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DATA LIST

PREPARING ACTIVITY ADTVE-3	DESIGN ACTIVITY ADTVE-32	DATE 8 May 70	SHEET 1 OF 1 SHEETS
AIRCRAFT TER 9/MK-82 BOMB		SHORT TITLE. TER-9 WITH INSTALLED DELIVERY ACCURACY INSTRUMENTATION.	
MOD. NO. 1069-13			
PROJECT NO. 69DFV008			

DWG SIZE	CODE IDENT.	DOCUMENT IDENTIFICATION	REV	DOCUMENT NOMENCLATURE
D	*	SK-2715D-TW		Bomb (MK 82) Modified (Ass'y)
D		SK-2719D-TW		Ease Plate (DTL)
B		SK-2725B-TW		Support Block (DTL)
D	*	SK-2734D-TW		Cut-Out Section (DTL)
D		SK-2735D-TW		Door DTL & Ass'y
D		SK-2736D-TW		Doubler (DTL)
D		SK-2745D-TW		Spacer (DTL)
D	*	SK-2752D-TW		Plate & Bracket (DTL)
D	*	SK-2784D-TW		Ter Rack (As-Built Brktry) (Sub-Ass'y) Detail
D	*	SK-2787D-TW		Mounting Plate & Support Arms (Ass'y & Instl)
D	*	SK-2823D-TW		Base Plate, (DTL)
C	*	SK-2842C-TW		Two- receptacle Plate (Ass'y)
B	*	SK-2856B-TW		Plate, Two-Connector (DTL)
D	*	SK-2858D-TW		Ter & M-82 Bomb (Ass'y)
D	*	SK-70D-7-TW		KB-3 Camera Instl in Ter (Ass'y & Instl)
B		SK-70B-28-TW		Door Plate (DTL)
B	*	SK-70B-36-TW		Spacer Block (DTL)
D	*	SK-70D-58-TW		Aft End Fairing Fabricating (DTL & Ass'y)
D	*	SK-70D-96-TW		Adjustable Potentiometer (Sub-Ass'y)
D	*	SK-70D-99-TW		Signal Jack Testing (Sub-Ass'y)
D	*	SK-70D-120-TW		Brkt Ass'y (DTL & Instl)
B	*	SK-70B-122-TW		Light Bracket (Sub-Ass'y)
D	*	SK-70D-123-TW		Mounting Plate (DTL)
D	*	SK-70D-191-TW		Receptacle Instl in nose fairing (Ass'y & Instl)
C		SK-70C-213-TW		4-Tab Holding Plate (DTL)
C	*	SK-70C-214-TW		4-Tab Holding Plate (DTL)
D		SK-70D-215-TW	B	Ballast Inst'l (Sub-Ass'y)
C		SK-70C-216-TW		Ballast "A" (DTL)
C		SK-70C-217-TW		Ballast "B" (DTL)
D	*	70VLX-23D		TER-9 DAS Aircraft & Pylon Wiring
F	*	70VLX80F-1		Ter-9 Data Acquisition System
F	*	70VLX80F-2		Ter-9 Data Acquisition System
D	*	70VLX81D		MKX VCO's Wiring Diagram
F	*	70VLX85F		Signal Conditioning Assy.
D	*	70VLX50D		Block Diagram TER-9 Data Acquisition System

PREFLIGHT SOP

PROJECT: 69DFV008

1.0 Armament Crew

1.1 Upload instrumented TER-9 using standard uploading procedures. (Aircraft Stations #2 or #8 may be used as specified by the Daily Operations Directive)

WARNING: DO NOT install cartridge on the station with the instrumented bomb.

1.2 Connect the umbilical cable that is provided with the TER to the DO-ALL and AIM-4 connectors in the MAU-12 pylon. (All normal TER functions are provided through this cable.)

1.3 Exercise caution during uploading or downloading to prevent damage to the following items: exposed camera lens in the aft TER housing, coaxial connectors on the breech assembly which protrude through top of rack, strain gauge on all sway braces and hooks, and initial storage sensing switches on the bottom fore and aft section of each rack.

1.4 The instrumented MK-82 bomb and the Dovat bomb will always be loaded on the instrumented TER on Station #2 or Station #3. The instrumented TER bomb load arrangement will be as specified by the Daily Operations Directive. Standard uploading procedure will be used at all times.

1.5 The Dovat bomb instrumentation is electrically mated to the TER with the pull-away cable on Station #2 or Station #3.

1.6 With power on the aircraft, depress Homing Switch on the aft fairing of the TER. This homes the TER to Station #1 and the homing light will be lit.

PREFLIGHT

2.0 Instrumentation Crew.

2.1 Place TER sensing switches in contact with the bomb.

2.2 Remove fastening screws on instrumented bomb door and lower the instrumentation package.

2.3 Check cables from bomb package to insure proper connection on inside of the bomb.

2.4 Loosen locking bolt on tape recorder cover and remove cover.

2.5 Clean tape recorder heads using cotton swab which has been emersed in Ampex Part #087-007 cleaner.

2.6 The tape recorder cover contains 1000 ft of 1/2 inch magnetic tape. Check the pre-loaded tape recorder cover to insure that the tape is positioned as per diagram on the cover. Install and tighten locking bolt.

- 2.7 Disconnect J9 from rear tape recorder control box. This permits local control of the tape recorder.
- 2.8 Remove access door on the underside of the fwd fairing and install cable from the calibrate box to P6.
- 2.9 Apply AC & DC power to the aircraft.
- 3.0 Place Special Weapons & Armament CB "IN". Refer to drawing No. 70VLX23D.
- 3.1 Place time code generator power switch "ON". Synchronization to the correct time can be done either manually or by an automatic sync pulse. Refer to time code generator sync instructions.
- 3.2 Allow approximately 15 minutes for warm-up and place the Run Switch on the tape recorder control box to Run. (Amber light on the aft fairing of the TER should be off).
- 3.3 On the calibrate, check ISM (Initial Store Movement) & MLM (Mechanical Linkage Movement) lights. If sensing switches are in contact with bombs, all lights should be illuminated.
- 3.4 Rotate R/L & C/L on calibration box from A through F & from F through A.
- 3.5 Depress Cal button on calibration box and observe voltmeter indication. If the meter does not indicate 1 volt, adjust with Cal adjust.
- 3.6 Place tape recorder Run Switch on the tape recorder control box to "OFF" & remove calibrate box cable.
- 3.7 Connect tape recorder plug P9 to rear of tape recorder control box.
- 3.8 Place instrumentation package in bomb and install door screws.
- 3.9 Remove TER-9 aft fairing.
- 4.0 Load KB-3 camera with pre-packed film magazine and adjust "F" stop for existing light conditions.
- 4.1 Check camera power connector and install camera fairing.

PILOT'S SOP

Project: 69DFV008

1. Before take-off, verify right or left inboard Special Weapons circuit breakers "IN", CB's No. 304, No. 313 LI and CB's No. 310, No. 312 RI.
2. Place Master Armament Switch in Arm position.
3. Place Master Armament CB "IN".
4. Twelve (12) seconds prior to releasing first bomb, place nose and tail arm switch to Nose & Tail position.
5. Release bombs at specified conditions. The bomb release conditions are determined by the project officer.
6. Place Nose & Tail Arm Switch to "Safe".

POSTFLIGHT SOP

PROJECT: 69DFV008

1.0 Armament Crew

1.1 Download bombs. Return any standard MK-82 bombs to bomb dump and instrumented MK-82 bomb to Project Officer.

1.2 Download TER after item 2.0 to 2.2 has been accomplished.

2.0 If tape or film has not been exhausted, run remaining film and tape.


2.1 Remove tape recorder cover and download mission tape (Project Officer will take tape).

2.2 Download camera film and turn in for processing.

APPENDIX B

**CLASS II AUTHORIZATION FOR CARRIAGE
OF INSTRUMENTED TER-9 WITH MK82 POD**

AEROSPACE VEHICLE MODIFICATION APPROVAL AND CONTROL

I - PREPARING AGENCY							
1. MOD NO. MO170-5	2. MOD CLASS II	3. VEHICLE T/M/S AND S/N F-4D, 66-8698	4. OWNING COMMAND AFSC	5. PROJ NUMBER 69DFV008	6. PRI 1235	7. ISM IDENT MOD - AAZ PROJ - BV	
8. PROJ OFFICER/SYMBOL/PHONE NO. Mr. Gallegos/ADTVE-31/2-2995		9. ENGINEER/SYMBOL/PHONE NO. Mr. Gallegos/ADTVE-31/2-2995		10. PROJECT PILOT/SYMBOL/PHONE To be assigned			
11. MOD SHORT TITLE: <p style="text-align: center;">"AUTHORITY TO CARRY AN INSTRUMENTED TER-9 AND AN INSTRUMENTED INERT MK-82 Bomb</p> <p>CAPABILITY PROVIDED: This Class II Modification package provides authorization for carriage of the Instrumented TER-9 and the modified MK-82 Bomb (developed under MOD No 1069-13) in order to provide a capability for collection of a data time history for external stores release and separation.</p>				12. DRAWING AND TECHNICAL DATA <input type="checkbox"/> TECHNICAL REPORTS ARE REQUIRED AND ATTACHED <input checked="" type="checkbox"/> DRAWINGS REQD AND ATTACHED <input checked="" type="checkbox"/> DRAWING NOS LISTED BELOW <input type="checkbox"/> SEE ATTACHED DATA LIST (AF FORM 1089) * Drawings forwarded with this package * 70VLX23D * SK70B234EM * SK2858D-TV			
							13. COST ANALYSIS
DESIGN & PKG PREPARATION							
GROUP "A" COMPONENTS							
GROUP "B" COMPONENTS							
14. REMARKS (For Preparing Agency)		YES	NO	15. REMARKS (For POL and PQMS)		YES	NO
SOP'S REQUIRED AND ATTACHED See Para 11		X		CONFIG CONTROL BOARD REQUIRED			
MODIFICATION KIT IS REQUIRED		X		FLIGHT SAFETY BOARD REQUIRED			
FLIGHT RESTRICTIONS ARE IMPOSED		X		FCF REQUIRED			
AIRBORNE OPS CHECK REQUIRED			X	AFTO 28 CARDS REQD AND ATTACHED			
16. APPROVAL: This modification provides the capabilities required for project support. Documentation included is adequate to provide for installation/removal, maintenance, and operation of the systems affected. Design is in accordance with applicable standards and specifications. There are no known ground or flight safety hazards attributable to the design of this modification. The design of this modification has been coordinated with the project pilot.							
 HAROLD G. WISE, 15 May 1970 C/Inl of Preparing Agency							
SECTION II - VALIDATION AND SAFETY OF FLIGHT REVIEW							
This modification has been reviewed for compatibility with the aircraft and systems affected and an initial safety of flight review has been performed. Modification is required for project support and is approved for accomplishment.							
REQUIRED OPERATIONAL DATE							
DURATION OF MODIFICATION				TWO YEARS			
_____ For the Vice Commander							

MODIFICATION INSTRUCTIONS AND CERTIFICATION		Page 1 of 3 pages
MODIFICATION NUMBER M0170-5	AIRCRAFT IDENTIFICATION F-4D #66-8698	PROJECT NO. 69DFV008
MODIFICATION INSTRUCTIONS AND GENERAL INFORMATION (Use additional sheets as required)		
<p>1. <u>INSPECTION REQUIREMENTS:</u></p> <p>a. <u>Preflight:</u> See Paragraph 11a</p> <p>(1) A/C Work Area: 2 or 4 and 8</p> <p>(2) Time to Preflight: Two Hours</p> <p>(3) Responsible Section/Phone No: ADTVE-31-1/882-2611/and ADTVE-23/882-2453</p> <p>b. <u>Postflight:</u> See Paragraph 11</p> <p>(1) A/C Work Area: 2 or 4 and 8</p> <p>(2) Time to Postflight: One Hour</p> <p>(3) Responsible Section/Phone No: ADTVE-31-1/882-2611 and ADTVE-23/882-2453</p> <p>c. <u>Phase or Hourly Inspection:</u> None Required</p> <p>d. <u>Special Inspection:</u> Do not install an ejection cartridge in the TER-9 at any station where the instrumented MK-82 Bomb is loaded. In addition, when the MK-82 instrumented bomb is being carried on station one, cartridges must not be installed at stations two and three either.</p> <p>(1) A/C Work Area: 2 or 4</p> <p>(2) Item No. on APGC Form 15A: 1</p> <p>(3) Time on A/C: 15 Minutes</p> <p>(4) Responsible Section/Phone No: ADTMA-42, 882-5771 (Weapons Loading Section)</p> <p>2. <u>POWER REQUIREMENTS:</u> a. The following electrical power requirements are imposed on/ or deleted from the aircraft electrical system as a result of this modification:</p> <p>6.8 Amps @ 28 Volts DC</p> <p>1.0 Amps, C Phase @ 115 Volts AC, 400Hz, Three Phase</p> <p>b. The electrical power load on the aircraft has been reviewed and it has been determined that adequate power is available for the additional load being imposed by this Class II Modification Package.</p> <p>c. Installation of electrical wiring in the aircraft in response to the requirements of this Class II Modification will be in accordance with the provisions of</p>		
CERTIFICATION		
We, the undersigned certify that within the respective areas of our responsibility this modification contains no known flight or ground safety hazards which can be attributed to the modification design.		
AERONAUTICAL ENGINEER	ELECTRICAL ENGINEER	MODIFICATION ENGINEER

MODIFICATION INSTRUCTIONS AND CERTIFICATION		Page 2 of 3 pages
MODIFICATION NUMBER M0170-5	AIRCRAFT IDENTIFICATION F-4D #66-8698	PROJECT NO. 69DFV008
<p>MODIFICATION INSTRUCTIONS AND GENERAL INFORMATION (Use additional sheets as required) Technical Order No. 1-1A-14 and Military Specification MIL-W-5088C unless deviation is authorized by action of the Configuration Control Board.</p> <p>3. Upon completion of this installation and a determination that the installed system is operational and safe for flight, the System Engineer will sign-off the modification on the AFGC Form 15C.</p> <p>4. At the time that the Class II Modification is signed off, the ADMP-31 Dock Chief will provide ADTVE-33 with a copy of the Class II Mod Package and a set of drawings marked to show any deviations that occurred during the physical installation in the aircraft. The information should include weights and station locations that were to be established at the time of installation.</p> <p>5. <u>INSTALLATION NOTES:</u> None</p> <p>6. <u>MODIFICATION INSTRUCTIONS:</u> None</p> <p>7. <u>AIRBORNE OPERATIONAL CHECKOUT:</u> None Required</p> <p>8. <u>FLIGHT LIMITATIONS:</u> a. Normal speed and "G" limits for the MK-82 bomb with low drag fin as published in T.O. IF-4C-1 are recommended as applicable for this Class II Modification. Para 10 this Mod must be complied with.</p> <p>b. We recommend no ejection cartridge be installed in the TER-9 position where the instrumented MK-82 bomb is being carried. When the latter is carried on the low bomb rack of the TER (i.e. position 1), we recommend no ejection cartridge be installed in any of the TER bomb rack locations (i.e. positions 1, 2, and 3). The above recommendations should prevent inadvertent release of the instrumented bomb or inadvertent release of standard bombs out of safe sequence.</p> <p>c. Emergency jettison of the TER with stores attached may be accomplished as specified in T.O. IF-4C-1.</p> <p>d. With the modified ejector racks on the TER, only MK-82 bombs are permissible on the modified TER.</p> <p>e. Reference. At the pilot's discretion, the opposite inboard pylon station may have stores uploaded to provide more symmetrical loading of the aircraft.</p> <p>9. <u>SECURITY CLASSIFICATION (of Equipment or Mod Attachments):</u> UNCLASSIFIED</p> <p>10. SPECIAL WEIGHT AND BALANCE DATA: a. It shall be verified that the instrumented bomb with low drag fin has the following characteristics prior to flight: Weight: 450 lbs min., 530 lbs max. C.G: 7" AFT of FWD lug (+ one inch) I pitch = I yaw = Mass Moment of Inertia - 42.3 slug - (Ft)² (+ 2.1 slug - Ft)²</p>		
CERTIFICATION		
We, the undersigned certify that within the respective areas of our responsibility this modification contains no known flight or ground safety hazards which can be attributed to the modification design.		
AERONAUTICAL ENGINEER	ELECTRICAL ENGINEER	MODIFICATION ENGINEER

MODIFICATION INSTRUCTIONS AND CERTIFICATION		Page <u>3</u> of <u>3</u> pages
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MODIFICATION NUMBER MDR70-5	AIRCRAFT IDENTIFICATION F-4D #66-0698	PROJECT NO. 69DFV008
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MODIFICATION INSTRUCTIONS AND GENERAL INFORMATION (Use additional sheets as required)

11. **SPECIAL INSTRUCTIONS:** a. Bomb drops from the TER are to be scheduled at the fuze test facility. During these tests the Pre-Flight and Post-Flight procedures as well as the up-loading check list will be verified and reproduced in final format.
- b. The Post Flight procedure must include cleaning of the TER-9 (Modified) bomb rack guns and the installed pressure transducers. Reference ToO.11B29-3-35-2 for the ejection gun cleaning instructions.

CERTIFICATION

We, the undersigned certify that within the respective areas of our responsibility this modification contains no known flight or ground safety hazards which can be attributed to the modification design.

AERONAUTICAL ENGINEER <i>[Signature]</i>	ELECTRICAL ENGINEER <i>[Signature]</i>	MODIFICATION ENGINEER <i>[Signature]</i>
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MODIFICATION INSTRUCTIONS AND CERTIFICATION

Page 1 of 1 page

MODIFICATION NUMBER
10270-5

AIRCRAFT IDENTIFICATION
F-4D #66-8698

PROJECT NO.
69DFV008

MODIFICATION INSTRUCTIONS AND GENERAL INFORMATION (Use additional sheets as required)

POWER-LOADING DATA, INSTRUMENTATION—D.C. ANALYSIS

D.C. BUS	TOTAL AMPS	D C VOLTAGE
1. MAIN _____	_____	28VDC ENGINE ALTERNATOR _____
2. NON-ESSENTIAL _____	_____	28VDC ENGINE GENERATOR _____
3. TERTIARY _____	_____	28VDC TRANS. RECT. <u>X</u>
4. SECONDARY <u>X</u>	6.8	28VDC AUX. POWER POD _____

EQUIPMENT		NO OF UNITS	AMPERES
1	Signal Conditioning	1	0.4
2	Tape Recorder	1	5.4
3	M-9 Camera	1	1.0
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
TOTAL AMPERES			6.8

MODIFICATION INSTRUCTIONS AND CERTIFICATION Page 1 of 1 pages

MODIFICATION NUMBER: **M0170-5** AIRCRAFT IDENTIFICATION: **F-4D #66-8698** PROJECT NO.: **69DFV008**

MODIFICATION INSTRUCTIONS AND GENERAL INFORMATION (Use additional sheets as required)

POWER-LOADING DATA INSTRUMENTATION - A.C. ANALYSIS

ELECTRICAL REQUIREMENTS PER UNIT
115/200V, 3 ϕ 400Hz, ENGINE GEN.

EQUIPMENT	UNITS	VA	WATTS				VARS				POWER FACTOR
			A ϕ	B ϕ	C ϕ	TOTAL	A ϕ	B ϕ	C ϕ	TOTAL	
Time Code Generator	1	100			100	100					1
Regulated Power Supply	1	15			15	15					1
TOTALS						115					1

APPENDIX D
TER-9 FLIGHT DATA

DATE 19 MAY 71 MISSION 22C BOMB ID 122 BOMB WEIGHT 498.25 LBS

EJECTOR MOMENT ARM 3.375 INCHES
TIME OF EJECTOR STROKE .064 SEC
A/C ANGLE OF ATTACK AT RELEASE 2.911 DEG
A/C PITCH ANGLE AT RELEASE -1.200 DEG
A/C ROLL ANGLE AT RELEASE -.593 DEG
RACK EJECTION ANGLE 0.000 DEG

FEET
FEET

TIME DELAY
MILLISECONDS

HR MIN SEC
*** *** **
17 18 3.686
17 18 3.698
17 18 3.699
17 18 3.700
17 18 3.699
17 18 3.763
17 18 3.700
*** *** **
***** DEG F
***** DEG F
64.74 DEG F

SEPARATION VELOCITY 7.7 FT/SEC
DISPLACEMENT METHOD 6.3 FT/SEC
PRESSURE METHOD

RELEASE HISTORY
PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

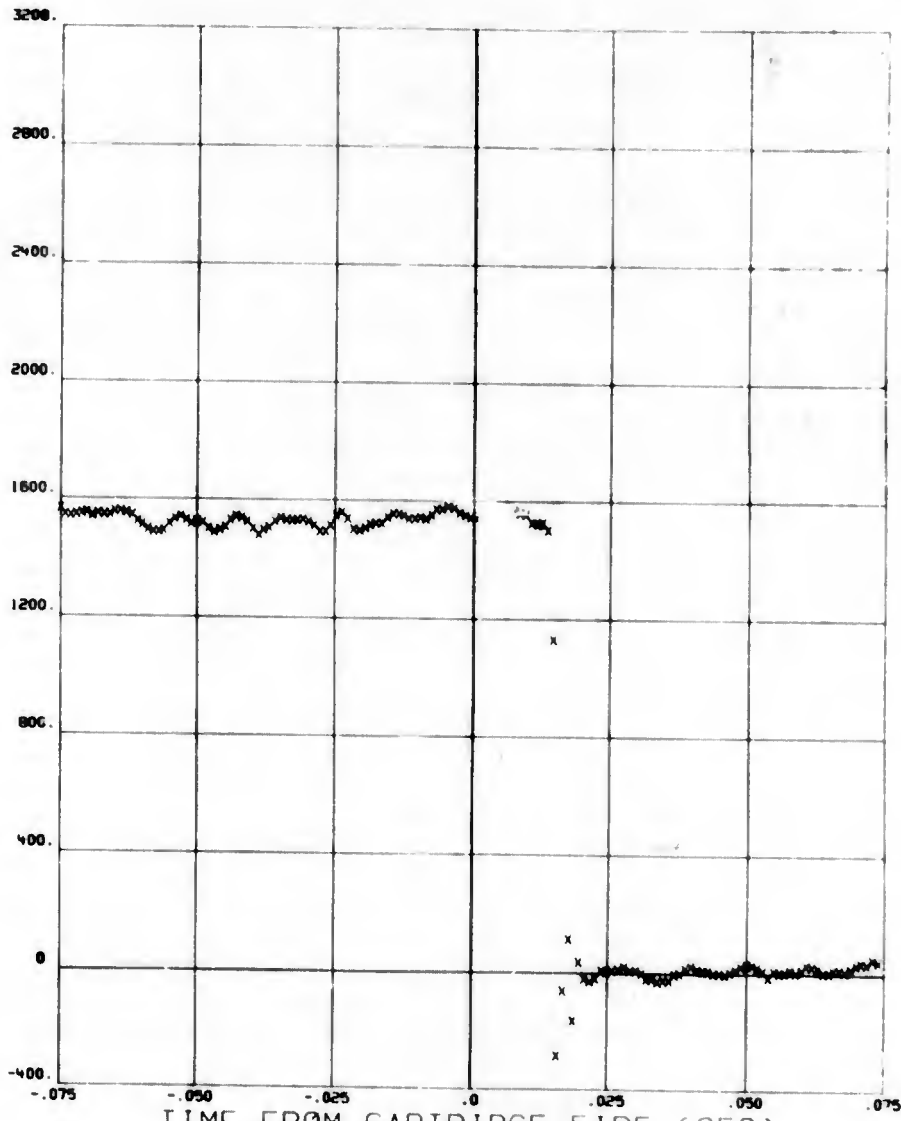
MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

670AG018 19 MAY 71 MSN 22C BOMB

122 RPM

RELATIVE
SWAY
ROLL
TRIPAIN
(LBS)
* = LEFT FWD



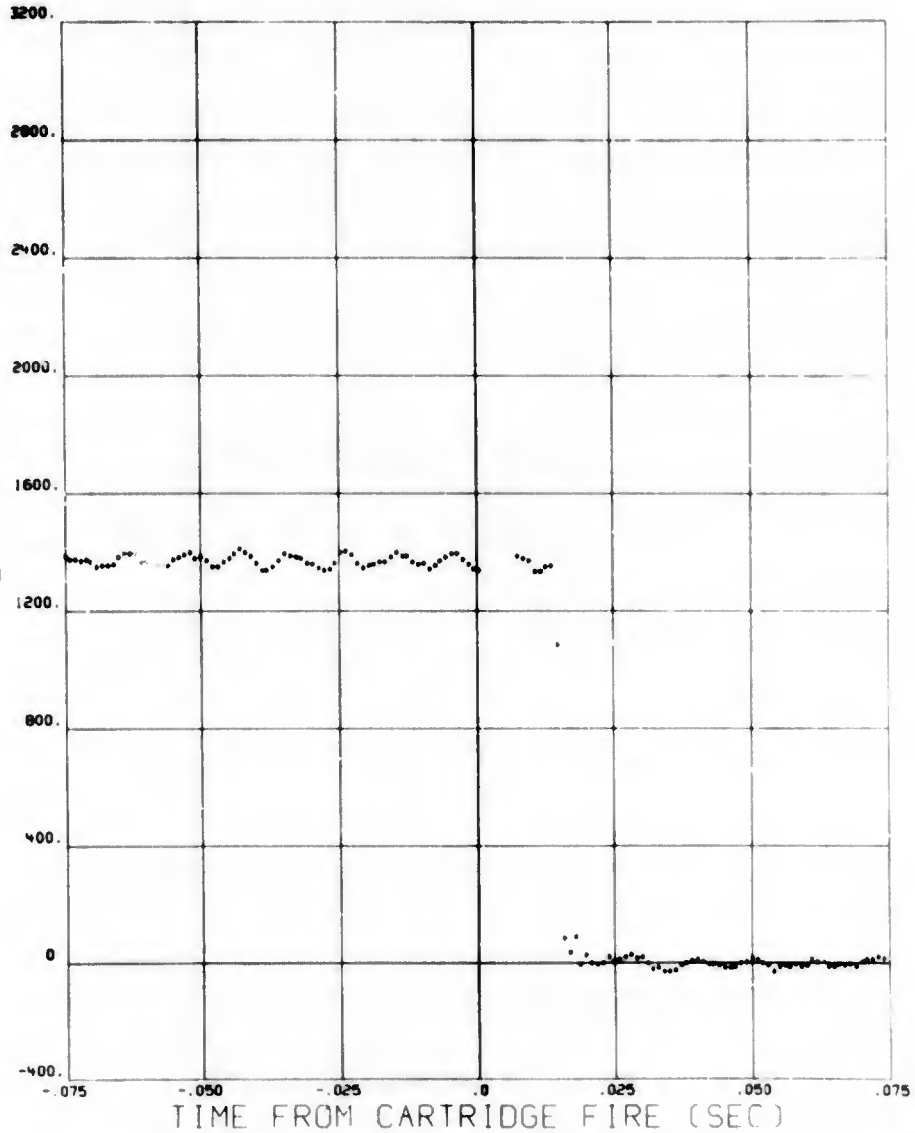
TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY 15X, ADIC

19 04 12 670AG018 19 MAY 71 MSN 22C BOMB

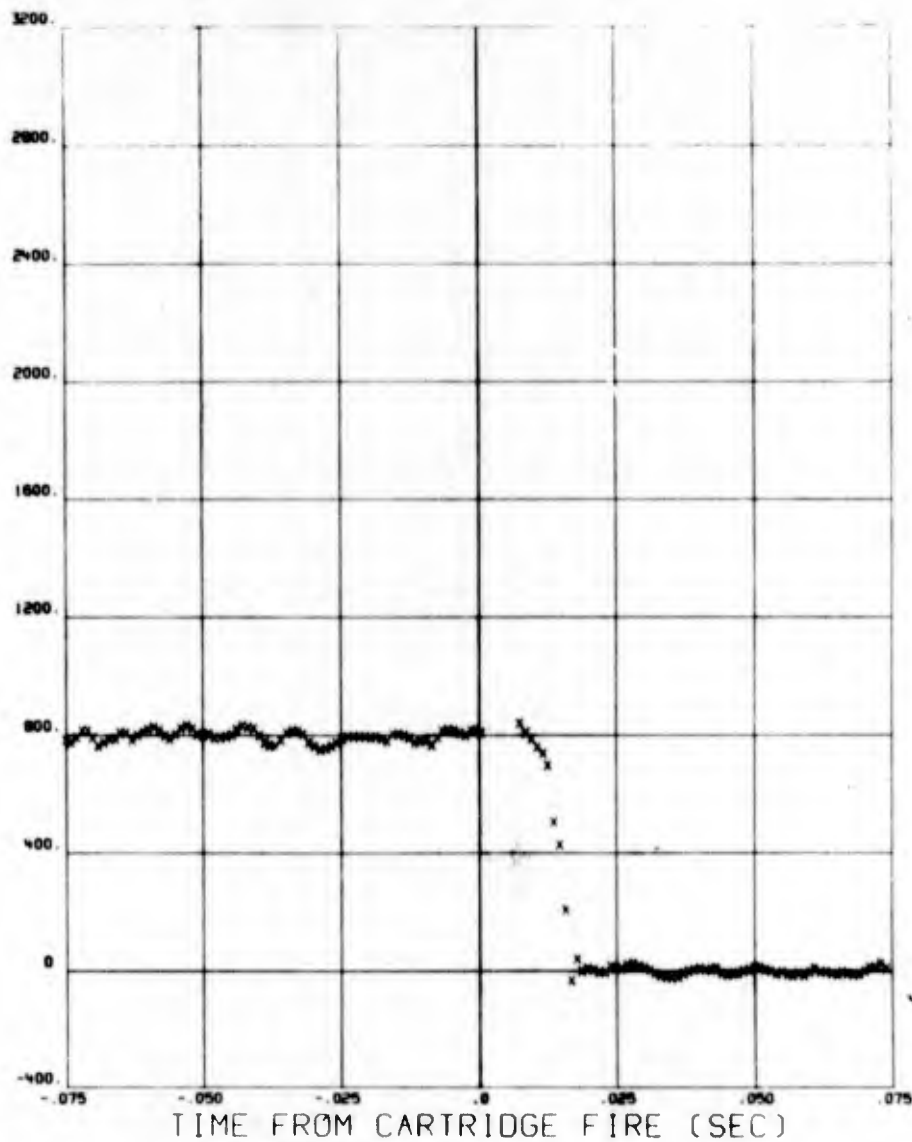
122^{R241} 2 0 7

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
• = RIGHT FWD



... 018 19 MAY 71 MFL 120 BOMB

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT

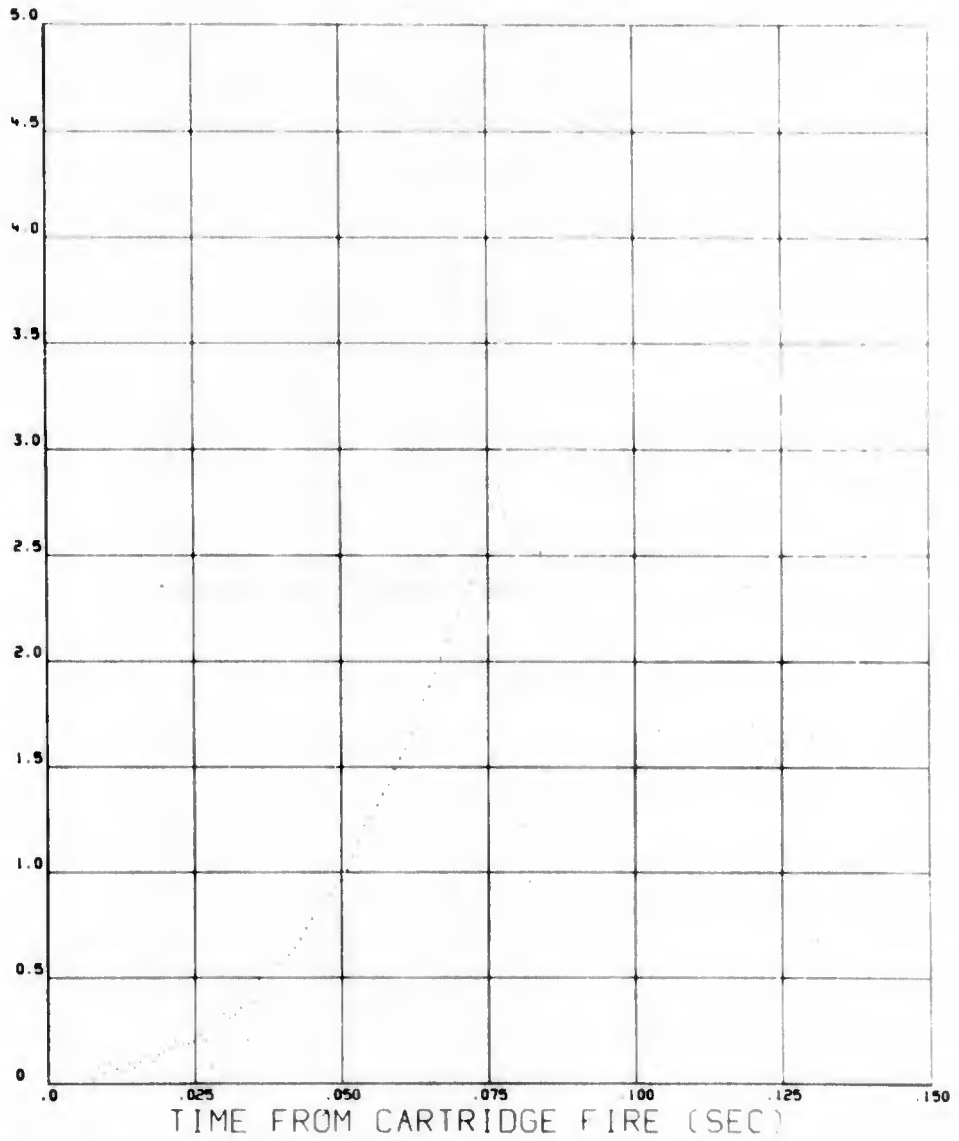


PLOT PREPARED BY TSX, ADTC

19 04 73 670AG018 19 MAY 71 MSN 22C BOMB

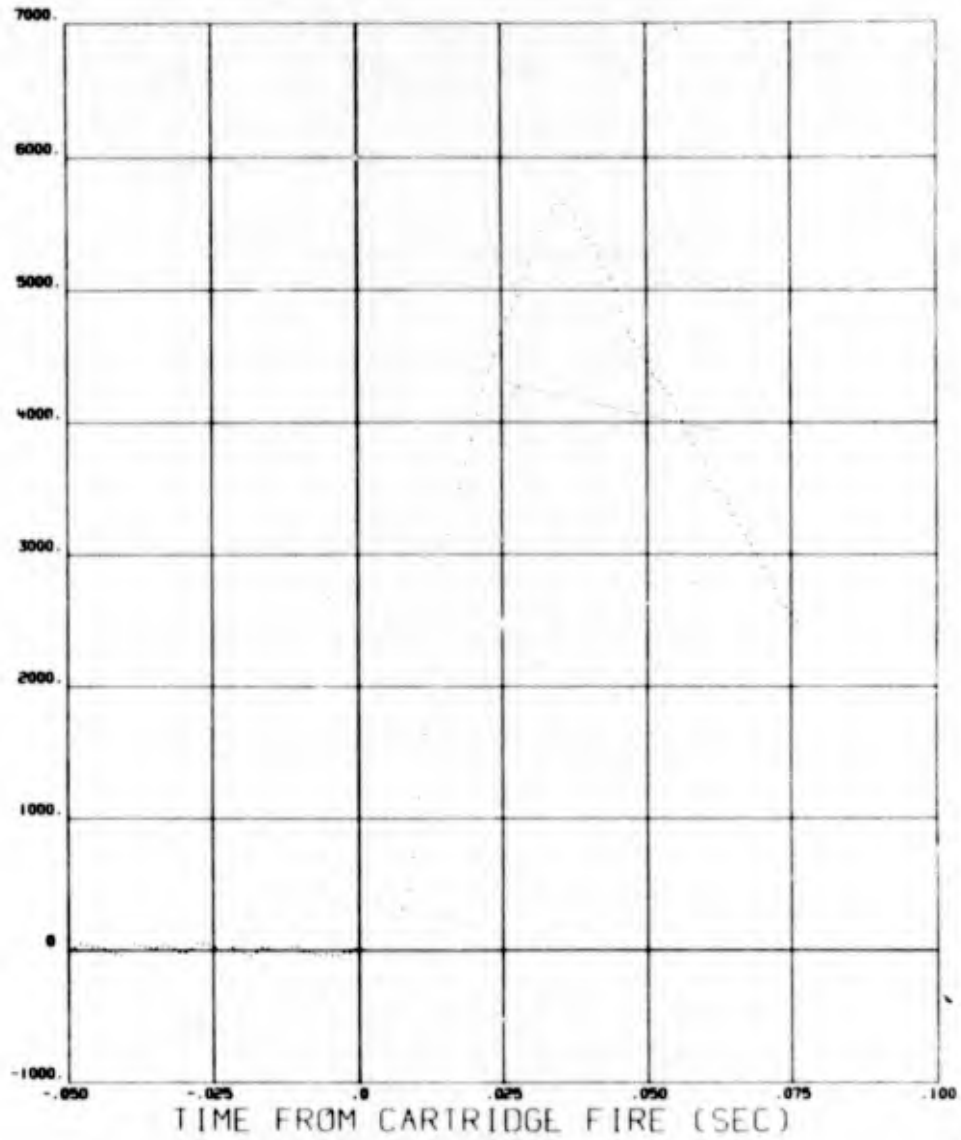
122^{RPM} 7

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY T5X, AOTC

EJECTION
CHAMBER
PRESSURE
(PSI)

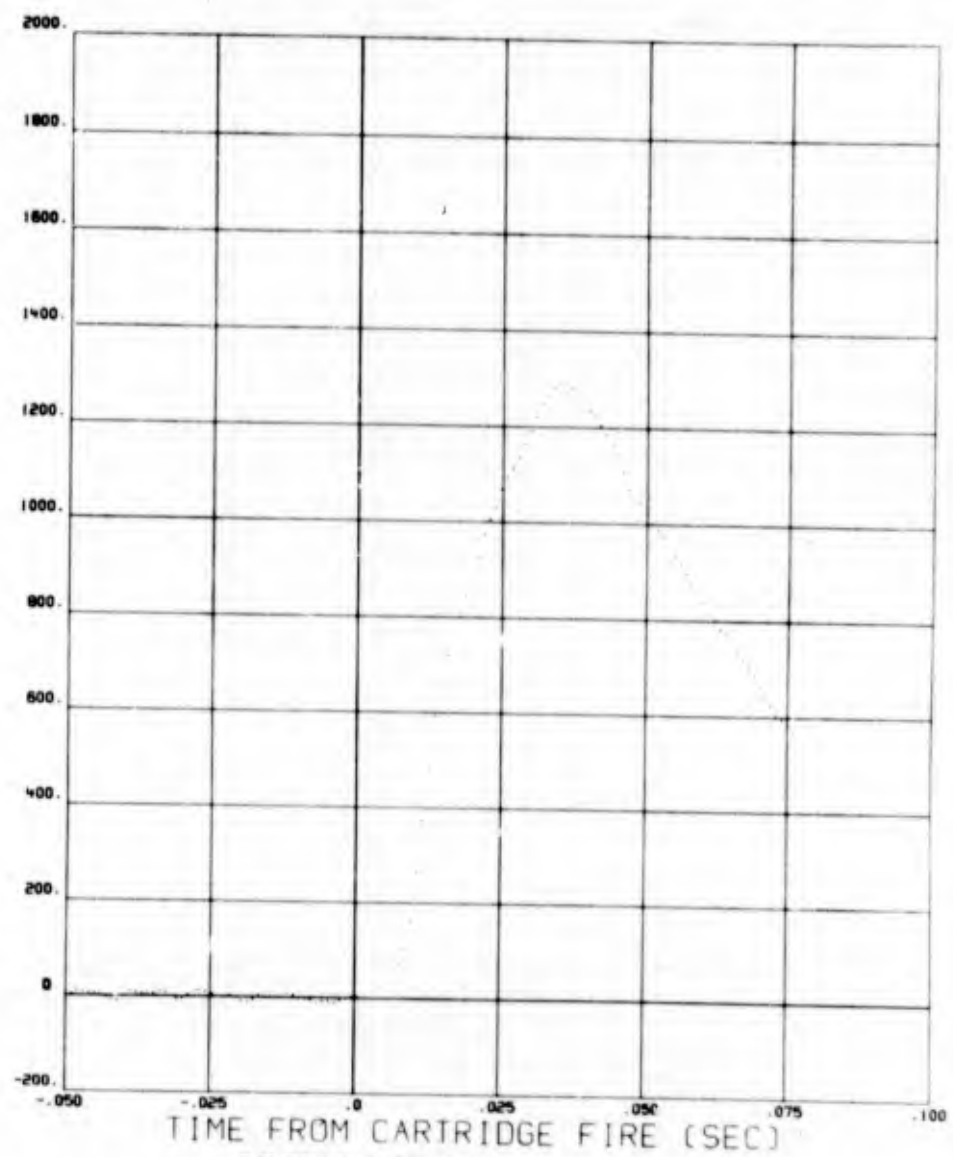


PLOT PREPARED BY 15X. ADTC

19/04/73 670AG018 19 MAY 71 MSN 22C BOMB

122 Rev 9 07

EJECTOR
FOOT
FORCE
(LBS)



DATE 23 JULY 71 MISSION 74C BOMB ID 55 BOMB WEIGHT 503.25 LBS

EJECTOR MOMENT ARM 3.250 INCHES
 TIME OF EJECTOR STROKE .063 SEC
 A/C ANGLE OF ATTACK AT RELEASE 2.313 DEG
 A/C PITCH ANGLE AT RELEASE .920 DEG
 A/C ROLL ANGLE AT RELEASE -12.520 DEG
 RACK EJECTION ANGLE 0.000 DEG

IMPACT RANGE FEET
 DEFLECTION FEET

RELEASE HISTORY
 PICKLE TIME SEC
 CARTRIDGE FIRE *****
 INITIAL LINKAGE MOVEMENT 17 31 29.654
 EJECTOR FOOT (FIRST MOTION) *****
 STORE FIRST MOTION (FORWARD) 17 31 29.674
 STORE FIRST MOTION (AFT) 17 31 29.671
 EJECTOR FOOT FULL EXTENDED 17 31 29.667
 HOOK FIRST MOTION (FORWARD) 17 31 29.737
 HOOK FIRST MOTION (AFT) 17 31 29.671
 HOOK FIRST MOTION (AFT) 17 31 29.666

TIME DELAY
 MILLISECONDS

 0

 20
 17
 13
 83
 17
 12

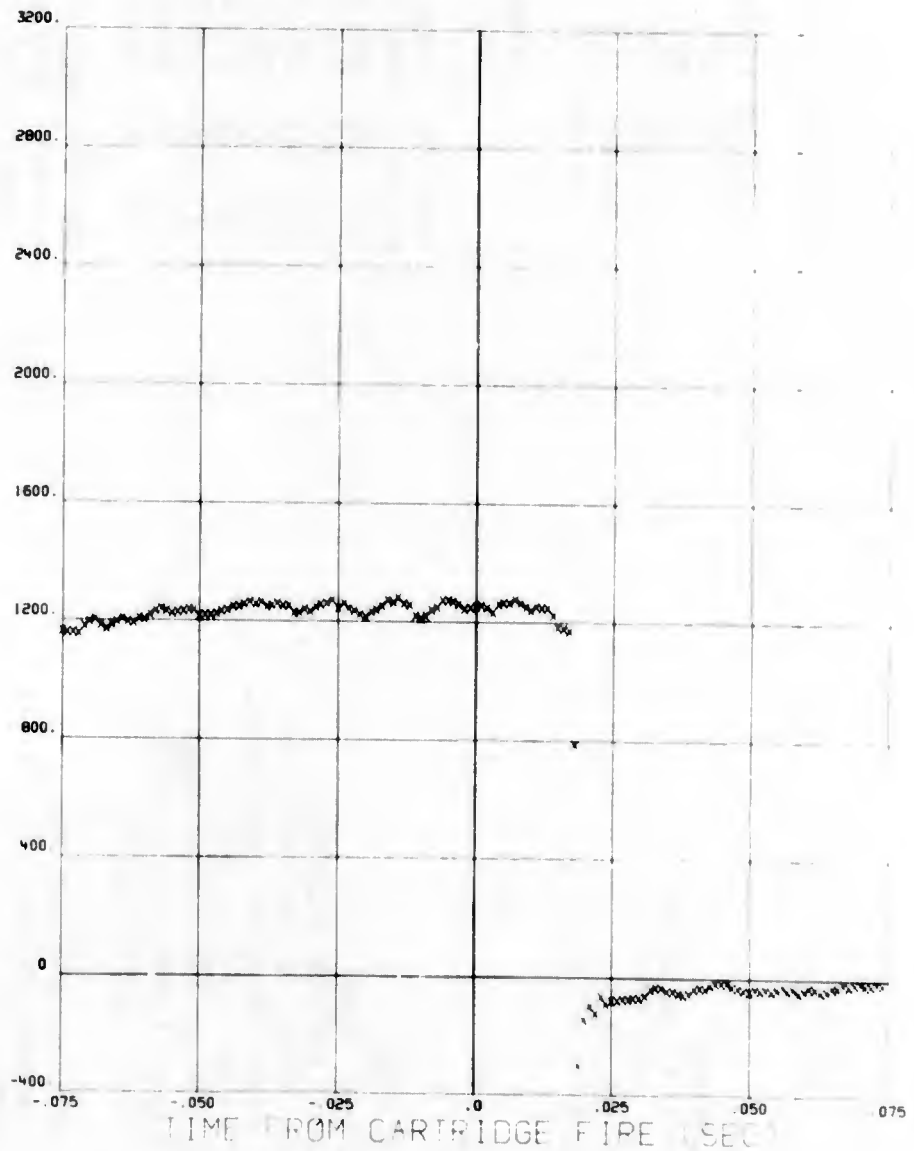
MAXIMUM PRE-FLT GROUND TEMPERATURE ***** DEG F
 MAXIMUM POST-FLT GROUND TEMPERATURE ***** DEG F
 MAXIMUM BREECH AMBIENT TEMPERATURE 100.54 DEG F

SEPARATION VELOCITY 7.1 FT/SEC
 DISPLACEMENT METHOD 6.2 FT/SEC
 PRESSURE METHOD

AGC18 23 JUL 71 M31 340 BOMB

5071

RELATIVE
WAVE
BRACE
STRAIN
(LBS)
X - LEFT FWD

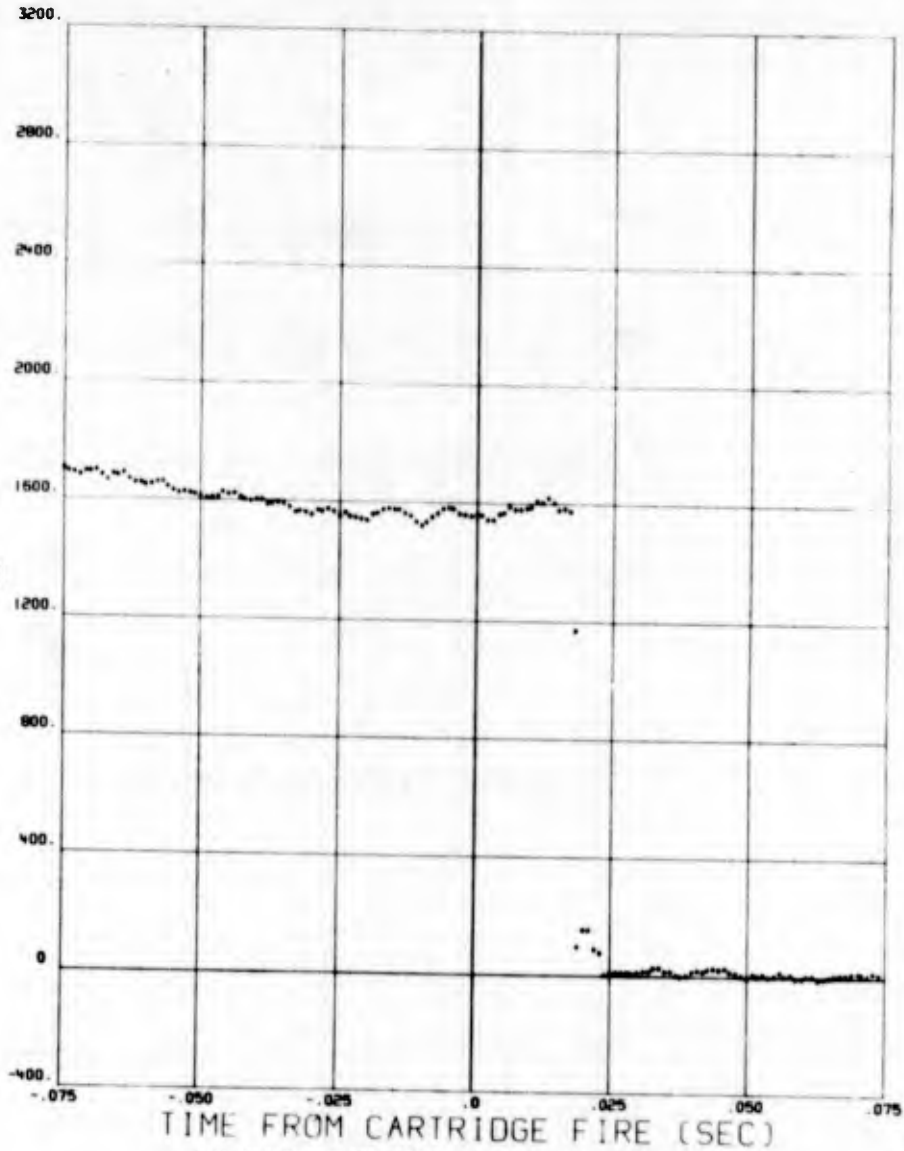


PLT PREPARED BY TSK, ADTC

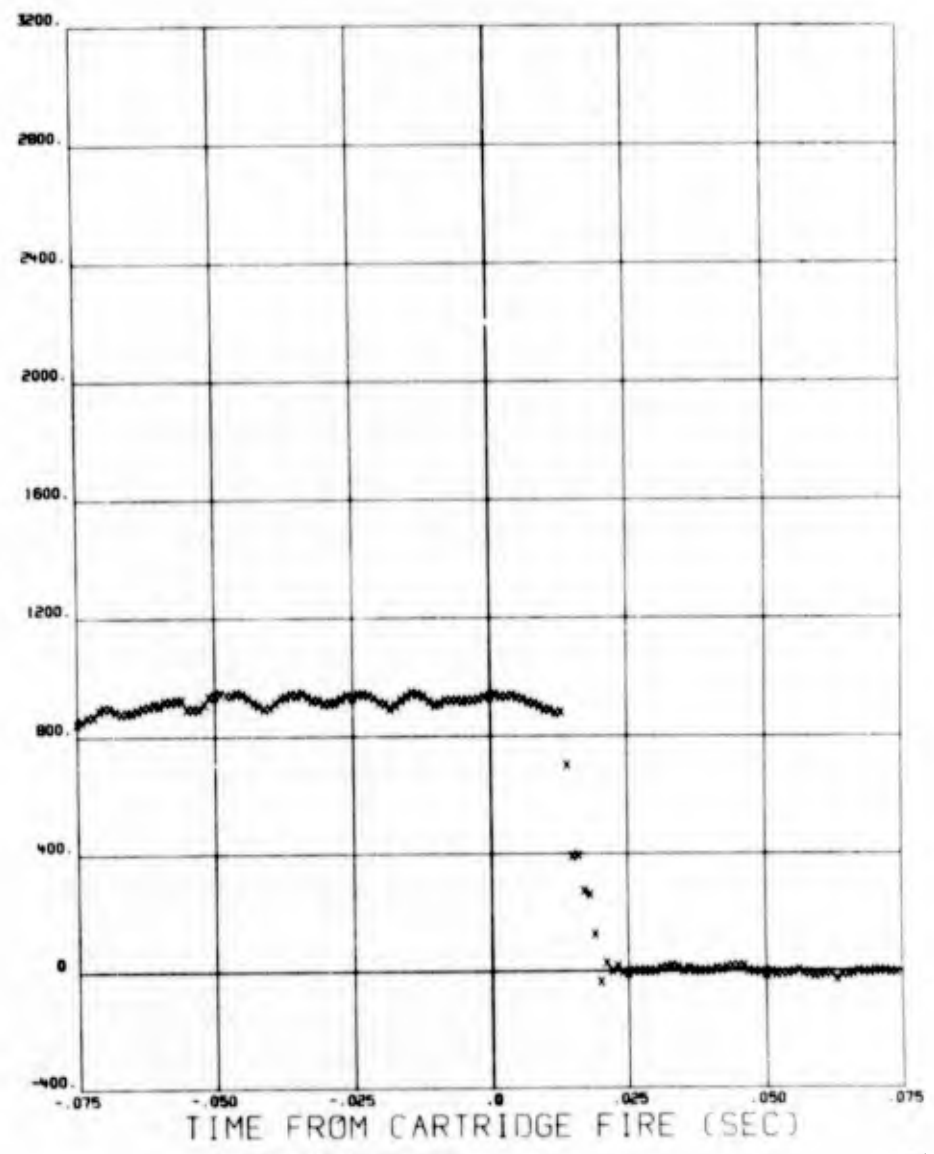
070AG018 23 JULY 71 MSN 340 BOMB

55^{R240} 2 0 1

RIGHT FWD
BRAKE
STRAIN
(LBS)

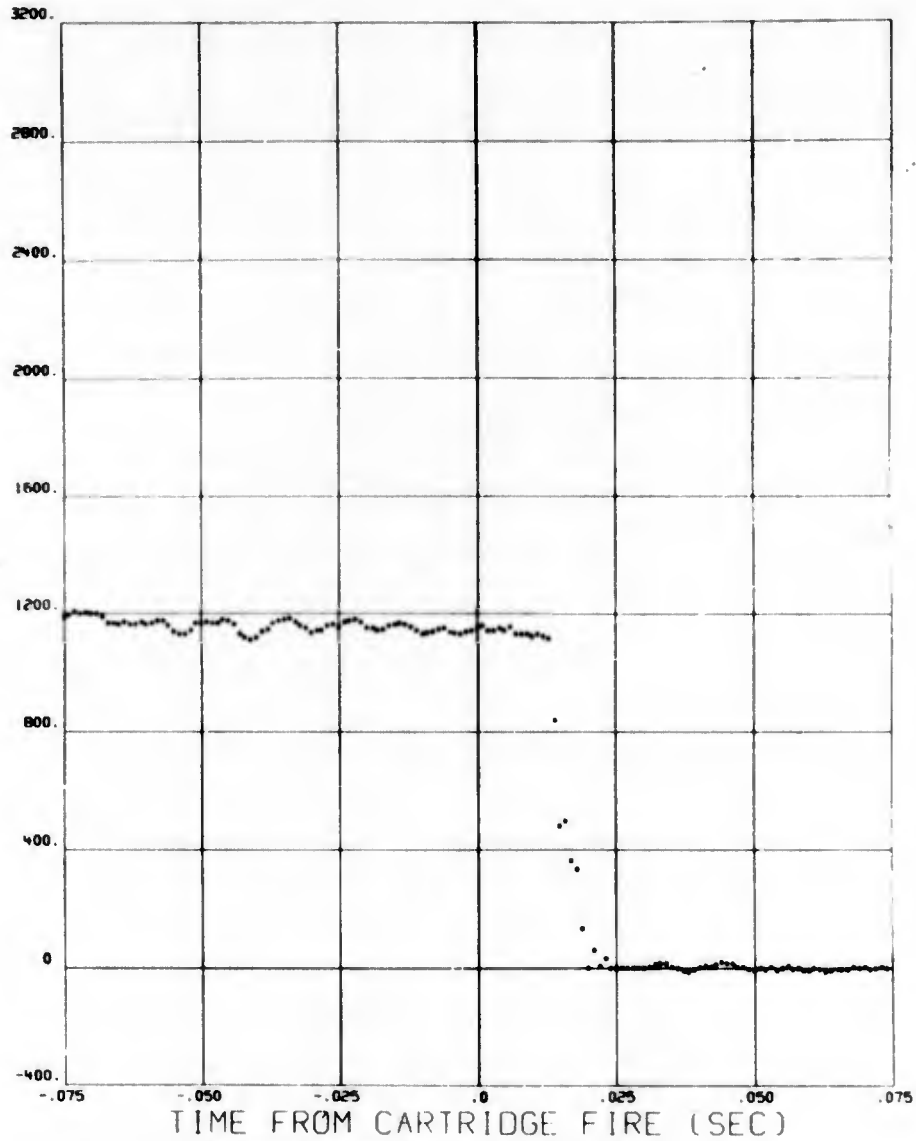


RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



PLOT PREPARED BY ISX, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
• = RIGHT AFT

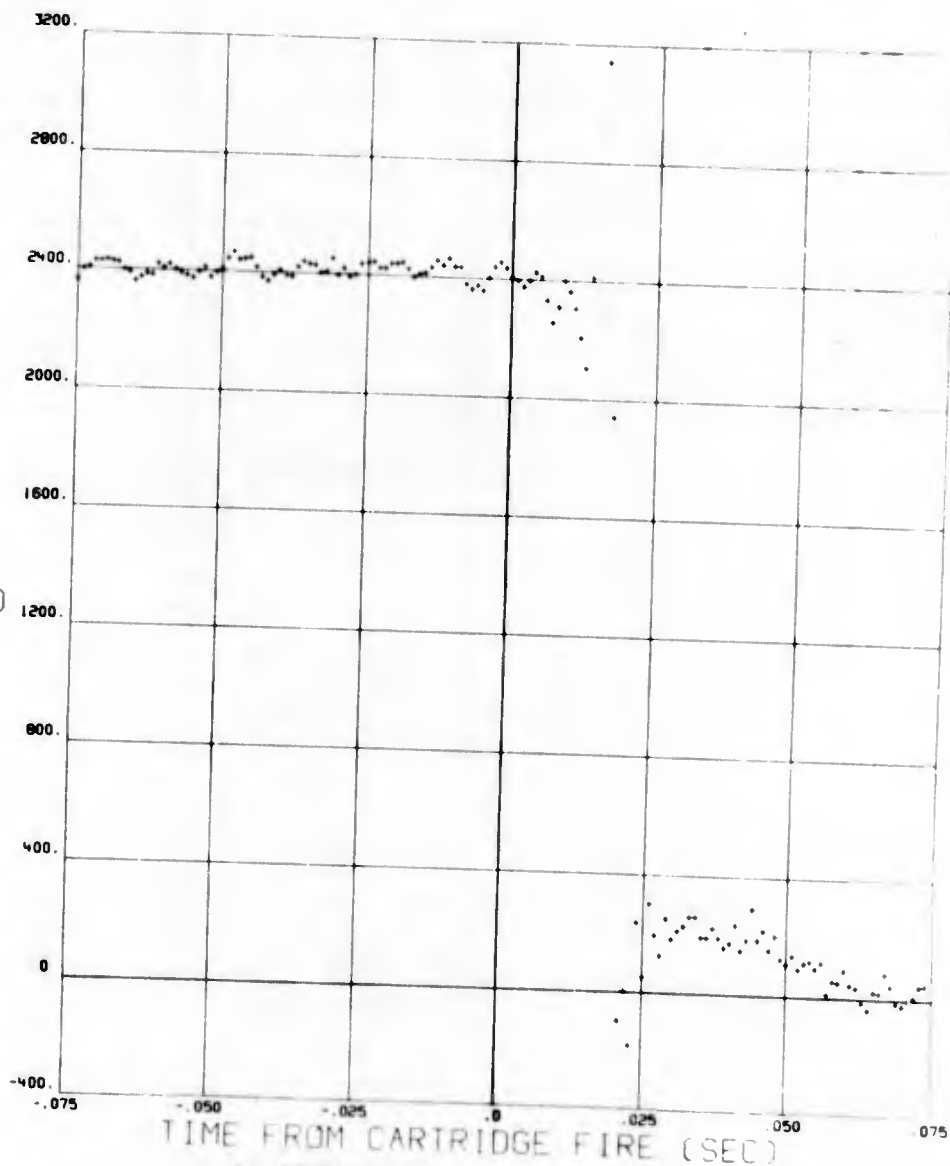


PLOT PREPARED BY TSX, ADTC

19 04 73 670AG018 23 JULY 71 MSN 34C BOMB

55 PAGE 5

RELATIVE
HOOK
REACTION
(LBS)
+ = FORWARD

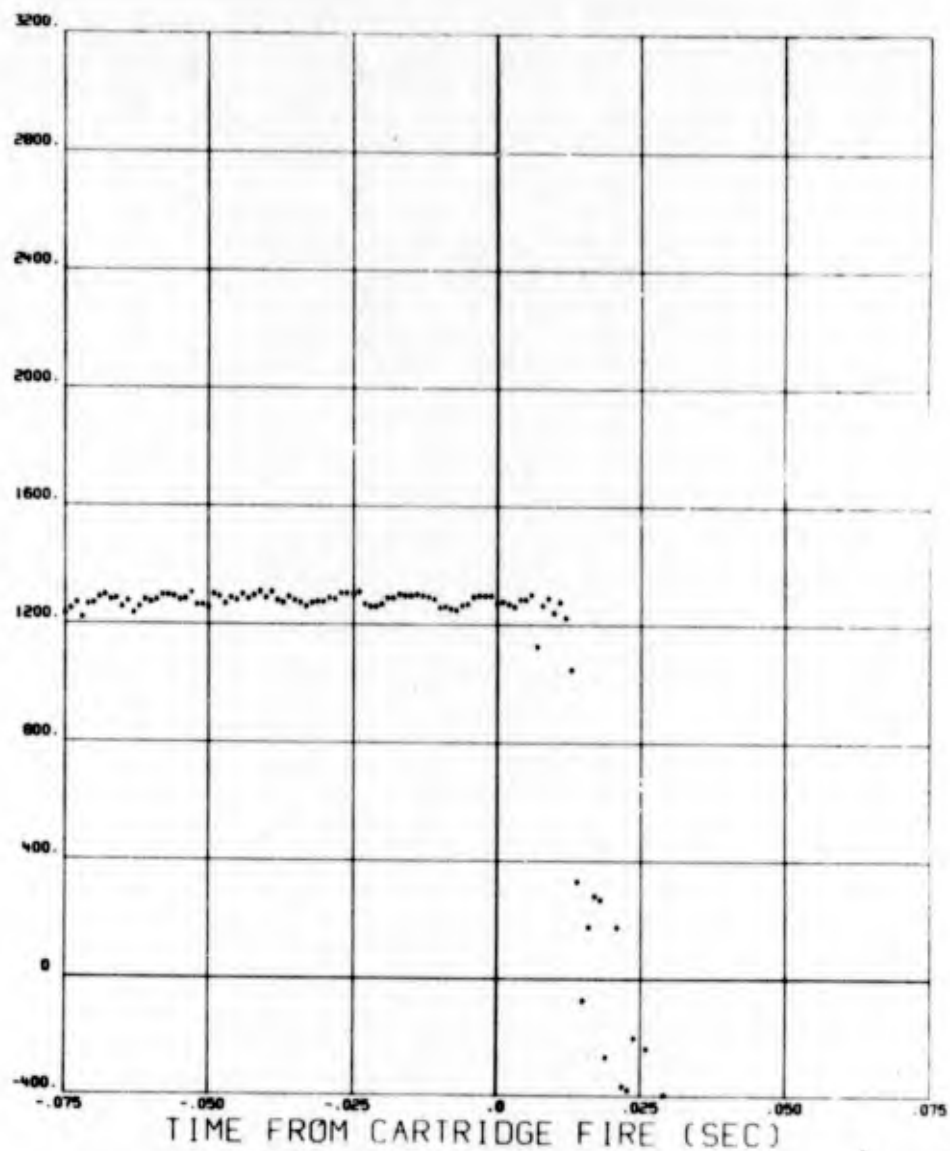


PLOT PREPARED BY TSX, ADIC

018 23 JULY 71 MSN 340 BOMB

55^{R240} 6 07

RELATIVE
HOOK
REACTION
(LBS)
* = AFT

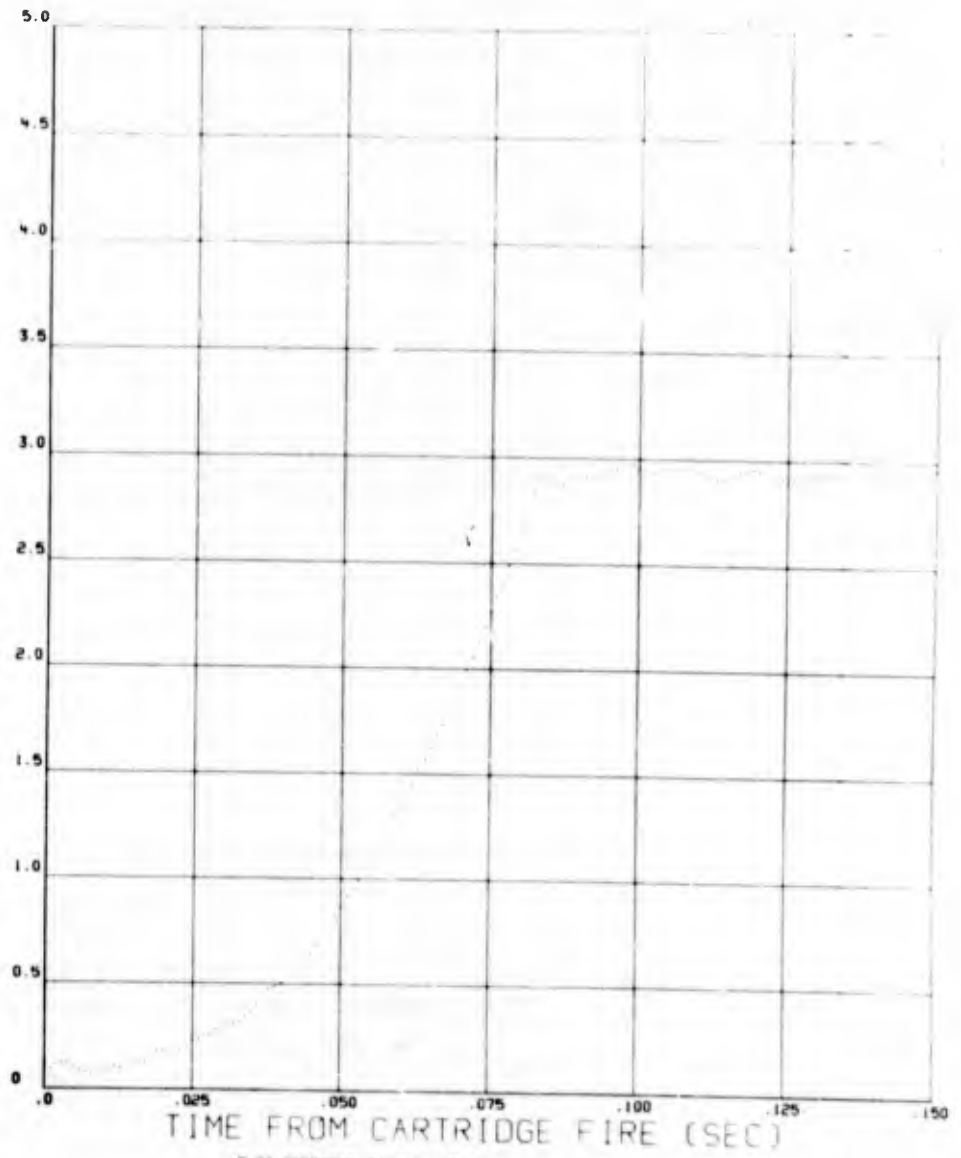


PLOT PREPARED BY TSX, ADTC

19 04 73 670AG018 23 JULY 71 MSN 340 BOMB

55⁶²⁴ 7

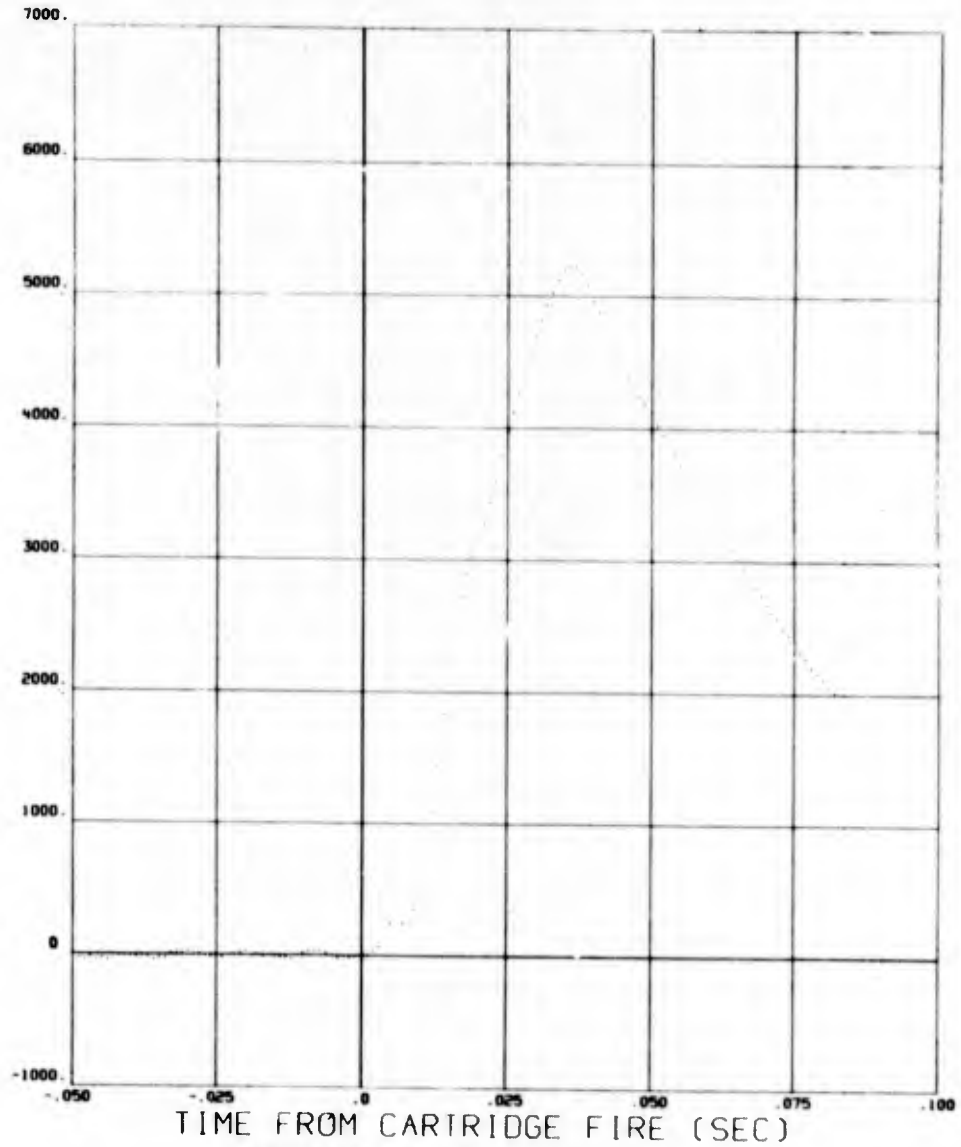
EJECTOR
FOOT
POSITION
(INCHES)



19 04 73 670AG018 23 JULY 71 MSN 34C BOMB

55^{R240} 0 0 7

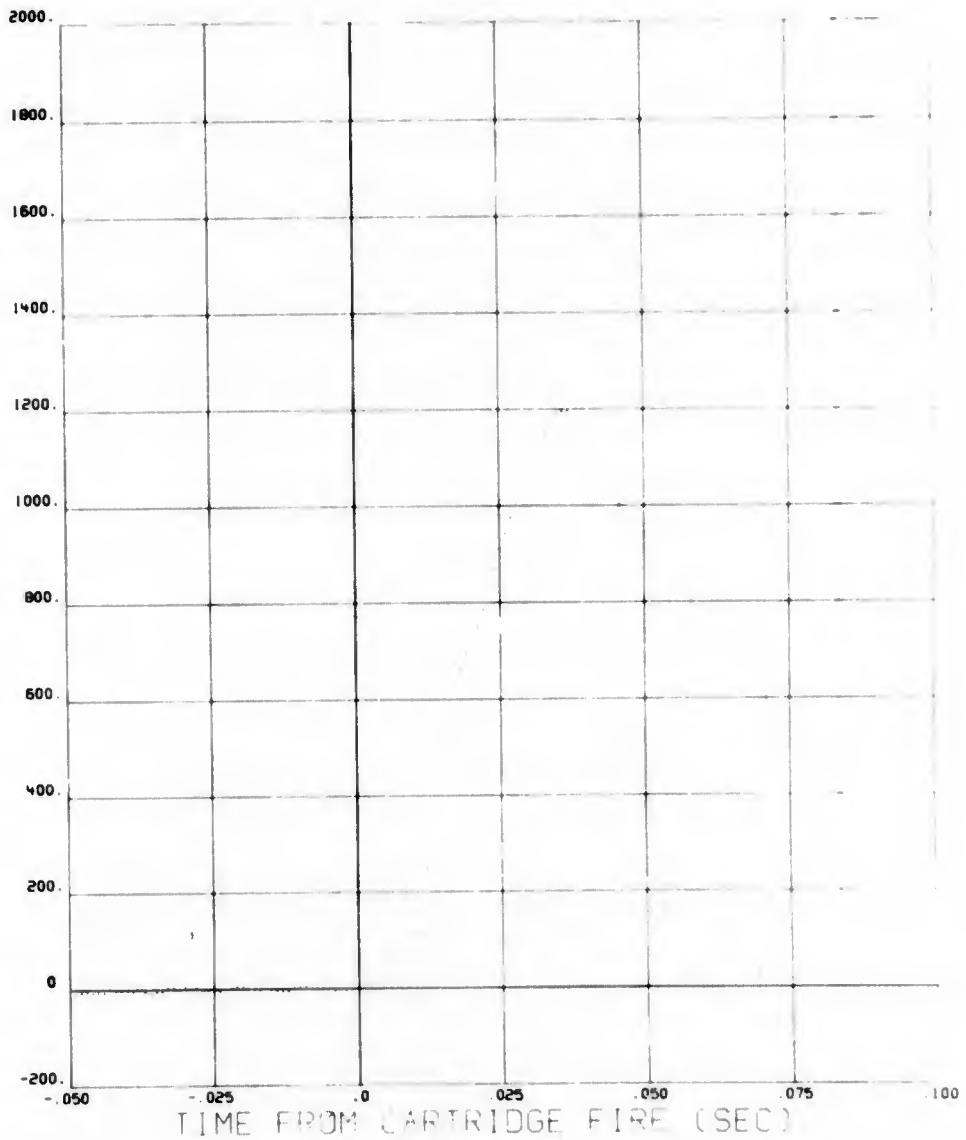
EJECTION
CHAMBER
PRESSURE
(PSI)



1970474 670AG018 23 JULY 71 MSN 340 BOMB

55^{RUND} 9

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY TSK, ADIC

DATE 23 JULY 71 MISSION 34S BOMB ID 119 BOMB WEIGHT 505.50 LBS

EJECTOR MOMENT ARM
3.125 INCHES

TIME OF EJECTOR STROKE
2.250 DEG
A/C ANGLE OF ATTACK AT RELEASE
.960 DEG
A/C PITCH ANGLE AT RELEASE
-4.280 DEG
A/C ROLL ANGLE AT RELEASE
-48.000 DEG
RACK EJECTION ANGLE

IMPACT RANGE DEFLECTION
FEET FEET

RELEASE HISTORY
PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

HR MIN SEC

17 33 35.818
17 33 35.824

17 33 35.833
17 33 35.833
17 33 35.908
17 33 35.833
17 33 35.833

100.09 DEG F
6.5 FT/SEC
4.1 FT/SEC

MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE
SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

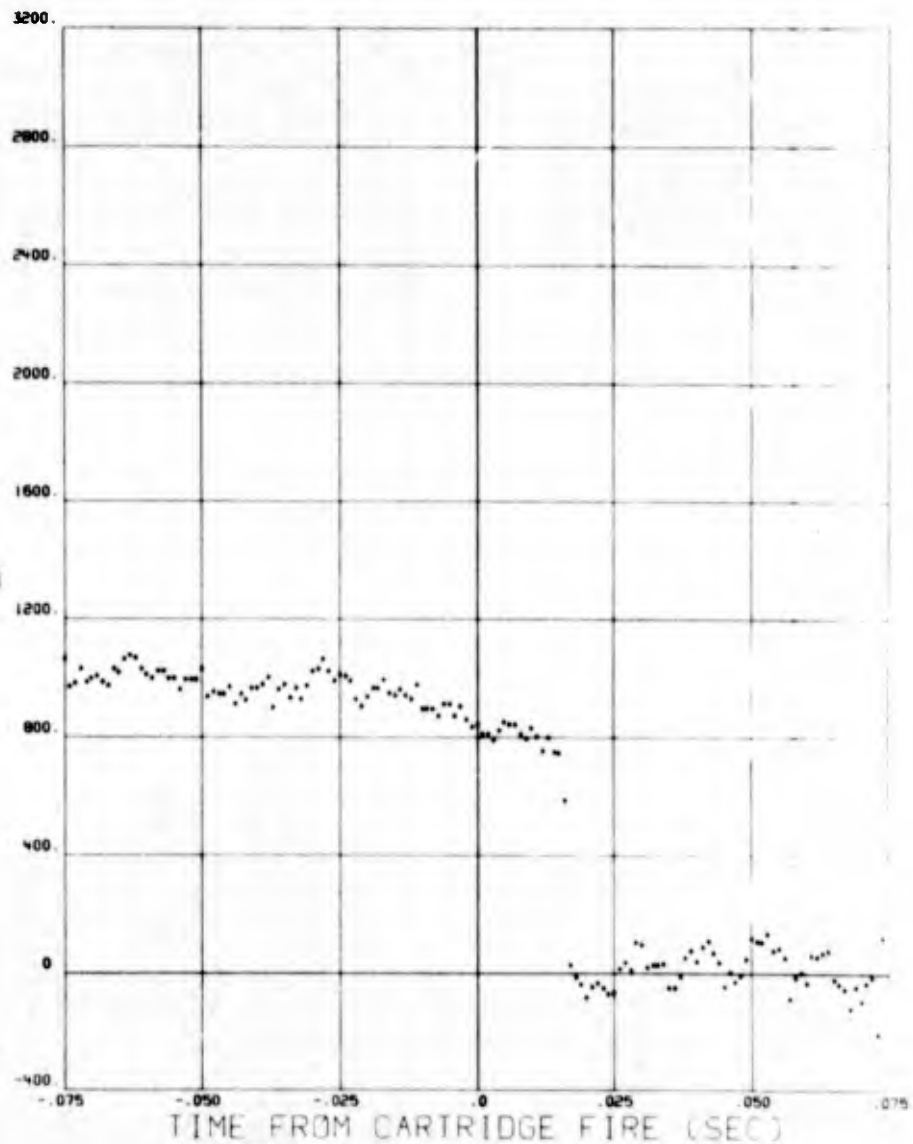
TIME DELAY
MILLISECONDS
0
6

15
15
90
15
15

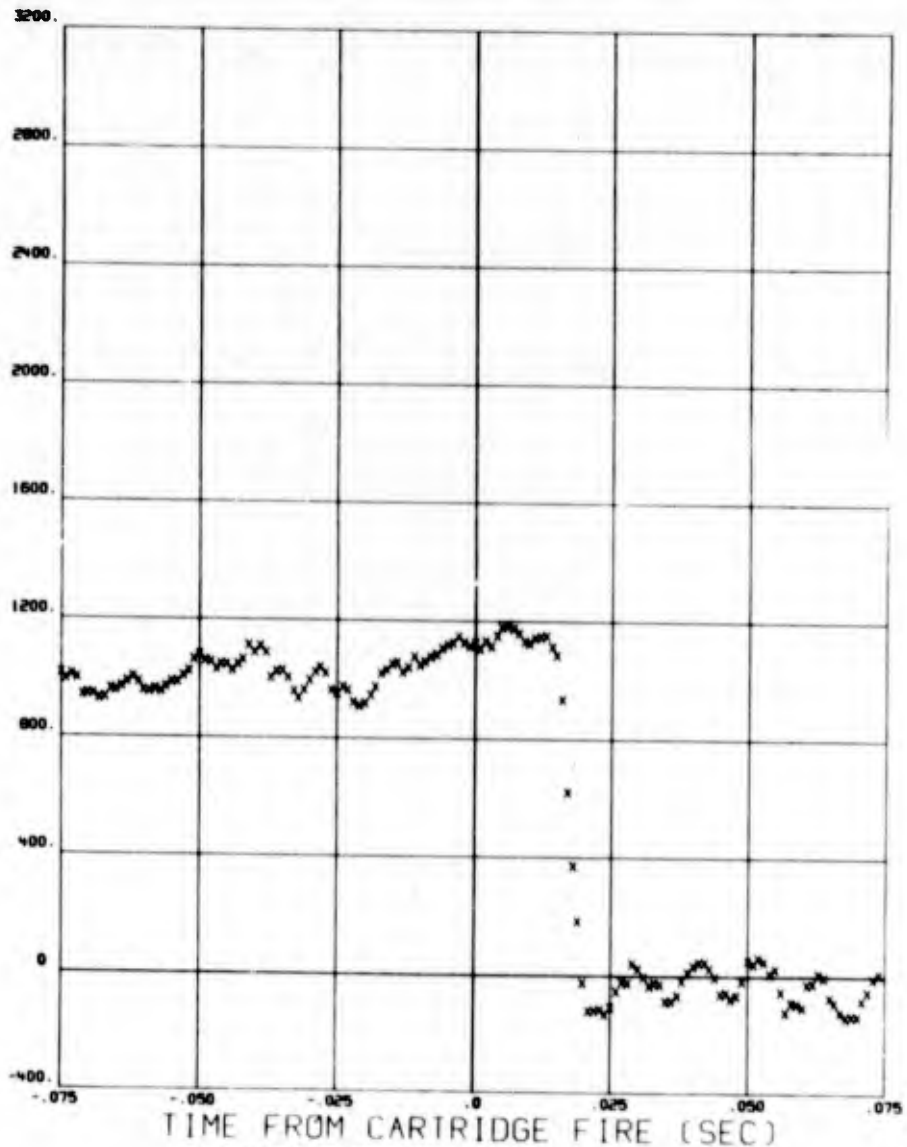
19 04/73 670AG018 23 JULY 71 MSN 34S BOMB

119^{R240} 11 0

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
• RIGHT FWD

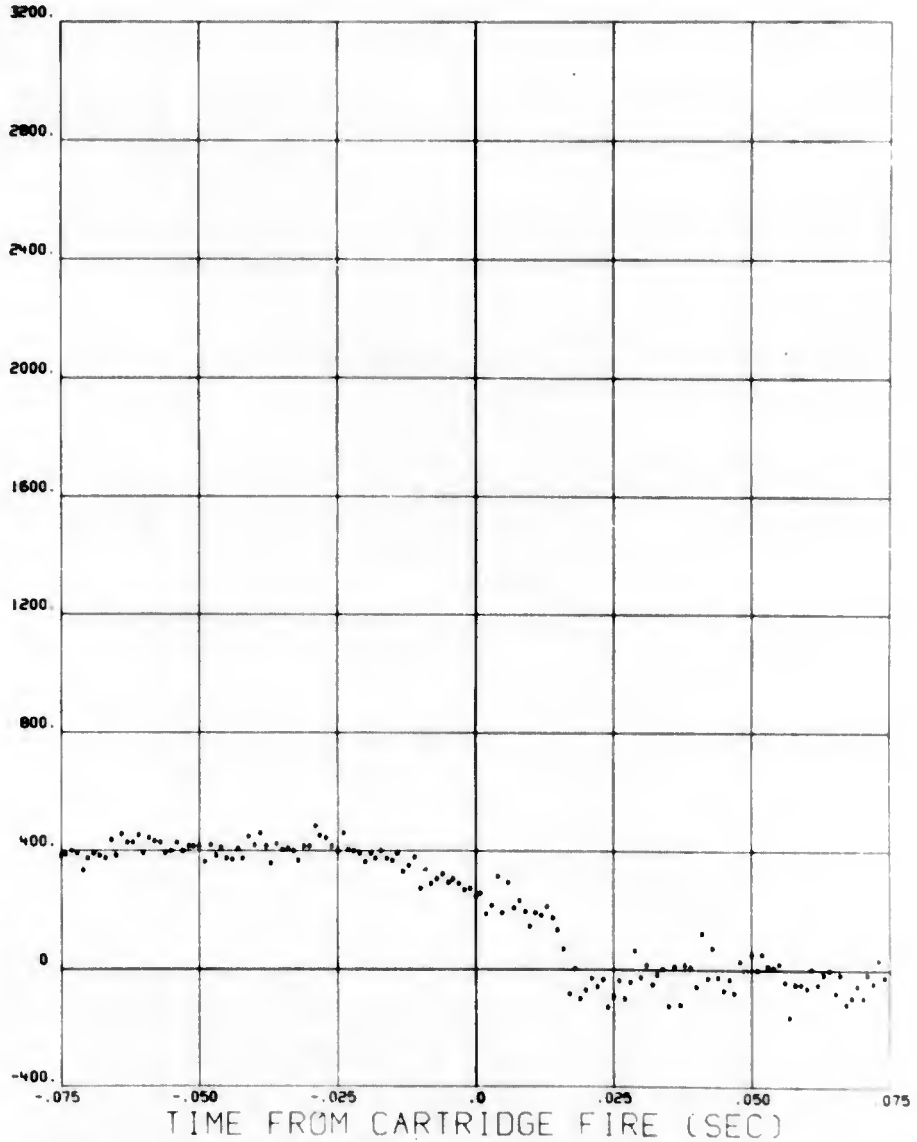


RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



PLOT PREPARED BY 15X, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT

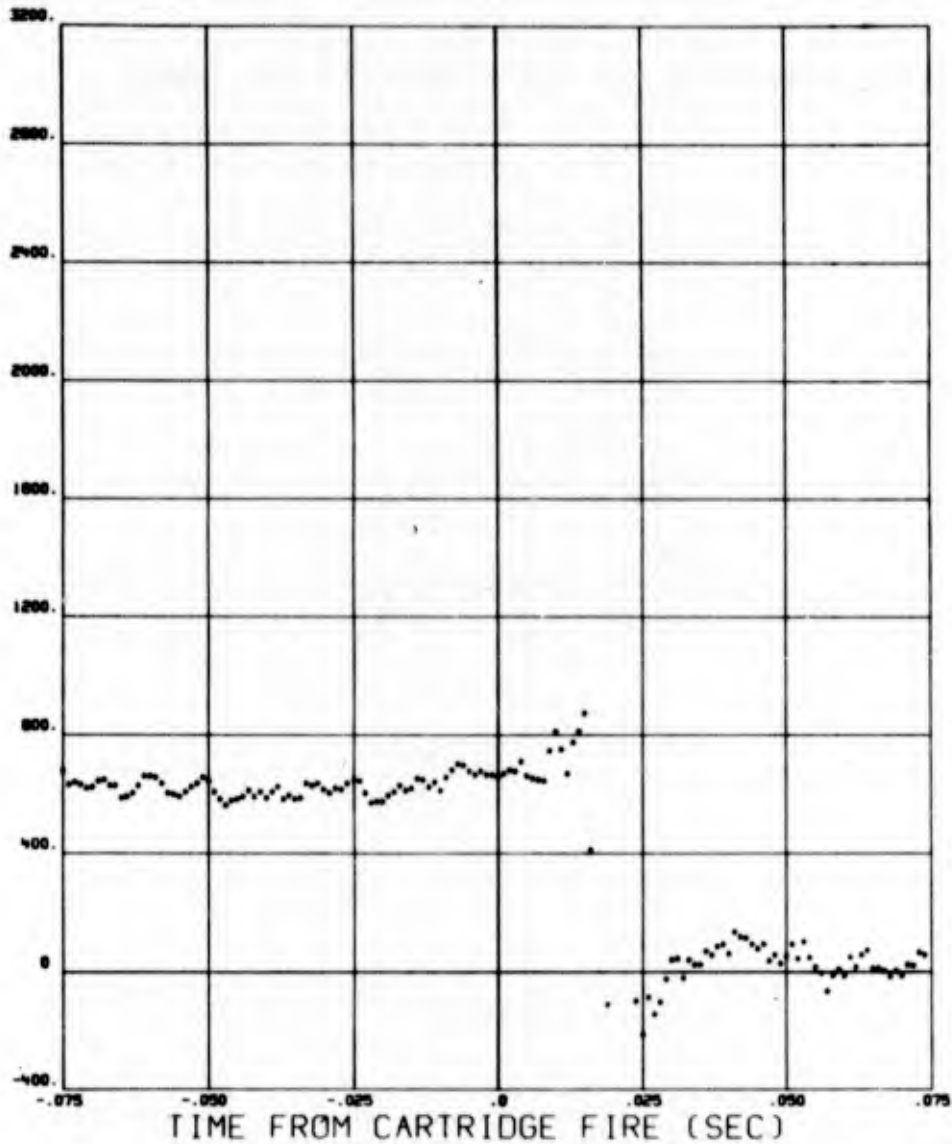


L

19/04/73 670AG018 23 JULY 71 MSN 34S BOMB

119⁰²⁹⁰ 15 07

RELATIVE
HOOK
REACTION
(LBS)
* = AFT

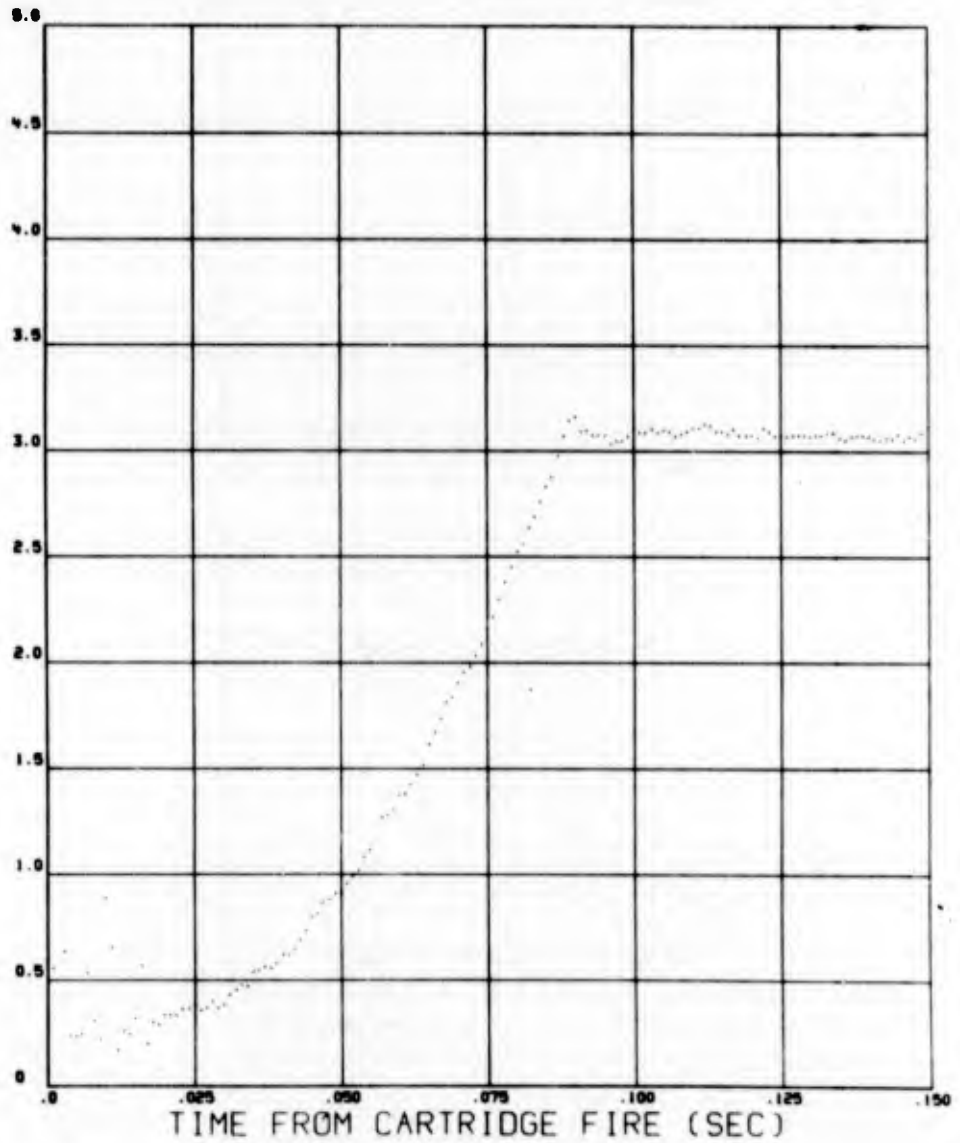


PLOT PREPARED BY TSX, ADTC

19/04/73 670AG018 23 JULY 71 MSN 34S BOMB

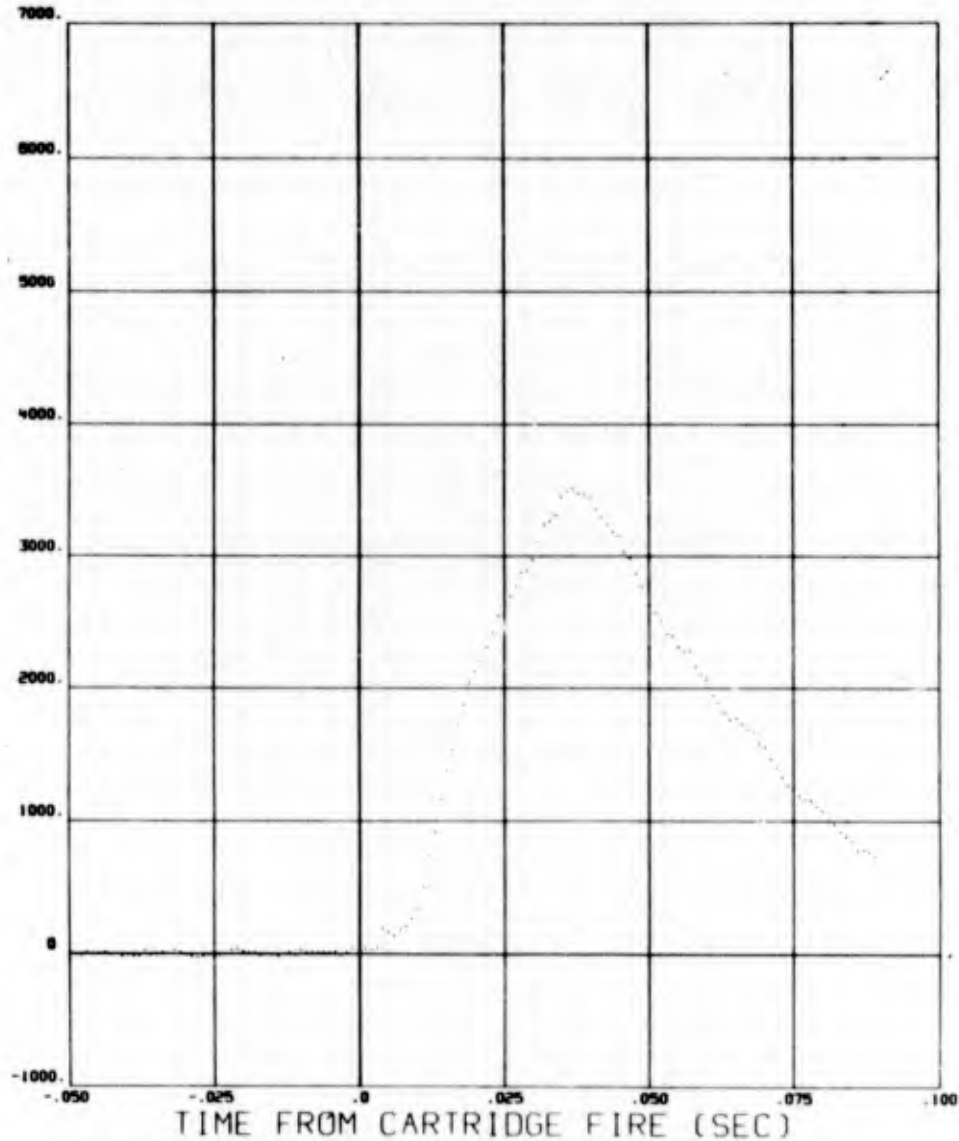
119 ^{REV 10} 07

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY TSX, ADTC

EJECTION
CHAMBER
PRESSURE
(PSI)

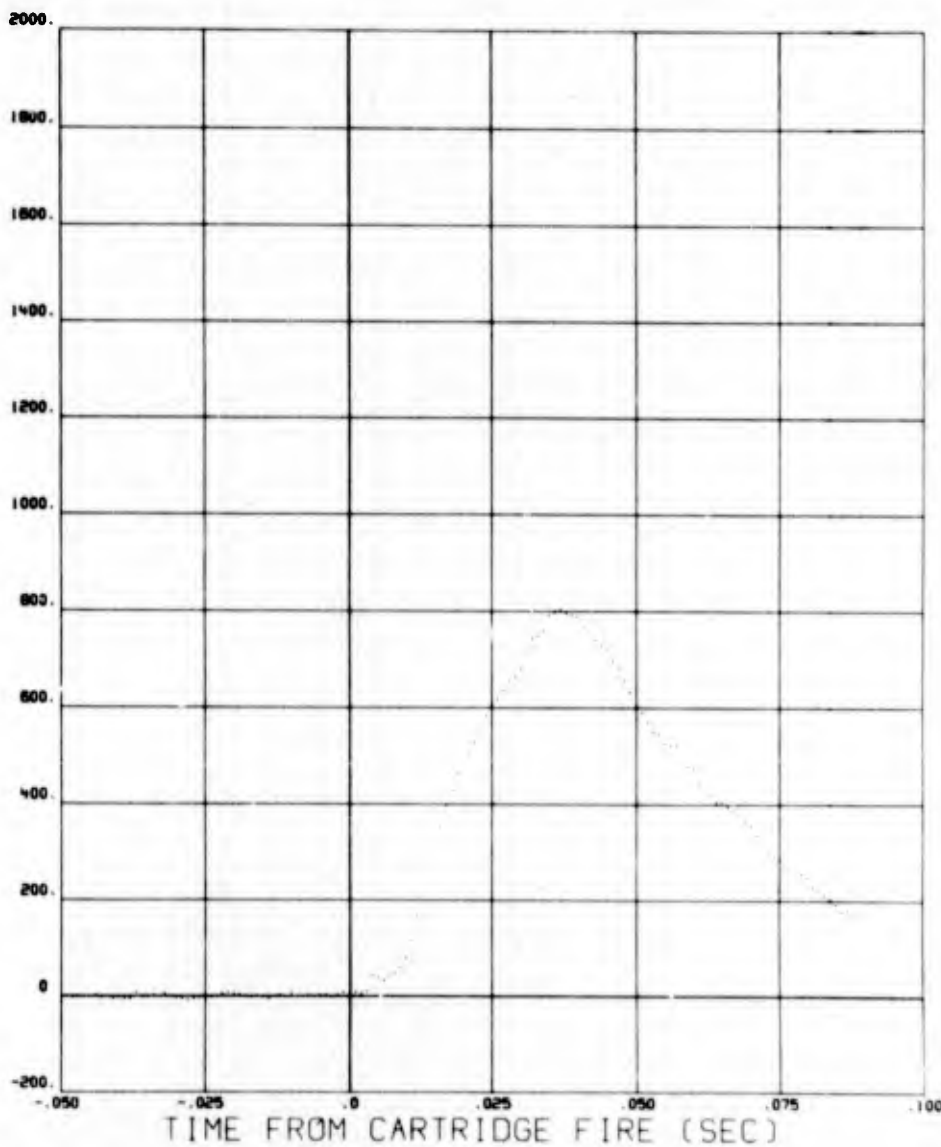


PLOT PREPARED BY 15X, ADTC

19/04/73 670AG018 23 JULY 71 MSN 34S BOMB

119^{R240} 10 0 7

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY TSX, ADTC

DATE 27 JULY 71 MISSION 35C BOMB ID 56 BOMB WEIGHT 511.25 LBS

EJECTOR MOMENT ARM 3.750 INCHES
TIME OF EJECTOR STROKE .069 SEC
A/C ANGLE OF ATTACK AT RELEASE 2.192 DEG
A/C PITCH ANGLE AT RELEASE .350 DEG
A/C ROLL ANGLE AT RELEASE -4.110 DEG
RACK EJECTION ANGLE 0.000 DEG

IMPACT RANGE DEFLECTION FEET FEET

RELEASE HISTORY PICKLE TIME CARTRIDGE FIRE INITIAL LINKAGE MOVEMENT EJECTOR FOOT (FIRST MOTION) STORE FIRST MOTION (FORWARD) EJECTOR FOOT FULL EXTENDED HOOK FIRST MOTION (FORWARD) HOOK FIRST MOTION (AFT)

HR	MIN	SEC	TIME DELAY MILLISECONDS
***	***	*****	0
17	35	56.713	10
17	35	56.723	13
17	35	56.726	17
17	35	56.726	10
17	35	56.723	02
17	35	56.795	11
17	35	56.724	10
17	35	56.723	

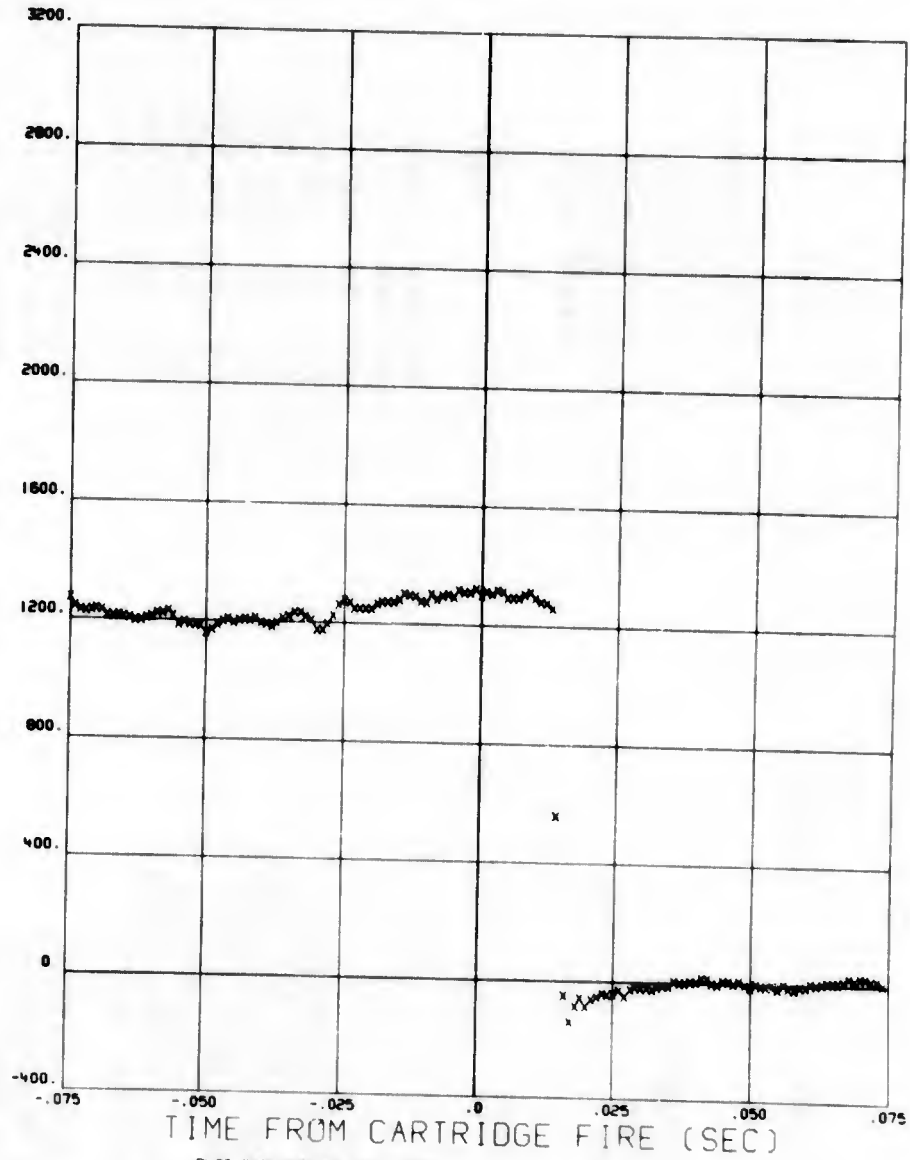
MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE

SEPARATION VELOCITY 7.2 FT/SEC
DISPLACEMENT METHOD
PRESSURE METHOD

19/04/73 670AG018 27 JULY 71 MSN 35C BOMB

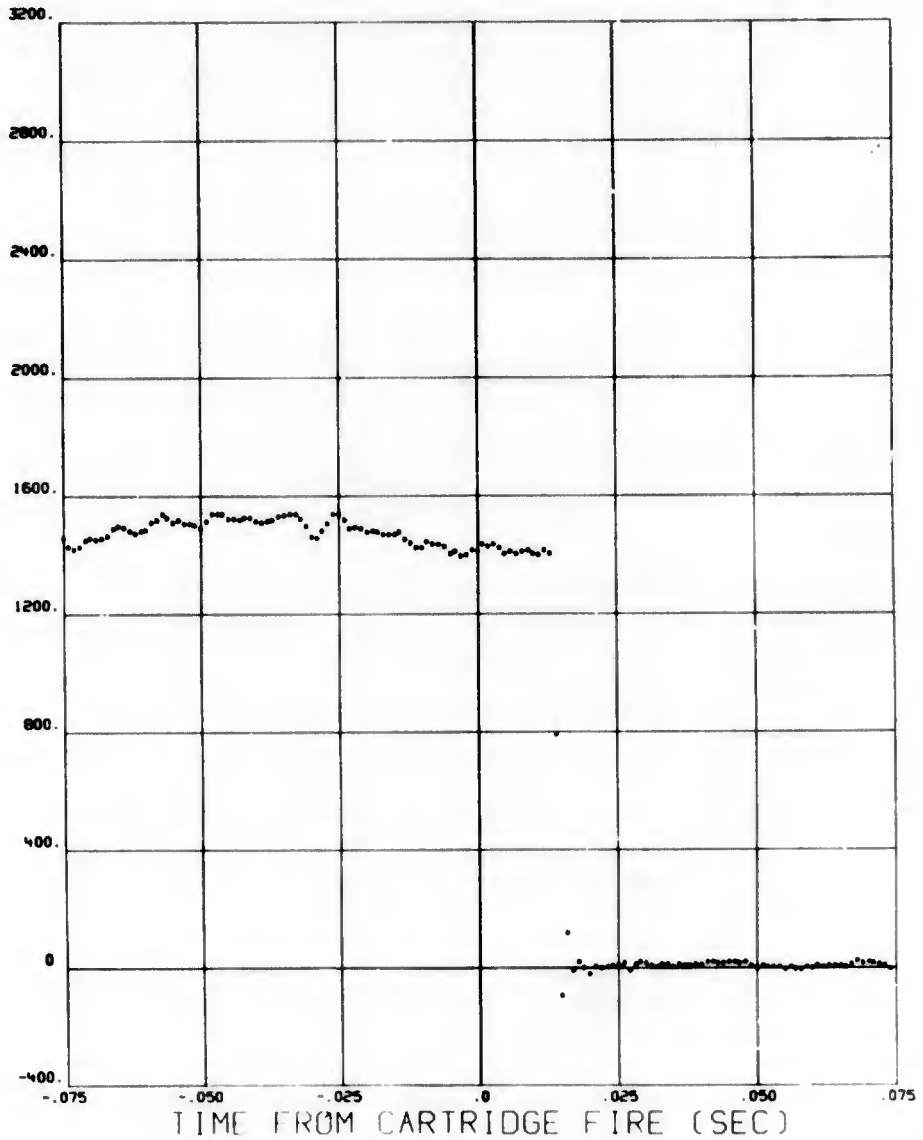
56 ^{R290} 18 07

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



PLOT PREPARED BY TSX, ADIC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD

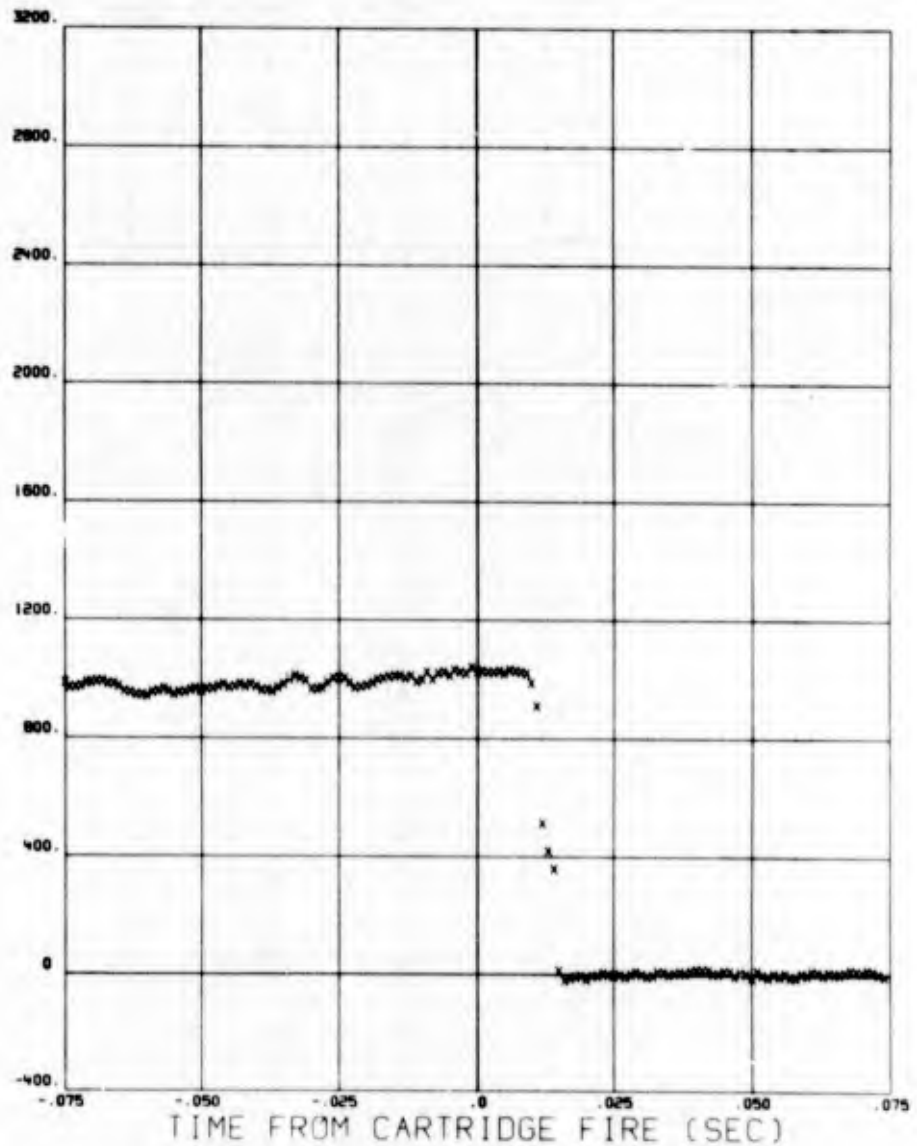


PLOT PREPARED BY TSX, ADIC

19/04/73 670AG018 27 JULY 71 MSN 35C BOMB

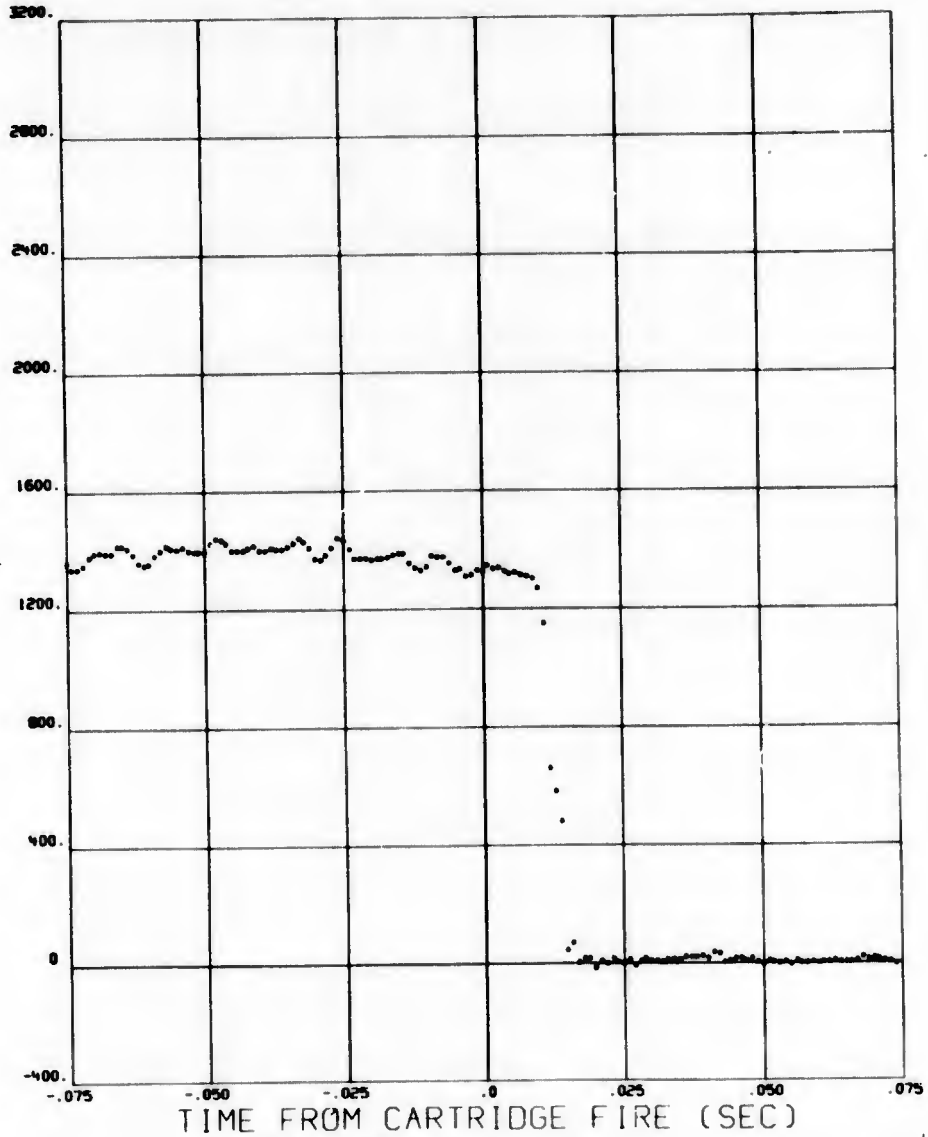
56^{R20} 21 0 7

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



PLOT PREPARED BY 15X, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT

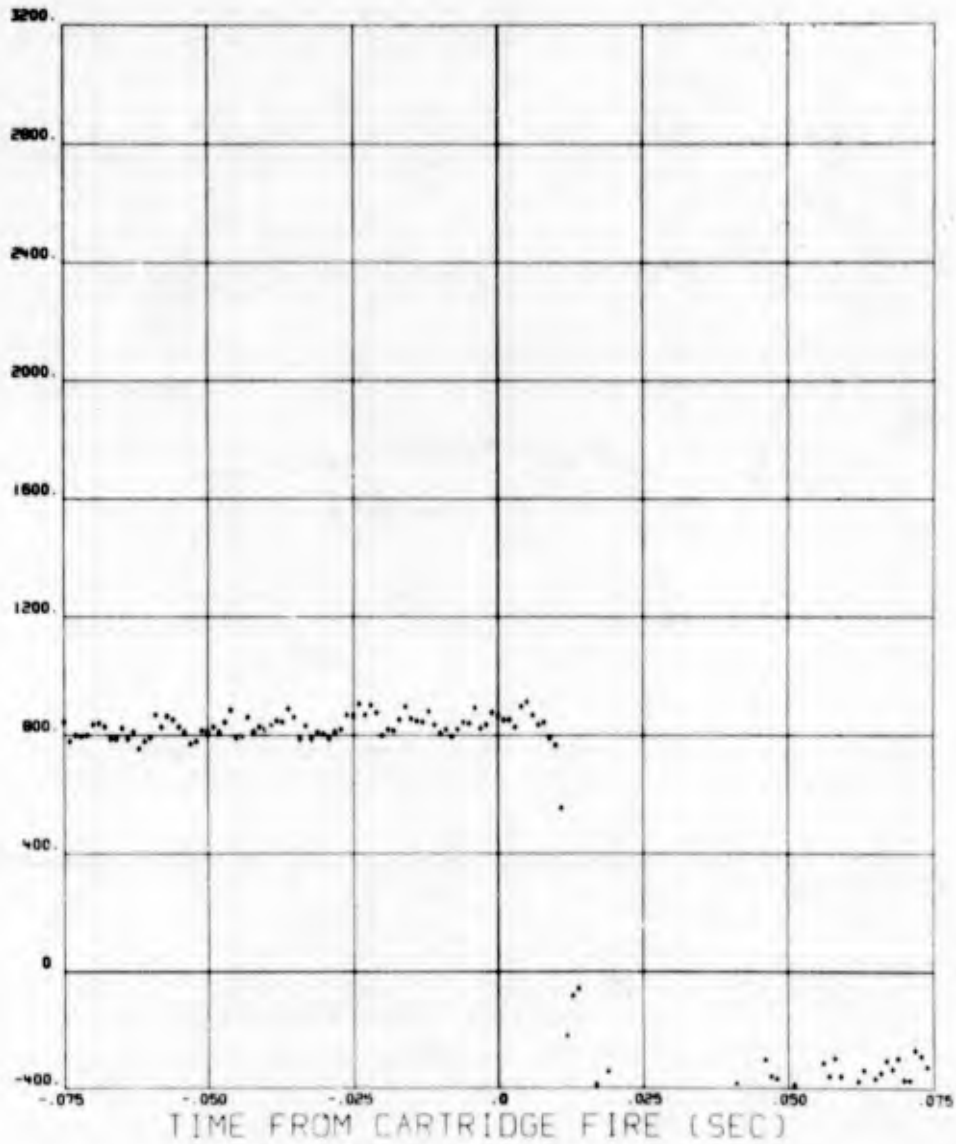


PLOT PREPARED BY 15X, ADIC

19/04/73 670AG018 27 JULY 71 MSN 35C BOMB

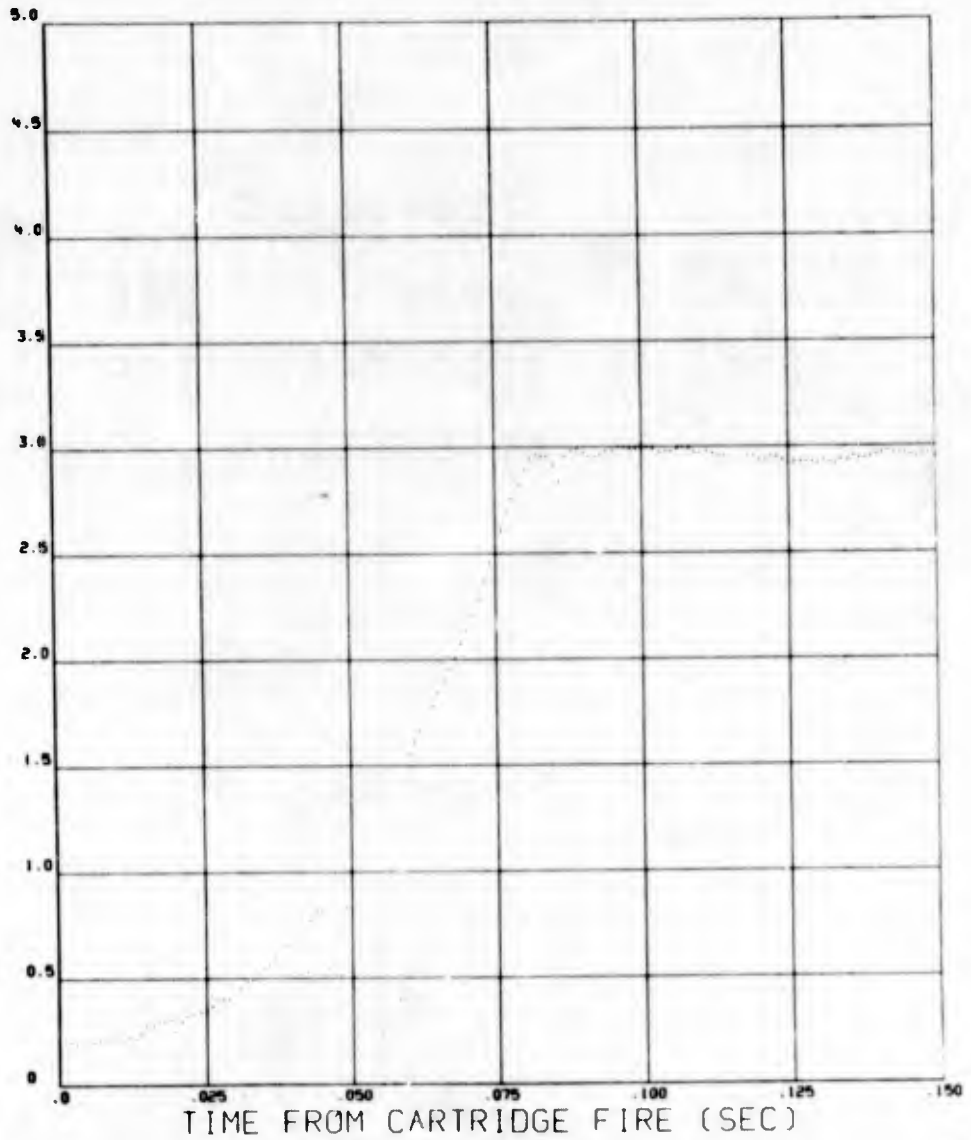
56^{R240}₂₄ 07

RELATIVE
HOOK
REACTION
(LBS)
* = AFT



PLT PREPARED BY 15A, ADTC

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY 15X, ADIC

DATE 12 AUG 71 MISSION 41C 90MR ID 47 BOMB WEIGHT 516.25 LBS

EJECTOR MOMENT ARM 3.125 INCHES
 TIME OF EJECTOR STROKE .065 SEC
 A/C ANGLE OF ATTACK AT RELEASE 3.038 DEG
 A/C PITCH ANGLE AT RELEASE .650 DEG
 A/C ROLL ANGLE AT RELEASE -.180 DEG
 RACK EJECTION ANGLE 0.000 DEG

IMPACT RANGE FEET
 DEFLECTION FEET

RELEASE HISTORY
 PICKLE TIME
 CARTRIDGE FIRE
 INITIAL LINKAGE MOVEMENT
 EJECTOR FOOT (FIRST MOTION)
 STORE FIRST MOTION (FORWARD)
 STORE FIRST MOTION (AFT)
 EJECTOR FOOT FULL EXTENDED
 HOOK FIRST MOTION (FORWARD)
 HOOK FIRST MOTION (AFT)

HR	MIN	SEC	TIME DELAY MILLISECONDS
***	***	*****	0
19	23	34.177	9
19	23	34.186	13
19	23	34.190	10
19	23	34.187	9
19	23	34.186	78
19	23	34.255	9
19	23	34.186	9
19	23	34.185	8

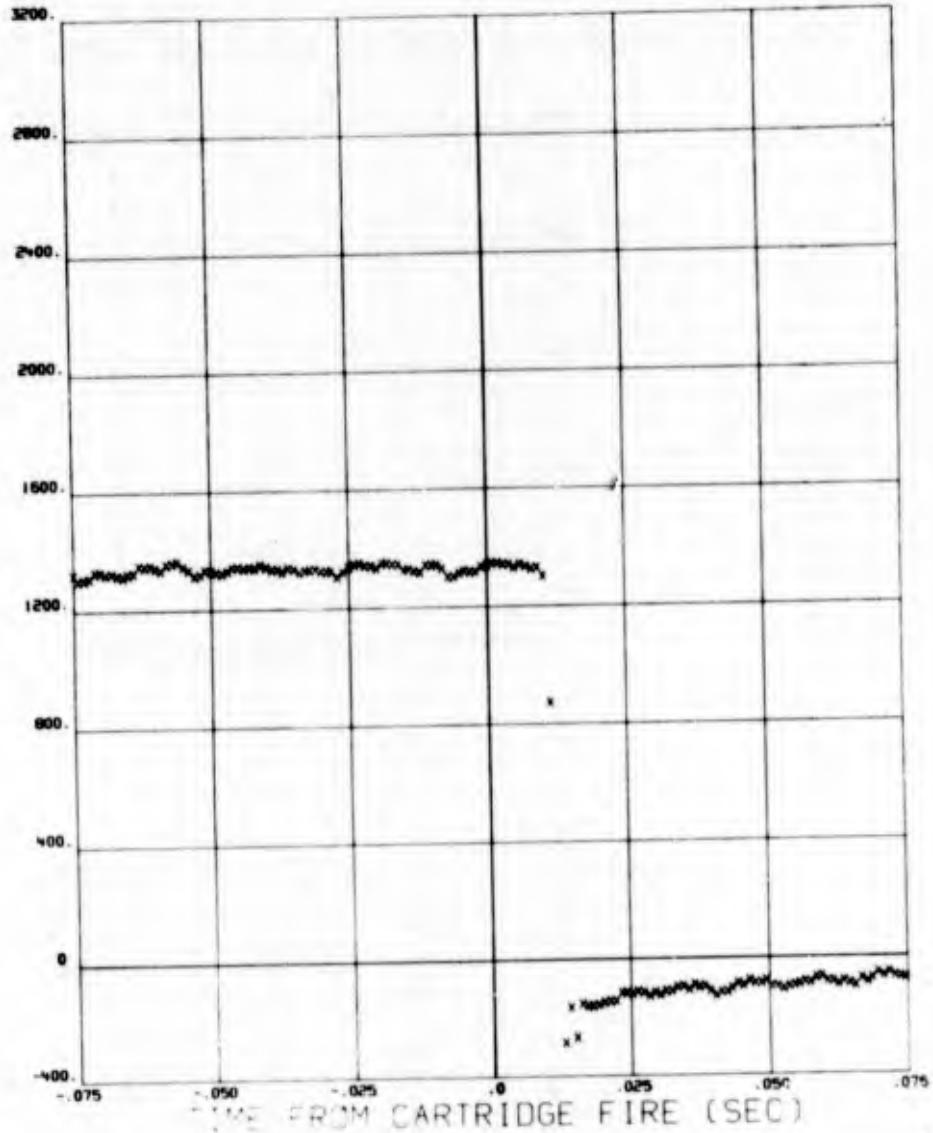
MAXIMUM PRE-FLT GROUND TEMPERATURE
 MAXIMUM POST-FLT GROUND TEMPERATURE
 MAXIMUM BREACH AMBIENT TEMPERATURE

SEPARATION VELOCITY
 DISPLACEMENT METHOD
 PRESSURE METHOD

***** DEG F
 ***** DEG F
 72.31 DEG F

7.4 FT/SEC
 6.2 FT/SEC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD

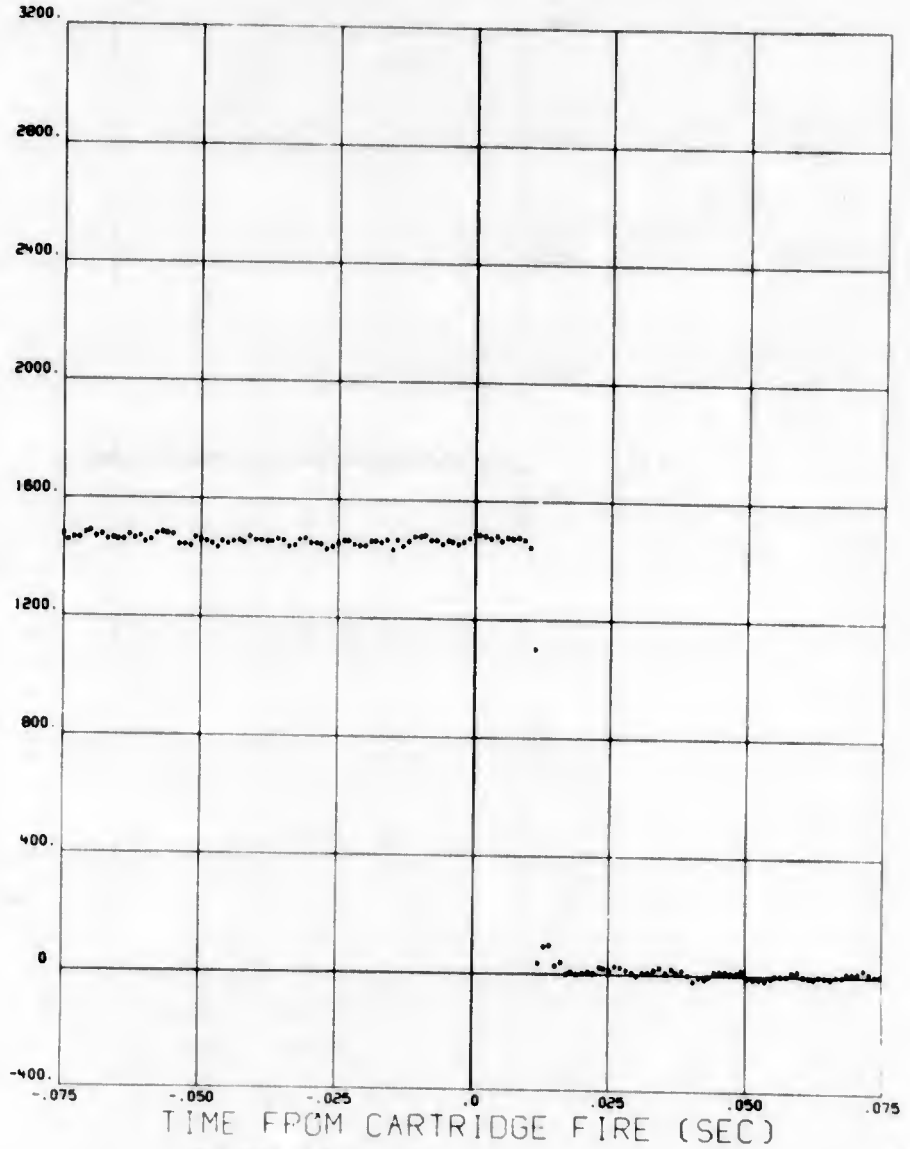


PLT PREPARED BY TSN, ADTC

19 04 73 670AG018 12 AUG 71 MSN 41C BOMB

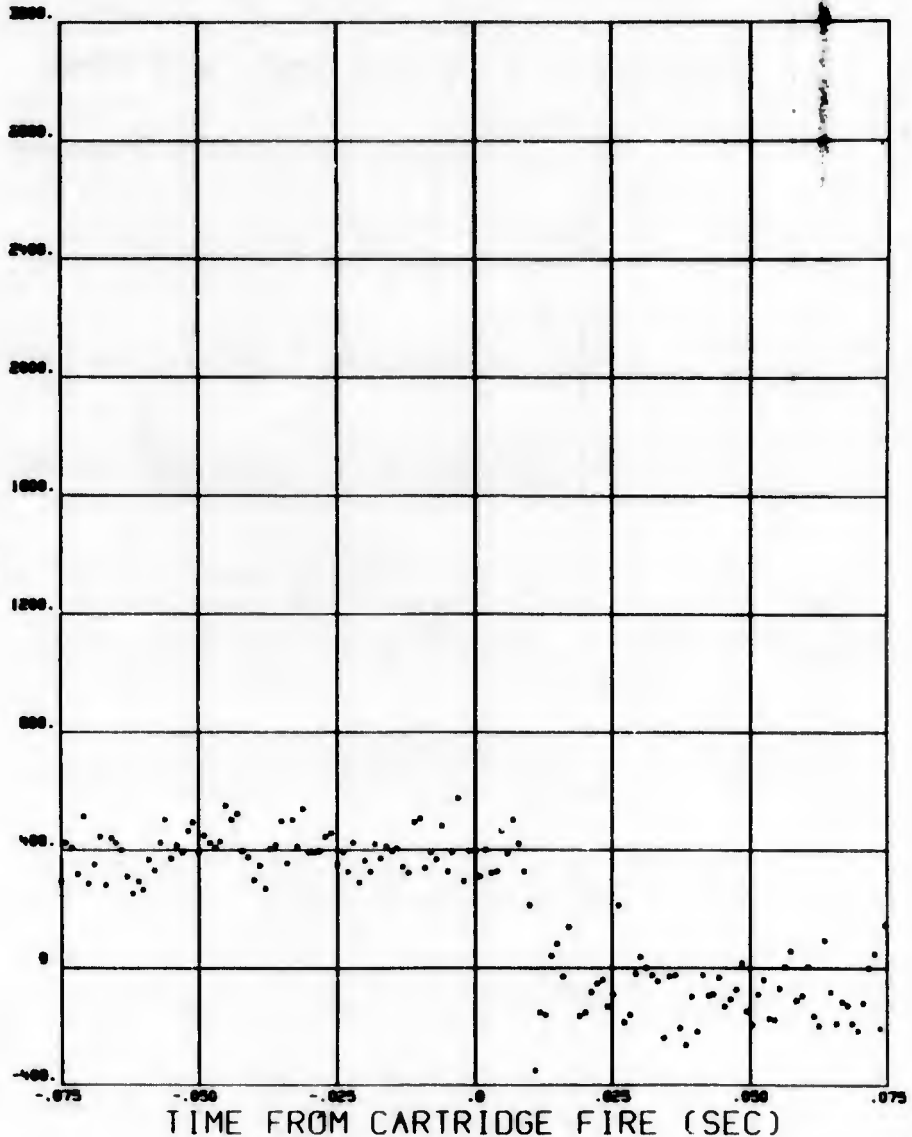
47^{R240}₂₉ 0 7

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
x = RIGHT FWD



PLOT PREPARED BY TSX, ADIC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT

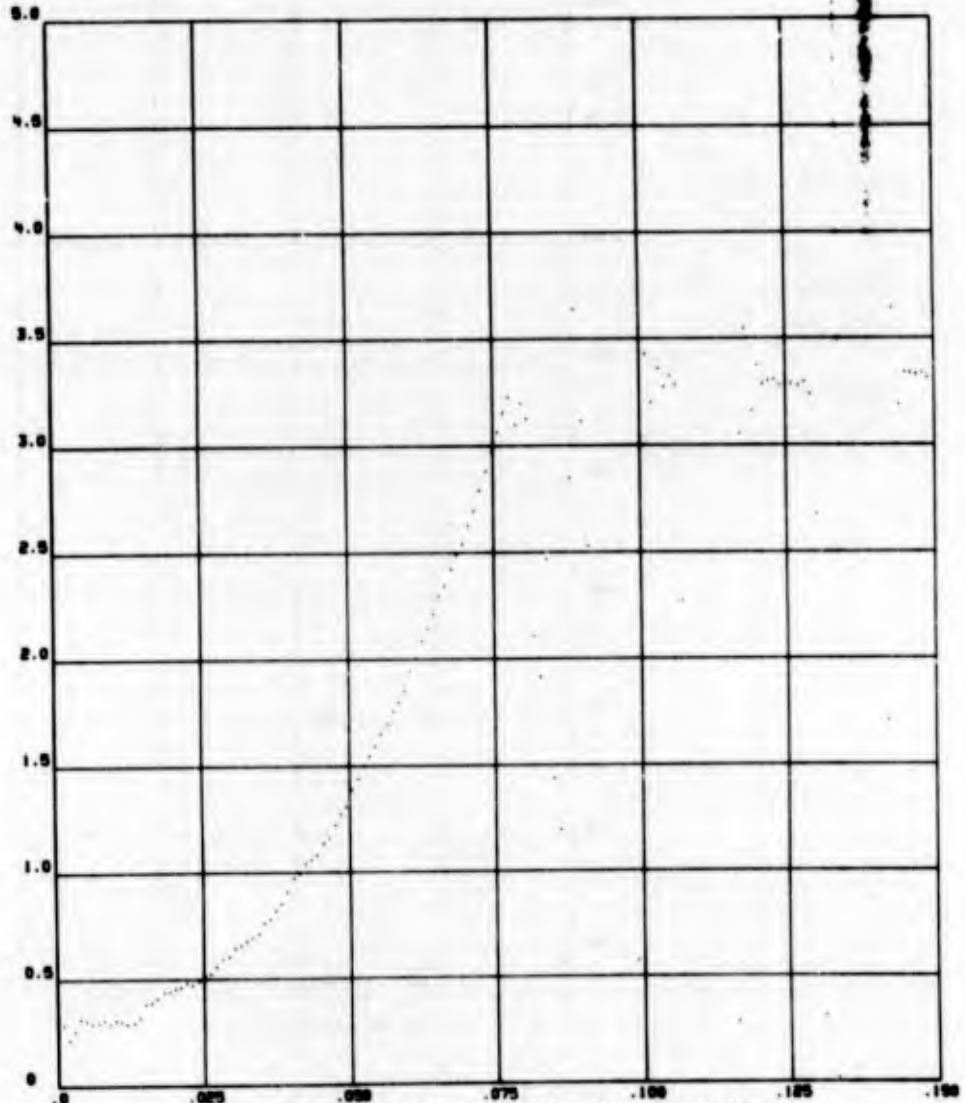


TIME FROM CARTRIDGE FIRE (SEC)
PLOT PREPARED BY TSK, ADIC

18/04/73 670AG018 12 AUG 71 MSN 41C BOMB

47 0.7

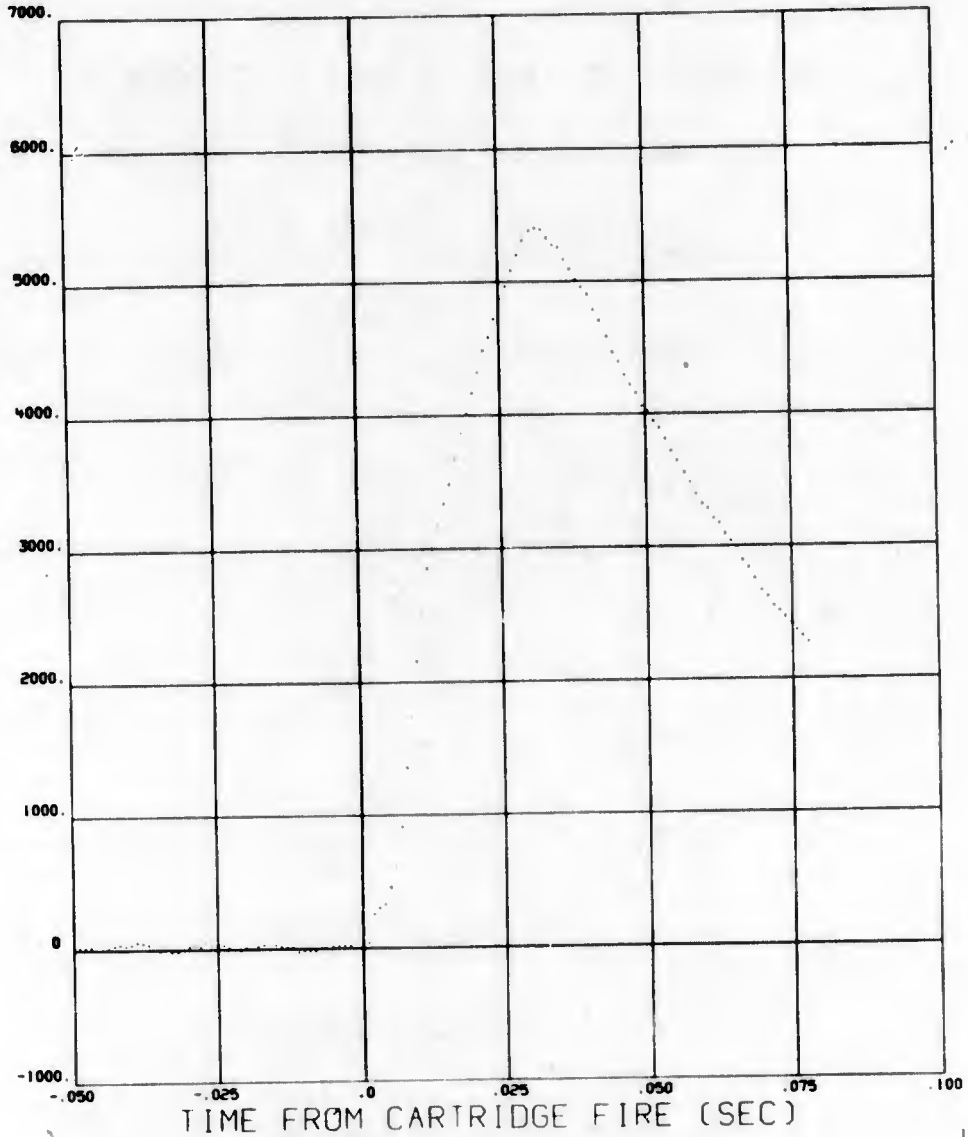
EJECTOR
FOOT
POSITION
(INCHES)



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

EJECTION
CHAMBER
PRESSURE
(PSI)

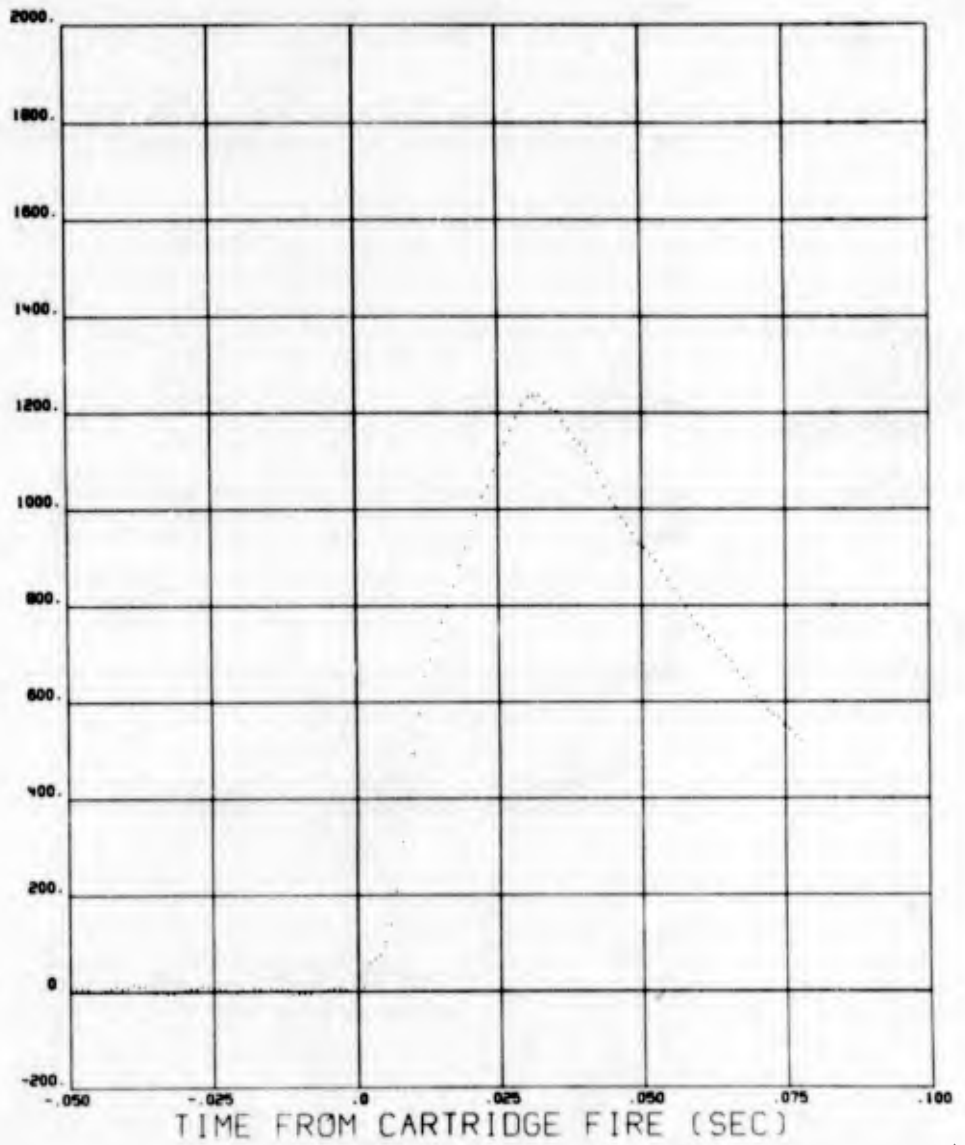


PLOT PREPARED BY ISX, ADIC

19/04/73 670AG018 12 AUG 71 MSN 41C BOMB

47⁰²⁰⁰ 30 0

EJECTOR
FOOT
FORCE
(LBS)



DATE 12 AUG 71 MISSION 41S BOMB ID 41 BOMB WEIGHT 520.25 LBS

EJECTOR MOMENT ARM 3.313 INCHES
 TIME OF EJECTOR STROKE .074 SEC
 A/C ANGLE OF ATTACK AT RELEASE 3.131 DEG
 A/C PITCH ANGLE AT RELEASE -.250 DEG
 A/C ROLL ANGLE AT RELEASE -1.900 DEG
 RACK EJECTION ANGLE -48.000 DEG

IMPACT RANGE FEET
 DEFLECTION FEET

RELEASE HISTORY
 PICKLE TIME
 CARTRIDGE FIRE
 INITIAL LINKAGE MOVEMENT
 EJECTOR FOOT (FIRST MOTION)
 STORE FIRST MOTION (FORWARD)
 STORE FIRST MOTION (AFT)
 EJECTOR FOOT FULL EXTENDED
 HOOK FIRST MOTION (FORWARD)
 HOOK FIRST MOTION (AFT)

HR	MIN	SEC	TIME DELAY MILLISECONDS
19	37	53.252	0
19	37	53.257	5
19	37	53.256	4
19	37	53.255	3
19	37	53.331	79
19	37	53.256	4
19	37	53.256	4

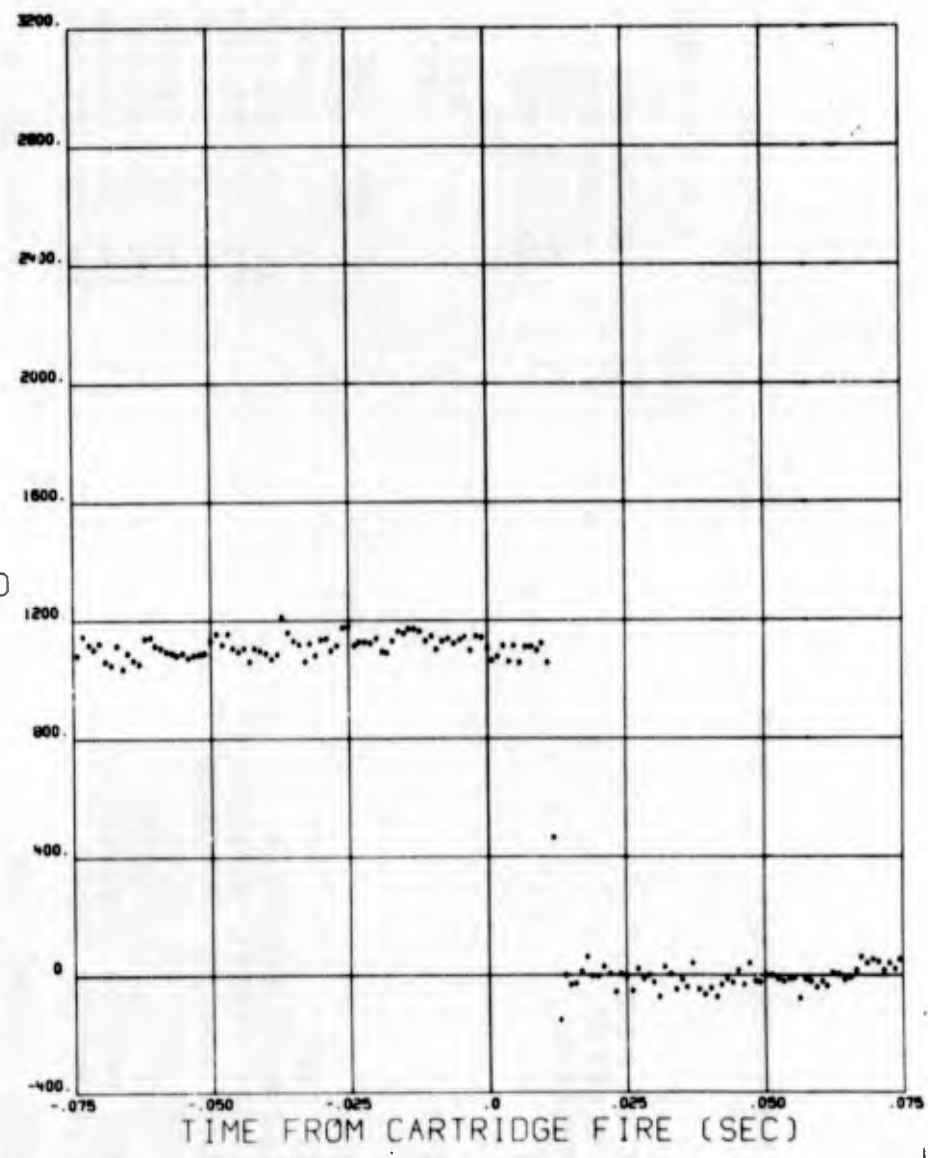
MAXIMUM PRE-FLT GROUND TEMPERATURE
 MAXIMUM POST-FLT GROUND TEMPERATURE
 MAXIMUM BREECH AMBIENT TEMPERATURE

***** DEG F
 ***** DEG F
 84.65 DEG F

SEPARATION VELOCITY
 DISPLACEMENT METHOD
 PRESSURE METHOD

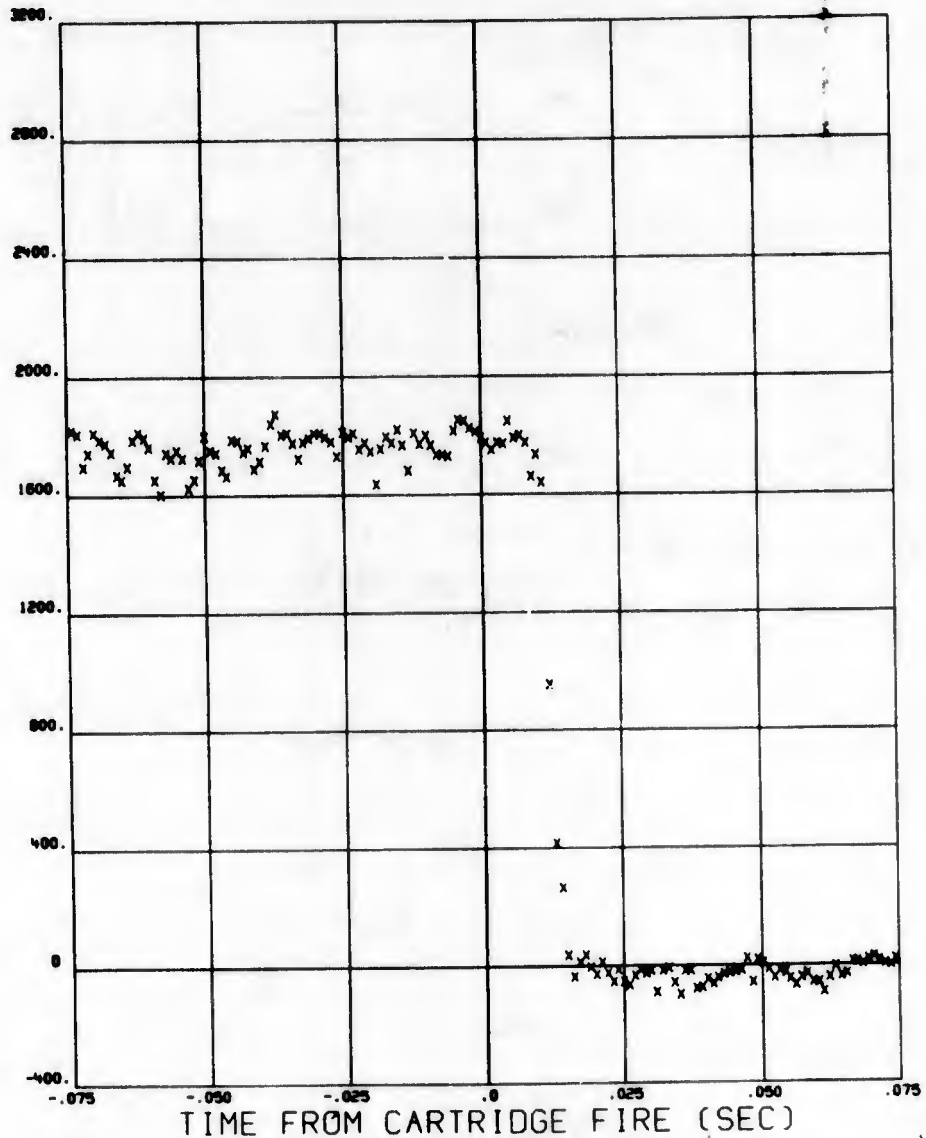
***** FT/SEC
 ***** FT/SEC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



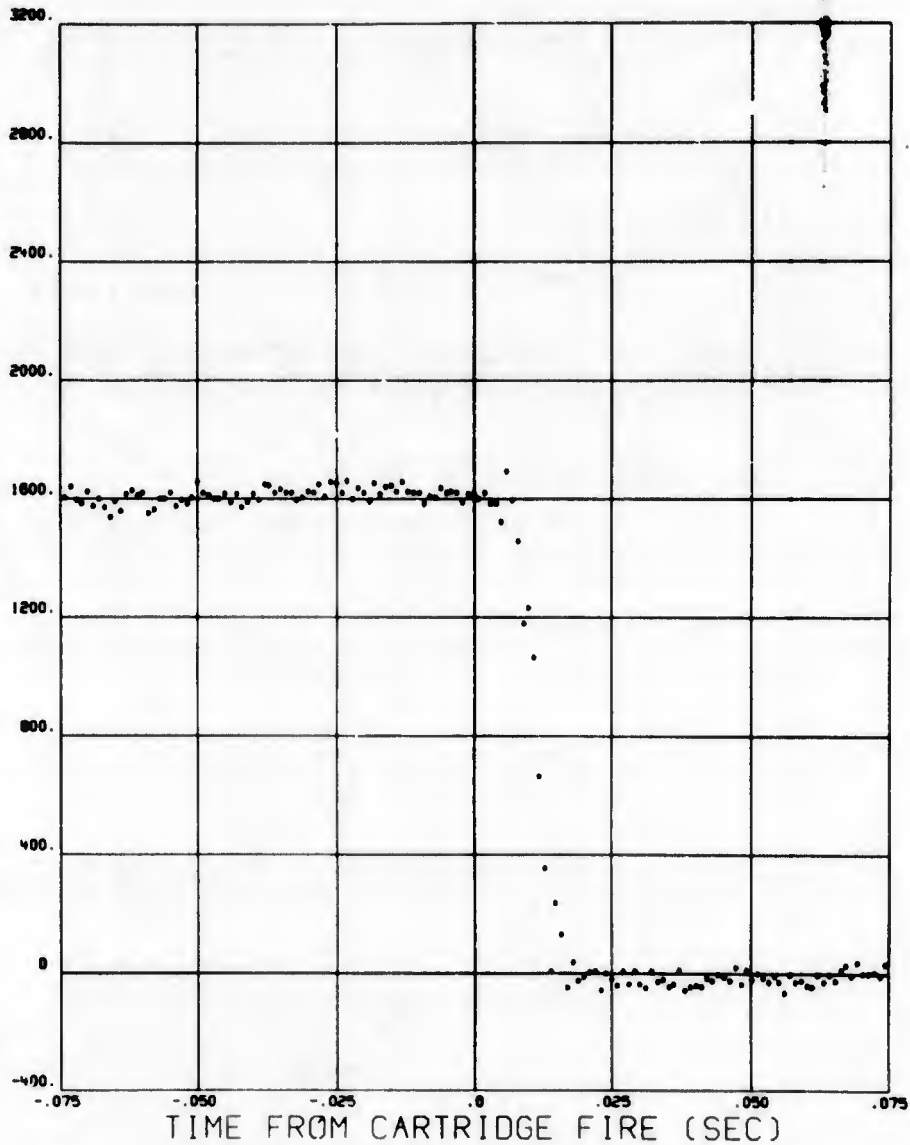
PLOT PREPARED BY TSX, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



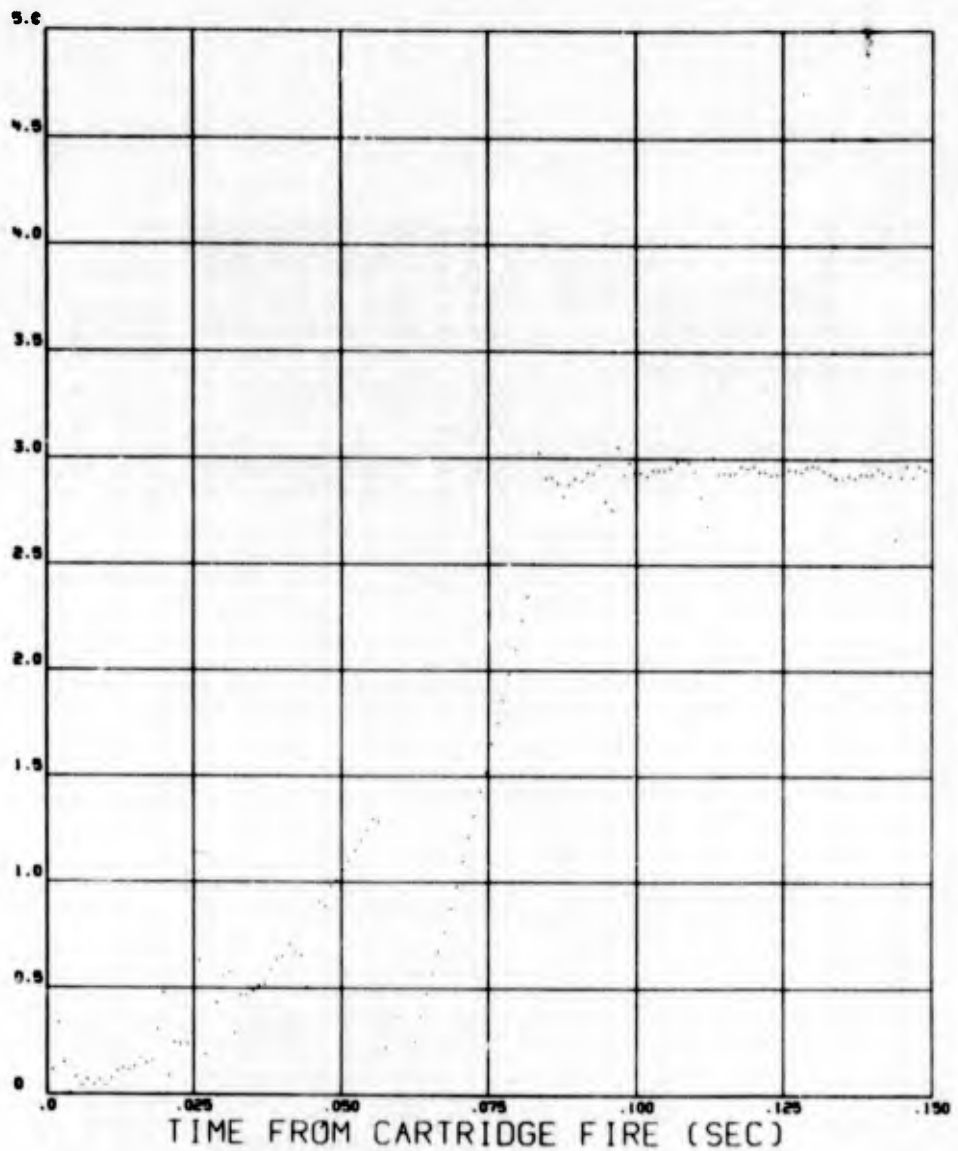
TIME FROM CARTRIDGE FIRE (SEC)
PLOT PREPARED BY TSM, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



PLT PREPARED BY TSX, ADTC

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY TSX, ADTC

DATE 17 AUG 71 MISSION 42S 80MR ID 48 BOMB WEIGHT 516.75 LBS

EJECTOR MOMENT ARM 3.375 INCHES
TIME OF EJECTOR STROKE .075 SEC
A/C ANGLE OF ATTACK AT RELEASE 2.177 DEG
A/C PITCH ANGLE AT RELEASE .260 DEG
A/C ROLL ANGLE AT RELEASE 1.560 DEG
RACK EJECTION ANGLE -48.000 DEG

IMPACT RANGE FEET
DEFLECTION FEET

RELEASE HISTORY
PICKLE TIME SEC *****
CARTRIDGE FIRE *****
INITIAL LINKAGE MOVEMENT 13 46 56.796
EJECTOR FOOT (FIRST MOTION) 13 46 56.806
STORE FIRST MOTION (FORWARD) 13 46 56.805
STORE FIRST MOTION (AFT) 13 46 56.806
EJECTOR FOOT FULL EXTENDED 12 46 56.881
HOOK FIRST MOTION (FORWARD) 13 46 56.806
HOOK FIRST MOTION (AFT) 13 46 56.806

TIME DELAY
MILLISECONDS

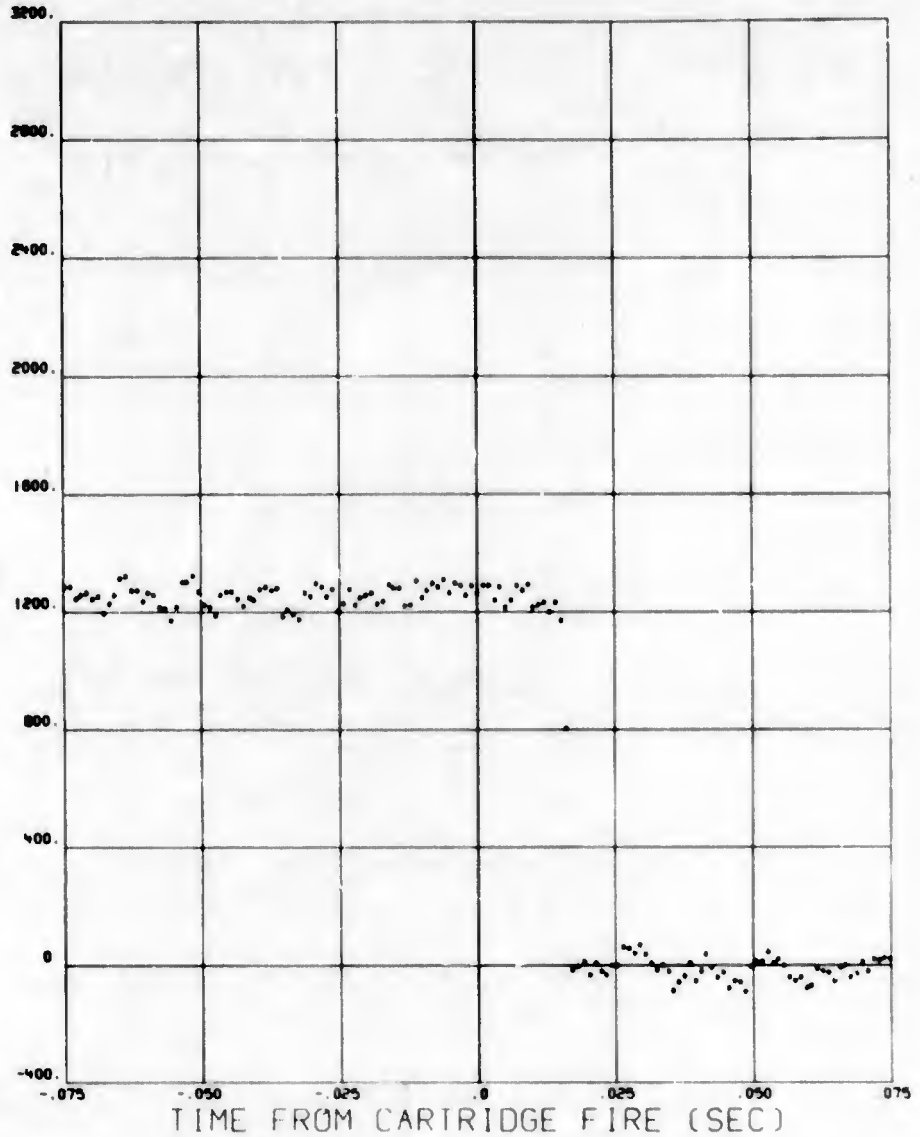
0
10
9
10
85
10
10

MAXIMUM PRE-FLT GROUND TEMPERATURE ***** DEG F
MAXIMUM POST-FLT GROUND TEMPERATURE ***** DEG F
MAXIMUM BREECH AMBIENT TEMPERATURE 95.41 DEG F

SEPARATION VELOCITY ***** FT/SEC
DISPLACEMENT METHOD 5.2 FT/SEC
PRESSURE METHOD

RELATIVE
SWAY
BRACE
STRAIN
(LBS)

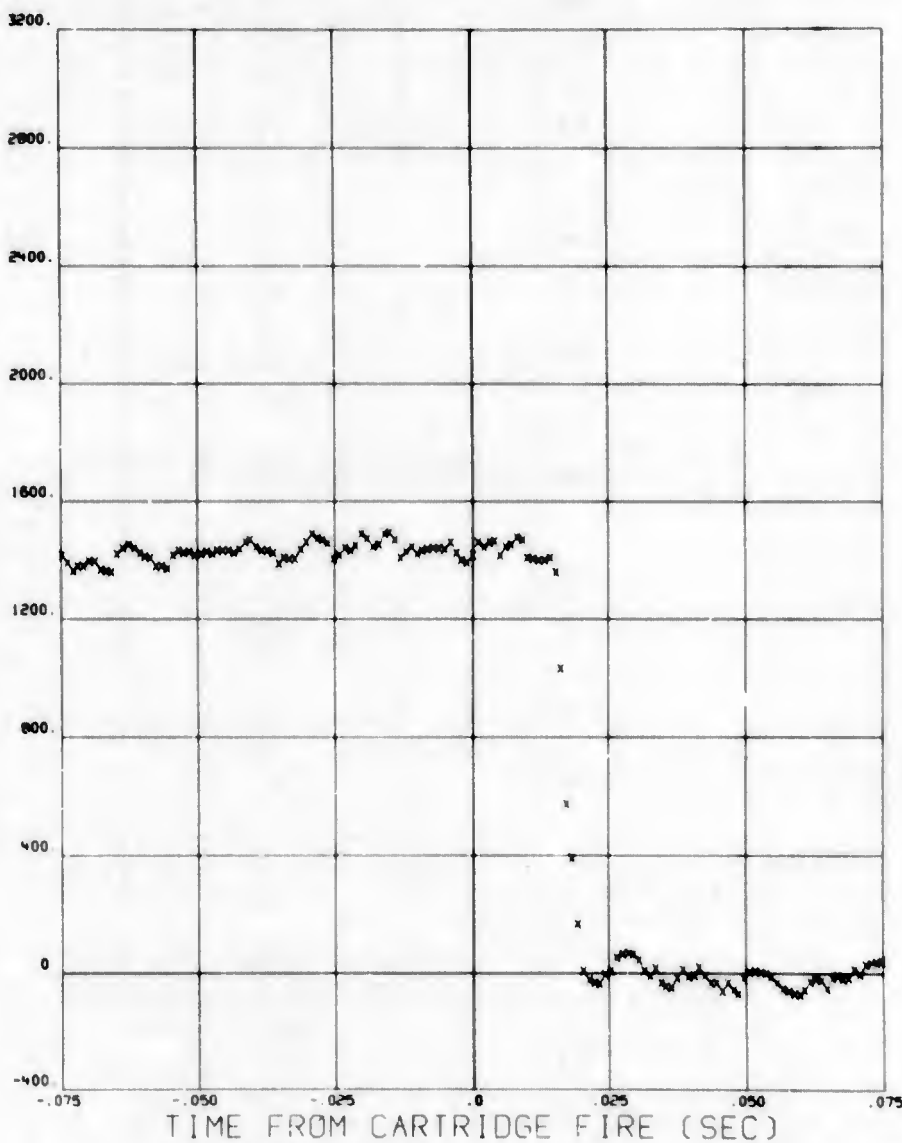
* = RIGHT FWD



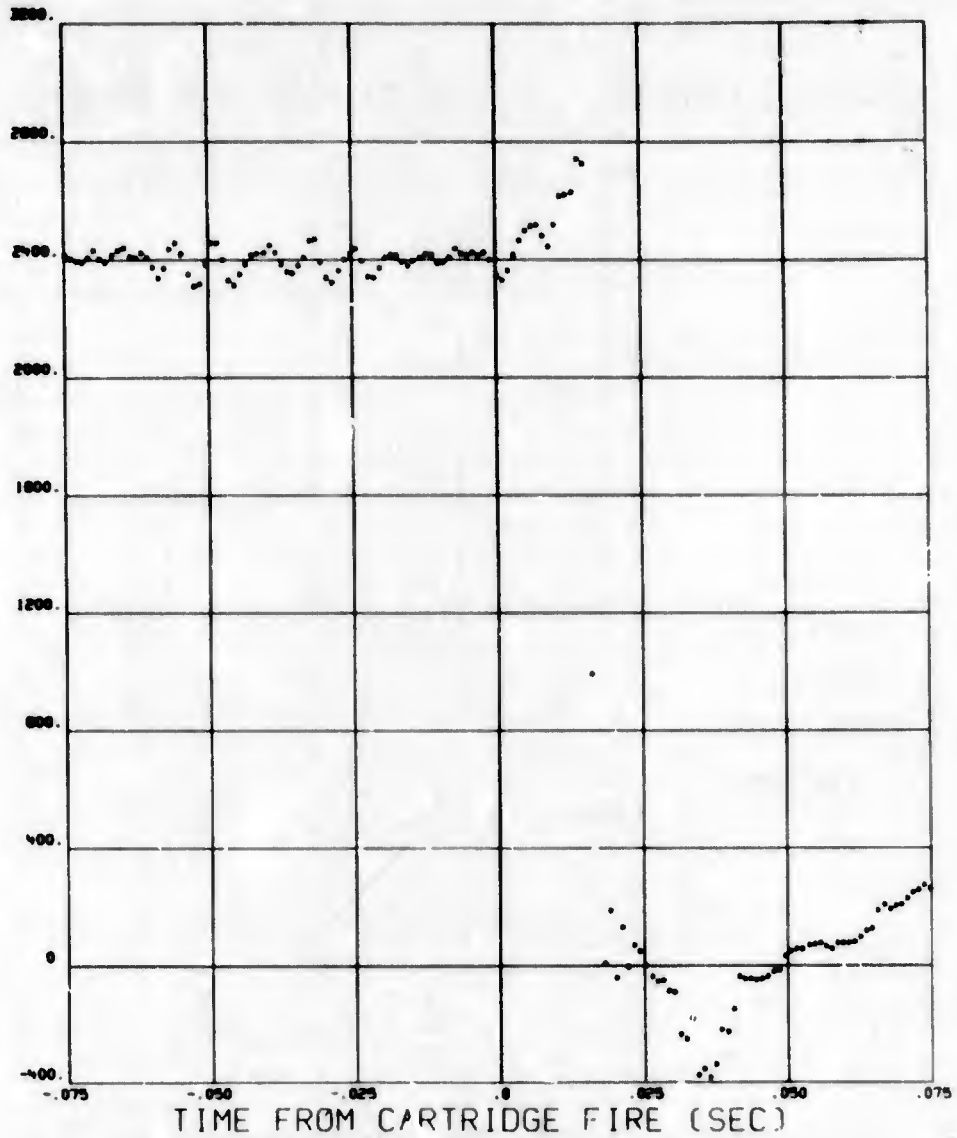
TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY 15X, ADIC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



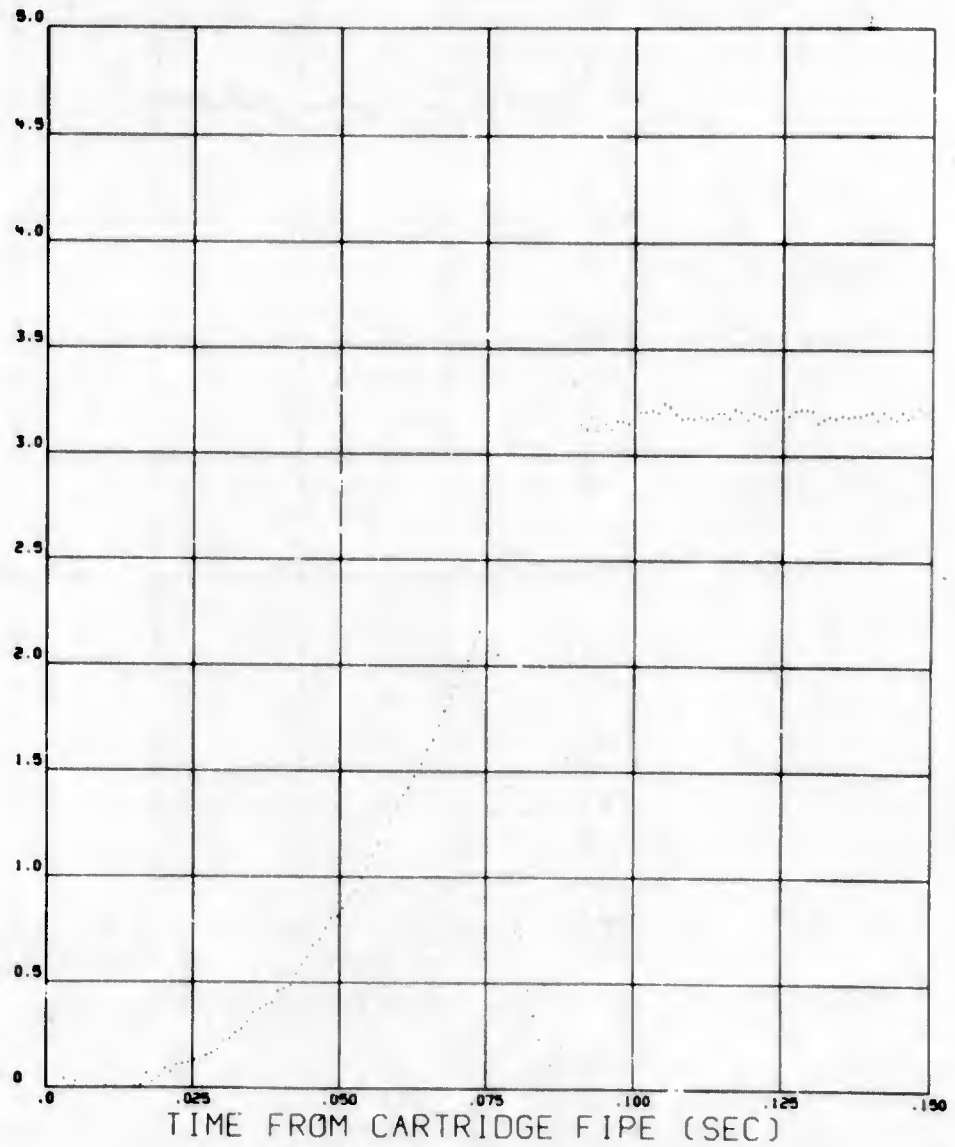
RELATIVE
HOOK
REACTION
(LBS)
* = AFT



19/04/73 670AG018 17 AUG 71 MSN 42S BOMB

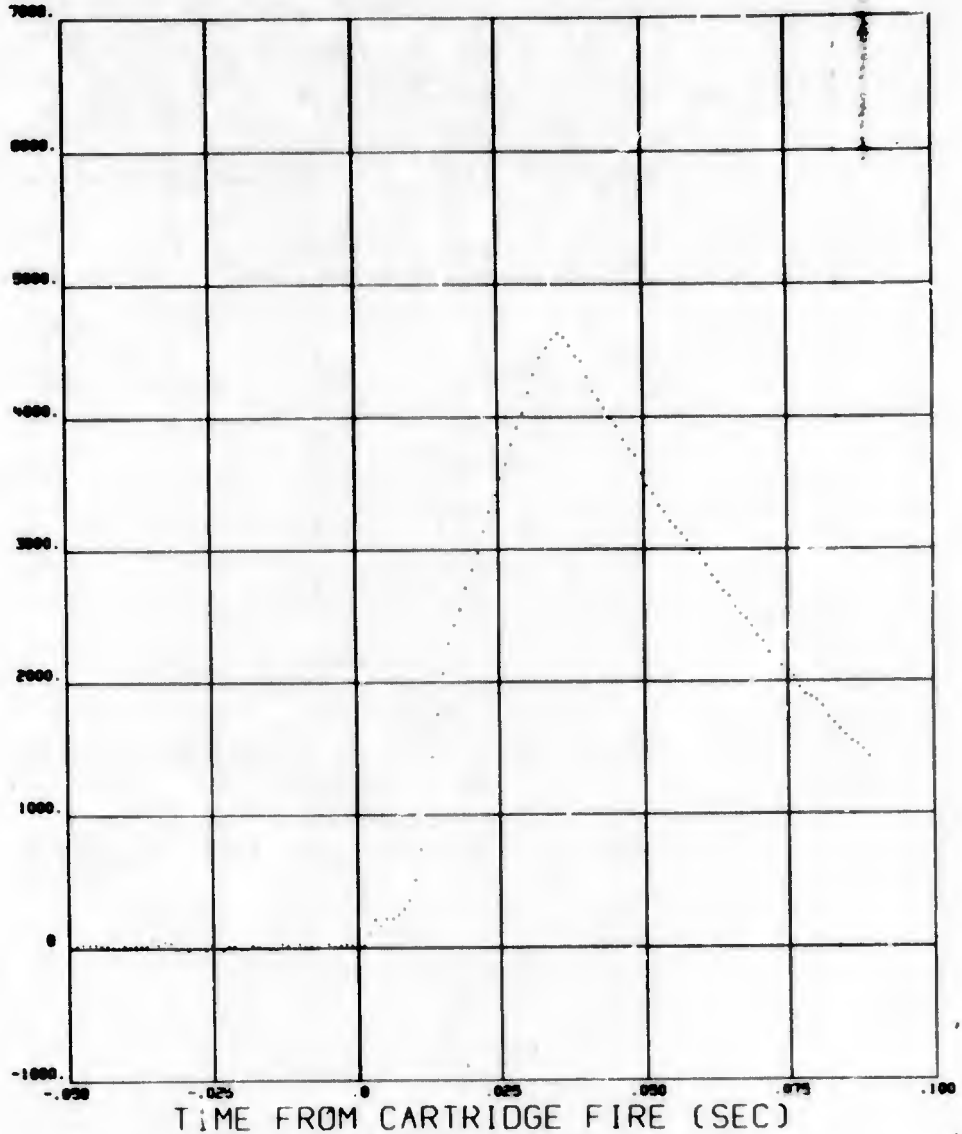
48^{REV 0} 52 07

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY TSX, ADTC

EJECTION
CHAMBER
PRESSURE
(PSI)

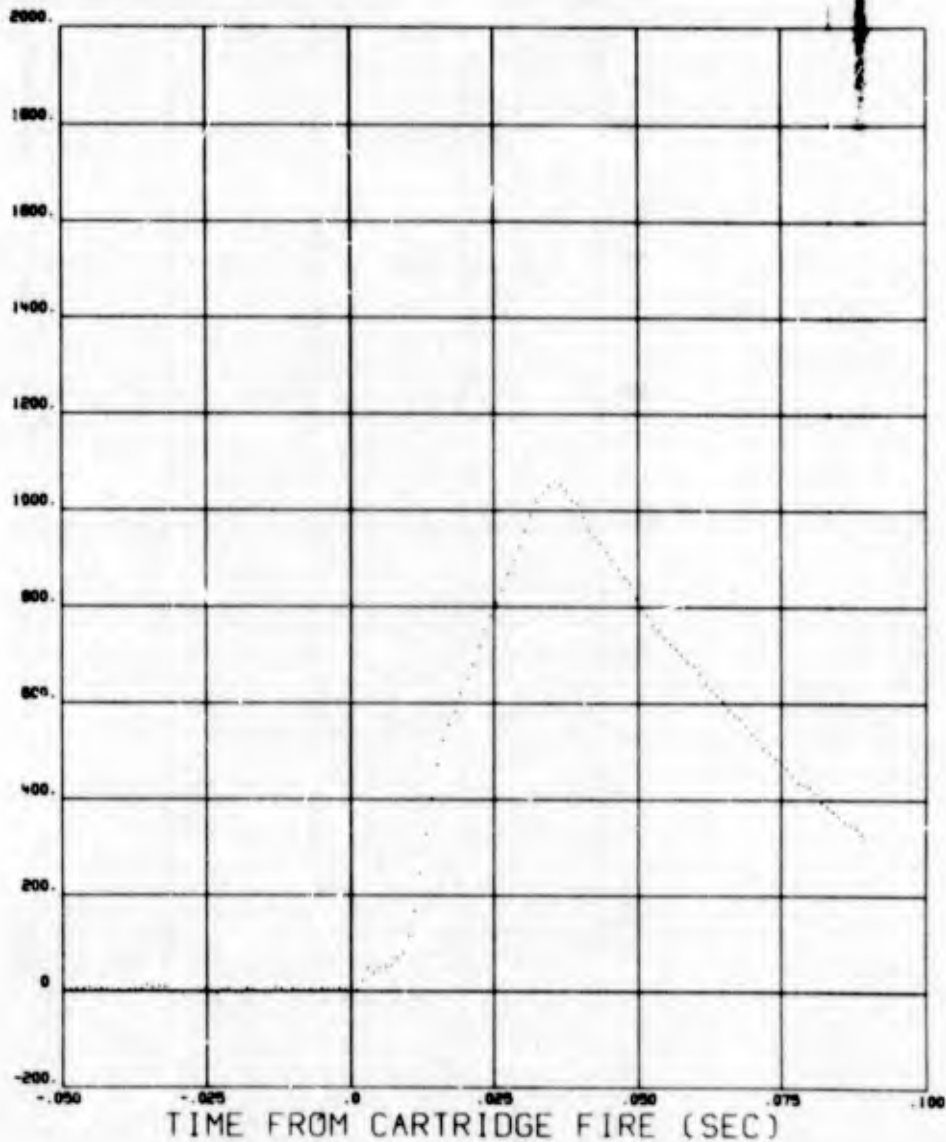


PLOT PREPARED BY TSX, AOTC

19/04/73 670AG018 17 AUG 71 MSN 42S BOMB

48

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY TSX, ADTC

DATE 18 AUG 71 MISSION 43C BOMB ID 77 BOMB WEIGHT 495.75 LBS

EJECTOR MOMENT ARM 3.688 INCHES
 TIME OF EJECTOR STROKE .069 SEC
 A/C ANGLE OF ATTACK AT RELEASE 2.153 DEG
 A/C PITCH ANGLE AT RELEASE 4.100 DEG
 A/C ROLL ANGLE AT RELEASE 6.700 DEG
 RACK EJECTION ANGLE 0.000 DEG

IMPACT RANGE FEET
 DEFLECTION FEET

RELEASE HISTORY
 PICKLE TIME FIRE
 CARTRIDGE FIRE
 INITIAL LINKAGE MOVEMENT
 EJECTOR FOOT (FIRST MOTION)
 STORE FIRST MOTION (FORWARD)
 STORE FIRST MOTION (AFT)
 EJECTOR FOOT FULL EXTENDED
 HOOK FIRST MOTION (FORWARD)
 HOOK FIRST MOTION (AFT)

HR	MIN	SEC	TIME DELAY MILLISECONDS
***	***	***	0
16	51	24.182	10
16	51	24.192	14
16	51	24.196	11
16	51	24.193	11
16	51	24.265	83
***	***	***	***
16	51	24.193	11

MAXIMUM PRE-FLT GROUND TEMPERATURE
 MAXIMUM POST-FLT GROUND TEMPERATURE
 MAXIMUM BREECH AMBIENT TEMPERATURE

***** DEG F
 ***** DEG F
 95.64 DEG F

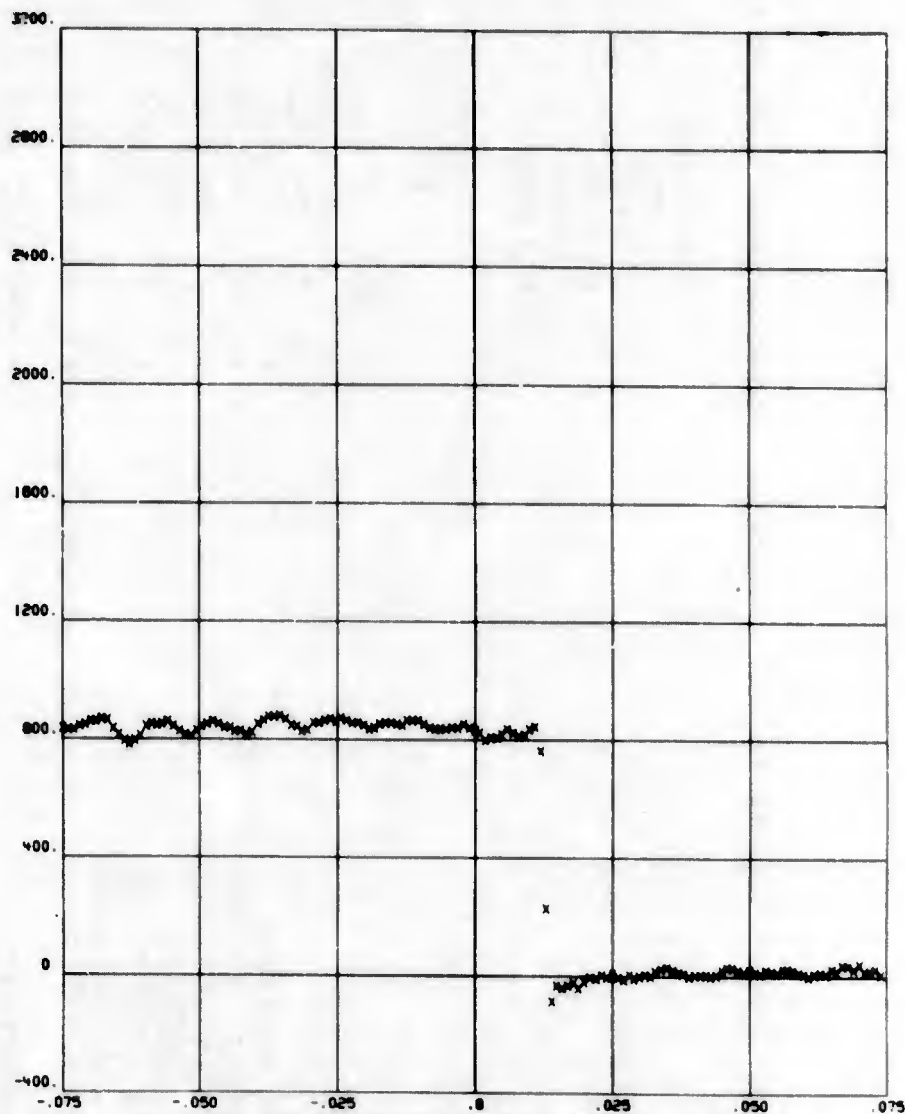
SEPARATION VELOCITY
 DISPLACEMENT METHOD
 PRESSURE METHOD

7.7 FT/SEC
 6.6 FT/SEC

19/04/73 670AG018 18 AUG 71 MSN 43C BOMB

77^{R290} 58 07

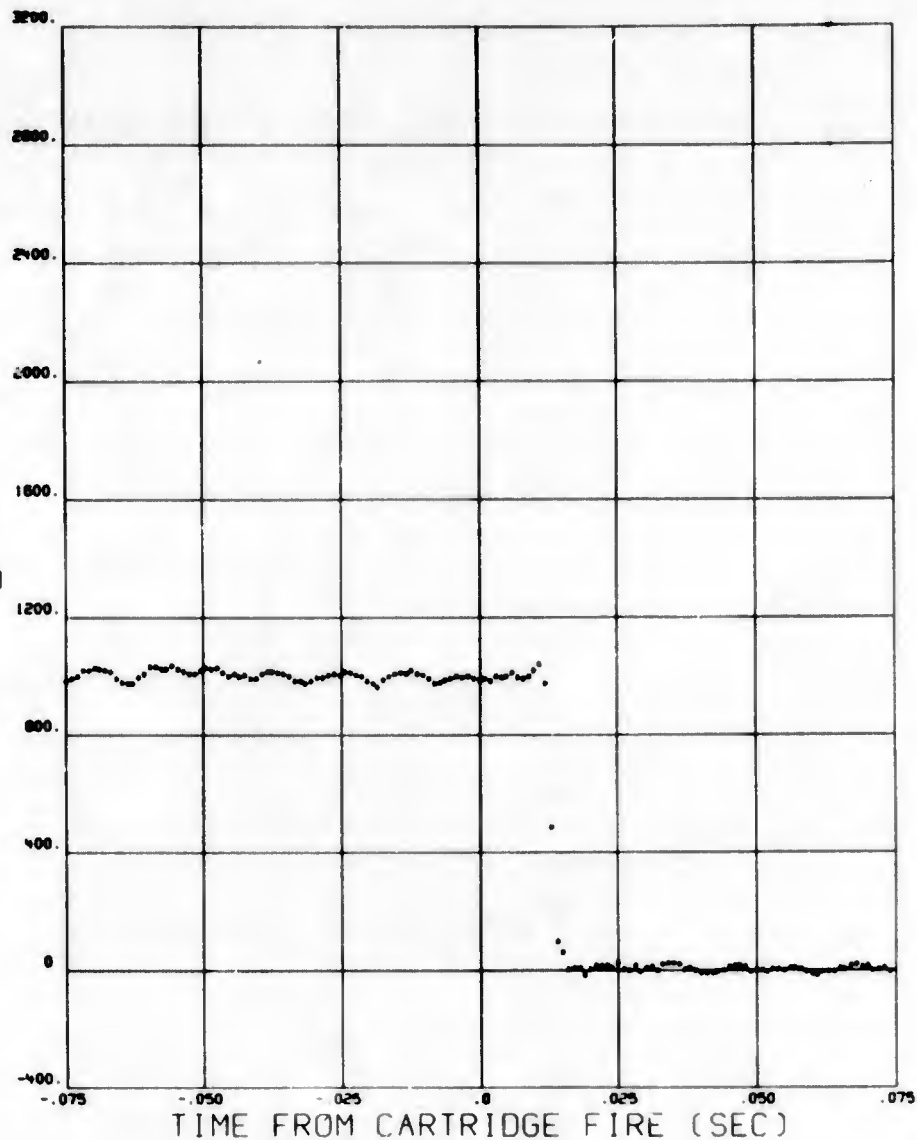
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSK, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD

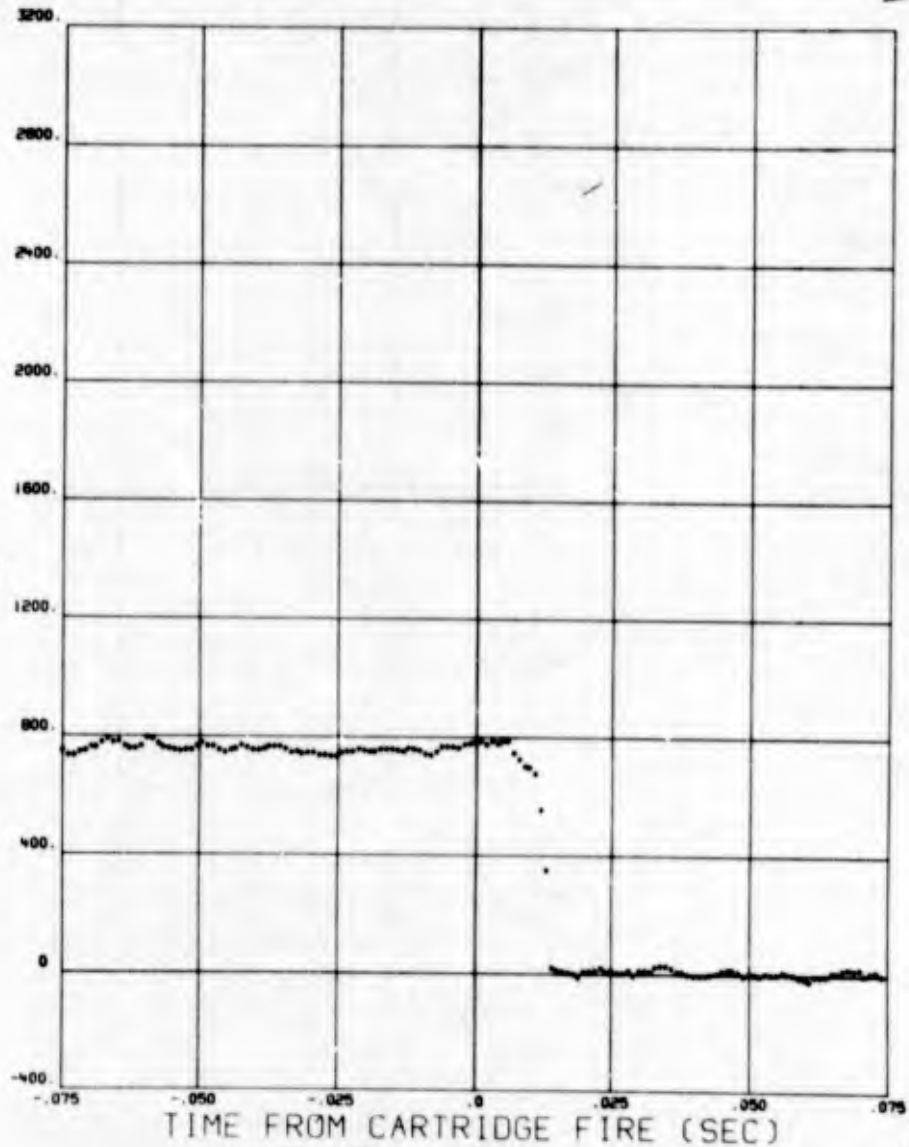


PLOT PREPARED BY 15x. ADTC

19/04/73 670AG018 18 AUG 71 MSN 43C BOMB

77^{REV} 58 07

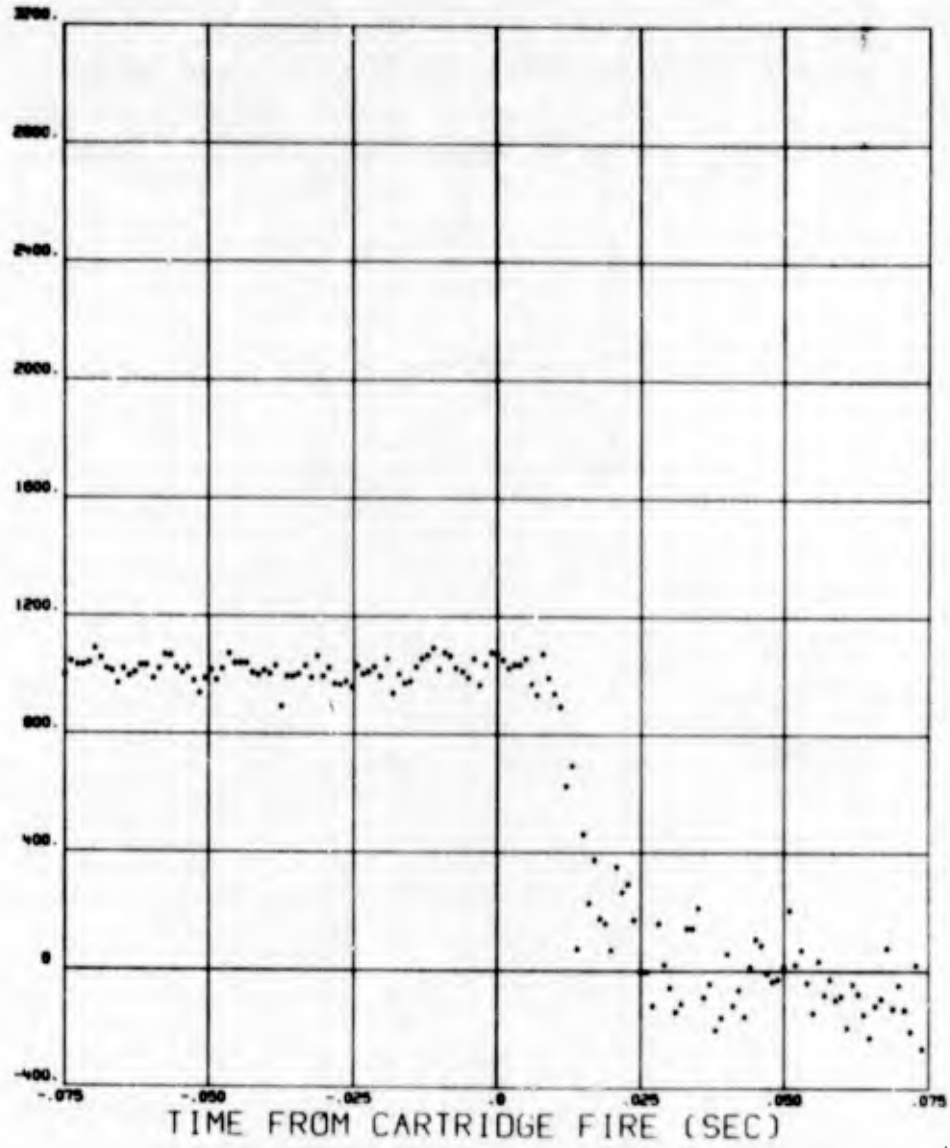
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

RELATIVE
HOOK
REACTION
(LBS)
* = AFT

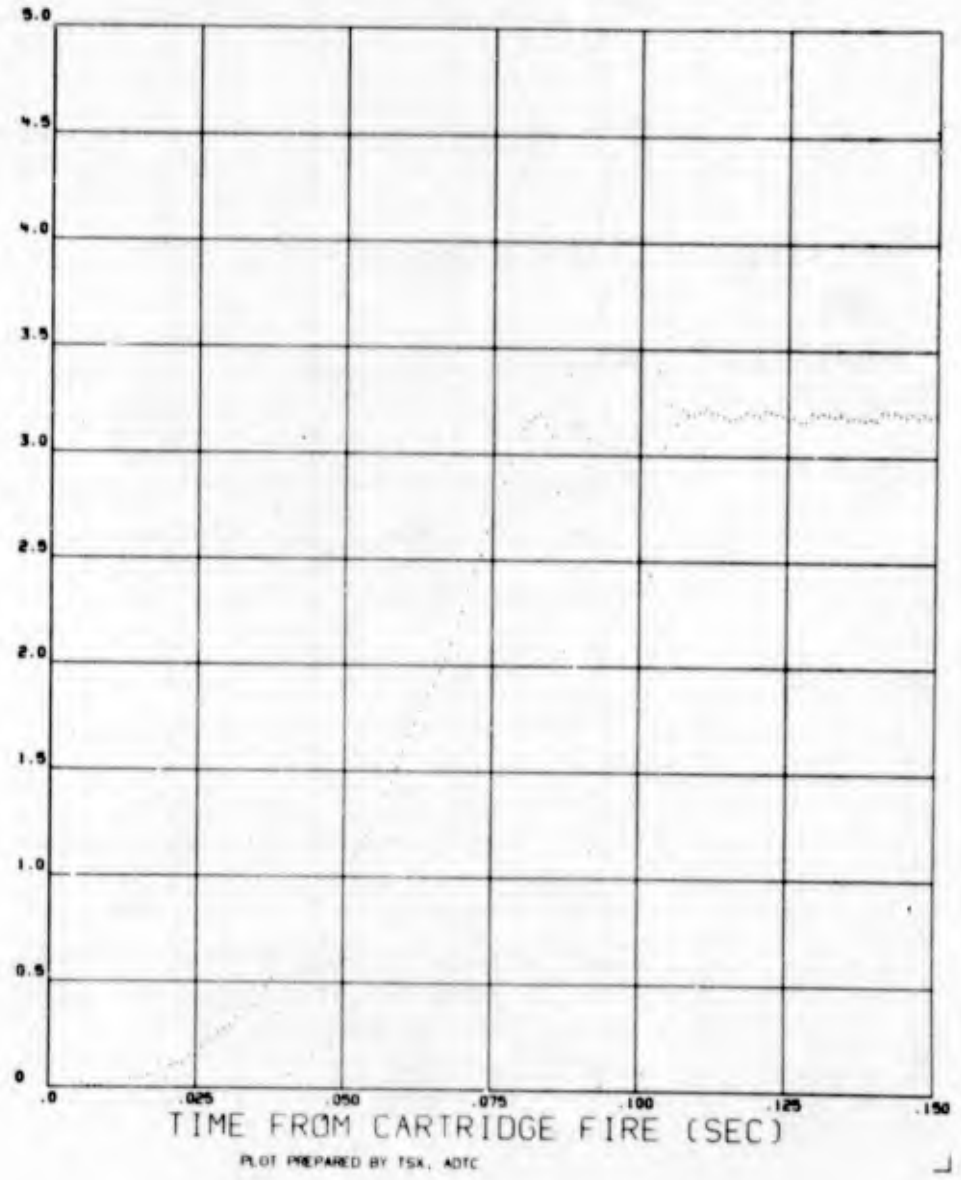


PLOT PREPARED BY 15X, AOTC

19/04/73 670AG018 18 AUG 71 MSN 43C BOMB

77RD 61 07

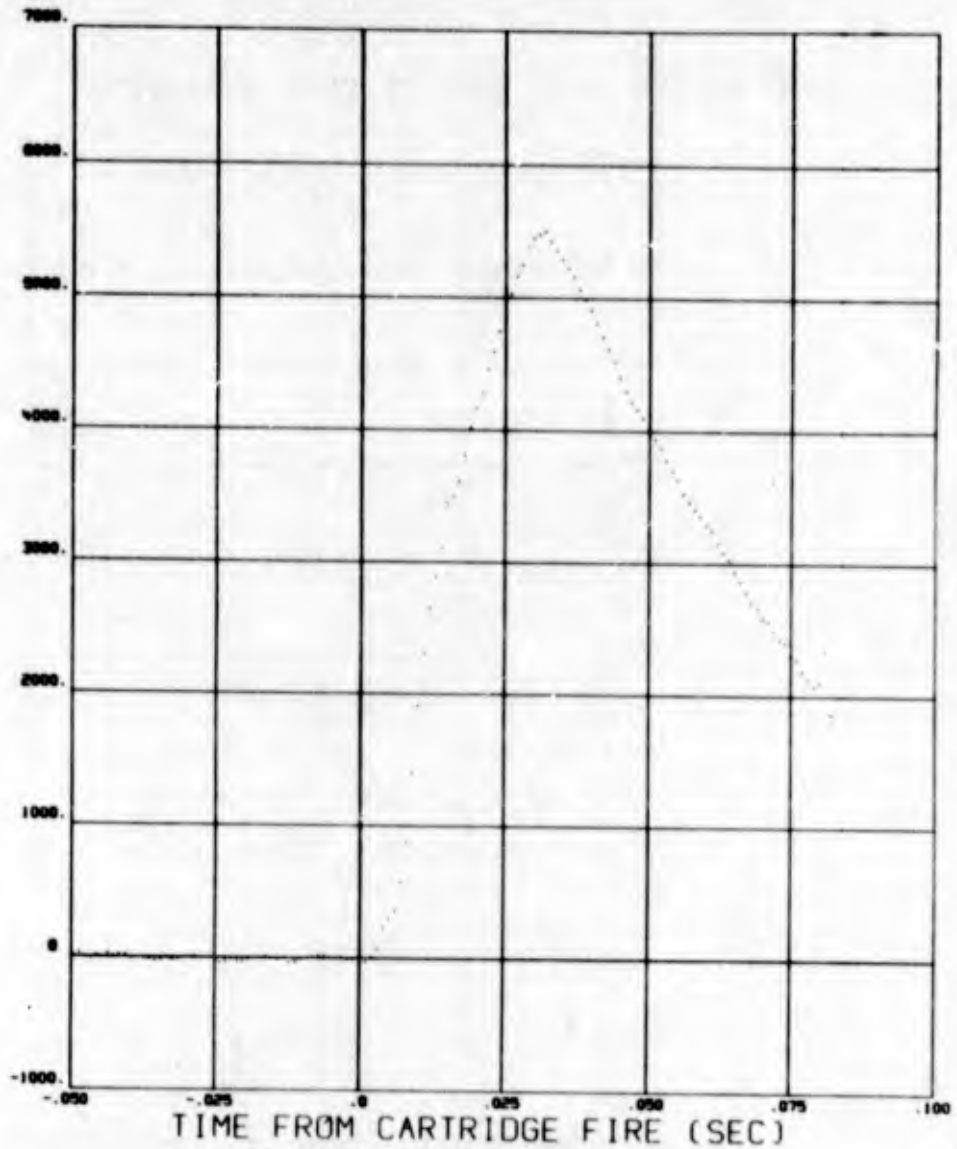
EJECTOR
FOOT
POSITION
(INCHES)



19/04/73 670AG018 18 AUG 71 MSN 43C BOMB

77 ⁰²⁴⁰ 62 0 7

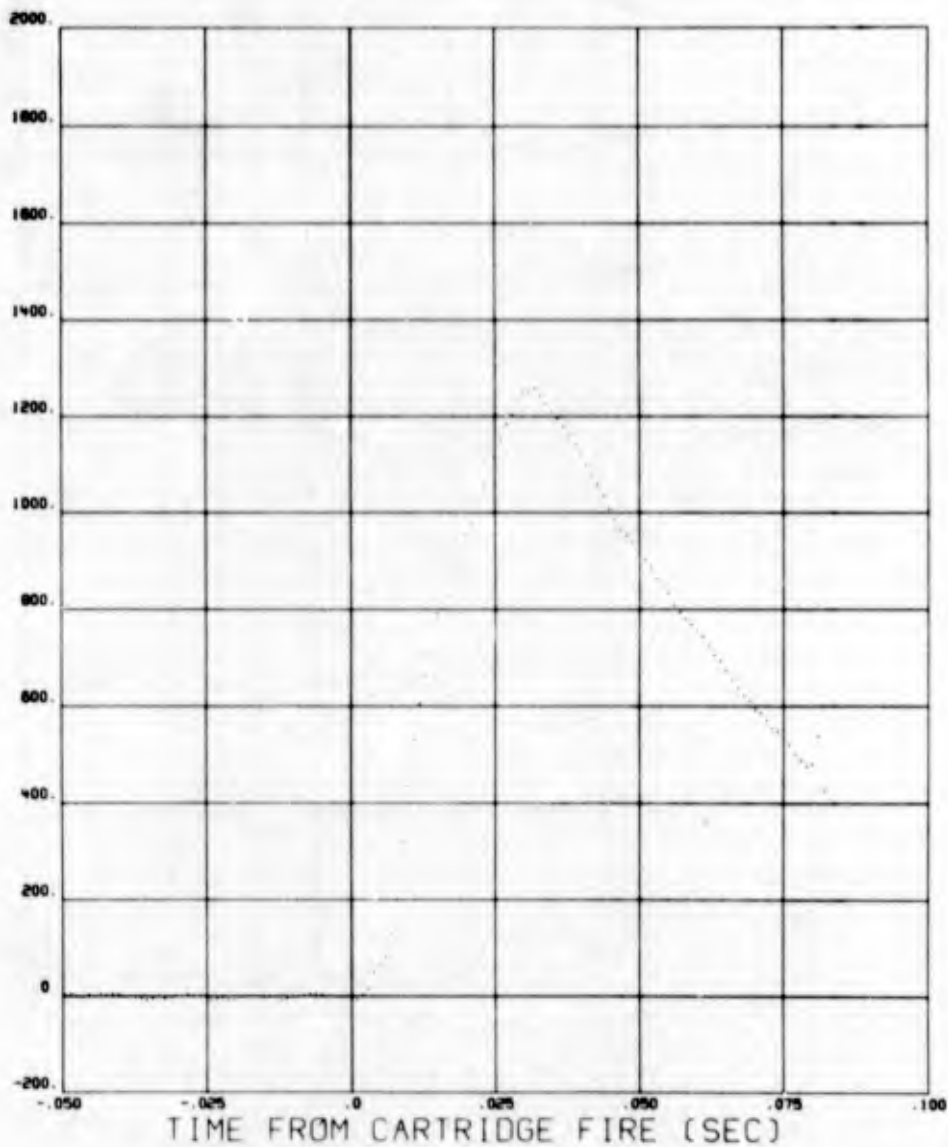
EJECTION
CHAMBER
PRESSURE
(PSI)



19/04/73 670AG018 18 AUG 71 MSN 43C BOMB

77^{REV} 07

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY 15X, ADTC

DATE 18 AUG 71 MISSION 43S BOMB ID 124 BOMB WEIGHT 506.25 LBS

EJECTOR MOMENT ARM 3.375 INCHES
TIME OF EJECTOR STROKE .078 SEC
A/C ANGLE OF ATTACK AT RELEASE 2.153 DEG
A/C PITCH ANGLE AT RELEASE 4.100 DEG
A/C ROLL ANGLE AT RELEASE 6.360 DEG
RACK EJECTION ANGLE -48.000 DEG

IMPACT RANGE DEFLECTION

FEET FEET

RELEASE HISTORY

PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

TIME DELAY
MILLISECONDS

0
1
1
1
79
1
1

HR MIN SEC
*** **
*** **
16 51 24.469
16 51 24.470
16 51 24.470
16 51 24.470
16 51 24.548
16 51 24.470
16 51 24.470

MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREACH AMBIENT TEMPERATURE

***** DEG F
***** DEG F
95.64 DEG F

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

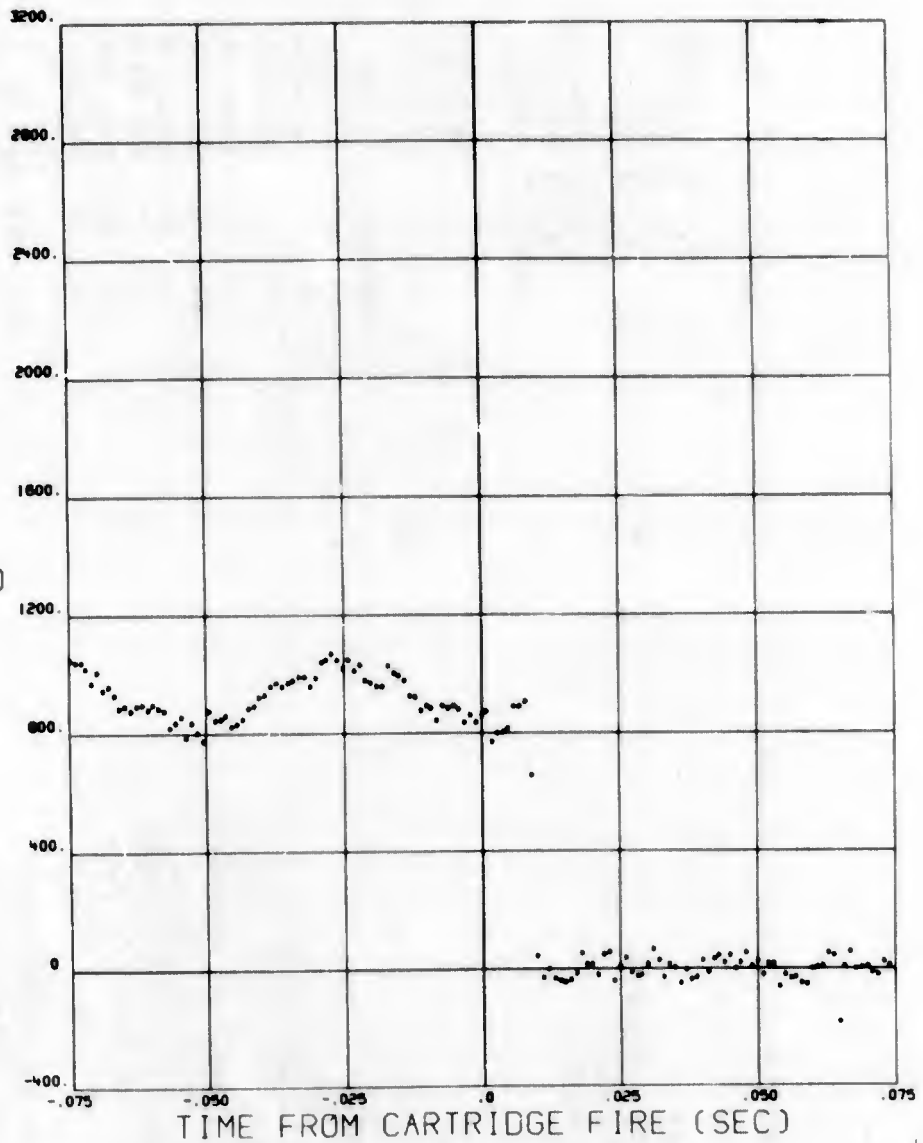
***** FT/SEC
4.7 FT/SEC

19/04/73 670AG018 18 AUG 71 MSN 43S BOMB

124 ^{R240} 60 07

RELATIVE
SWAY
BRACE
STRAIN
(LBS)

* = RIGHT FWD

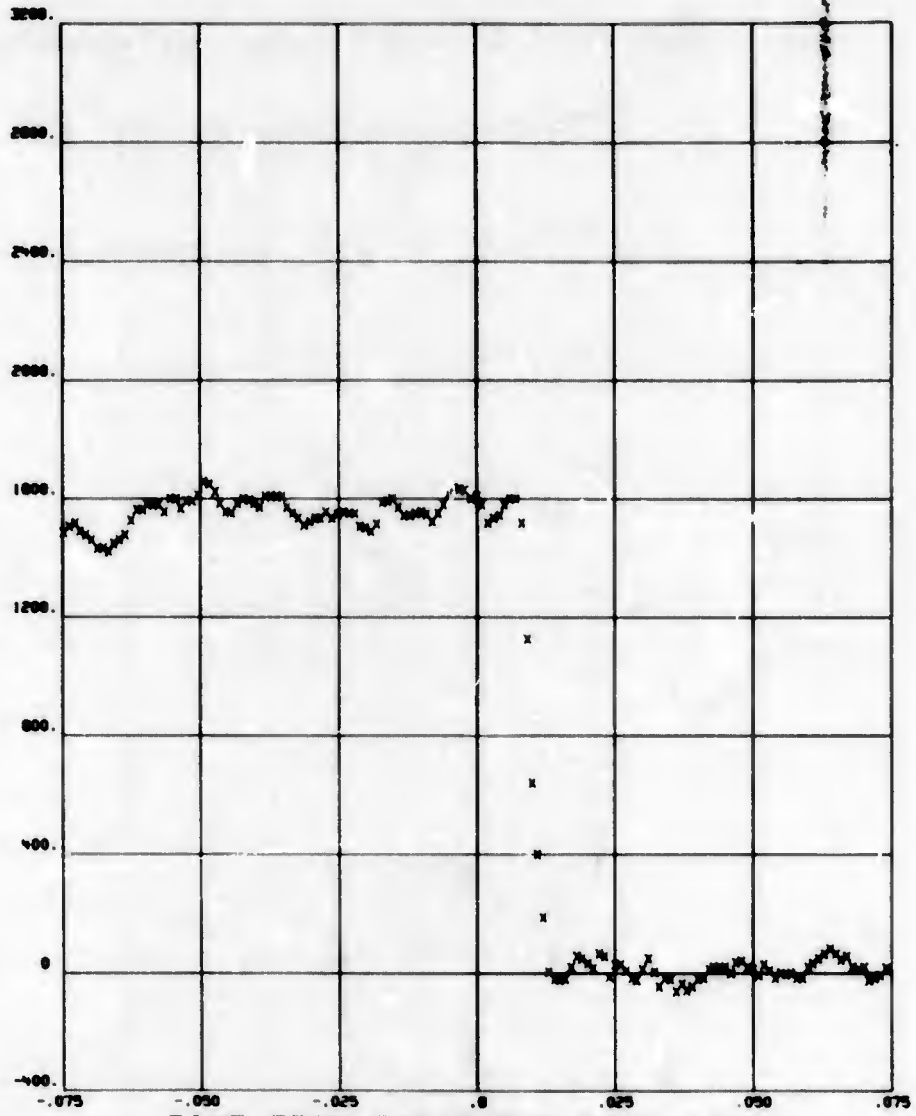


PLOT PREPARED BY TSX, ADIC

18/04/73 670AG018 18 AUG 71 MSN 43S BOMB

124 0.7

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



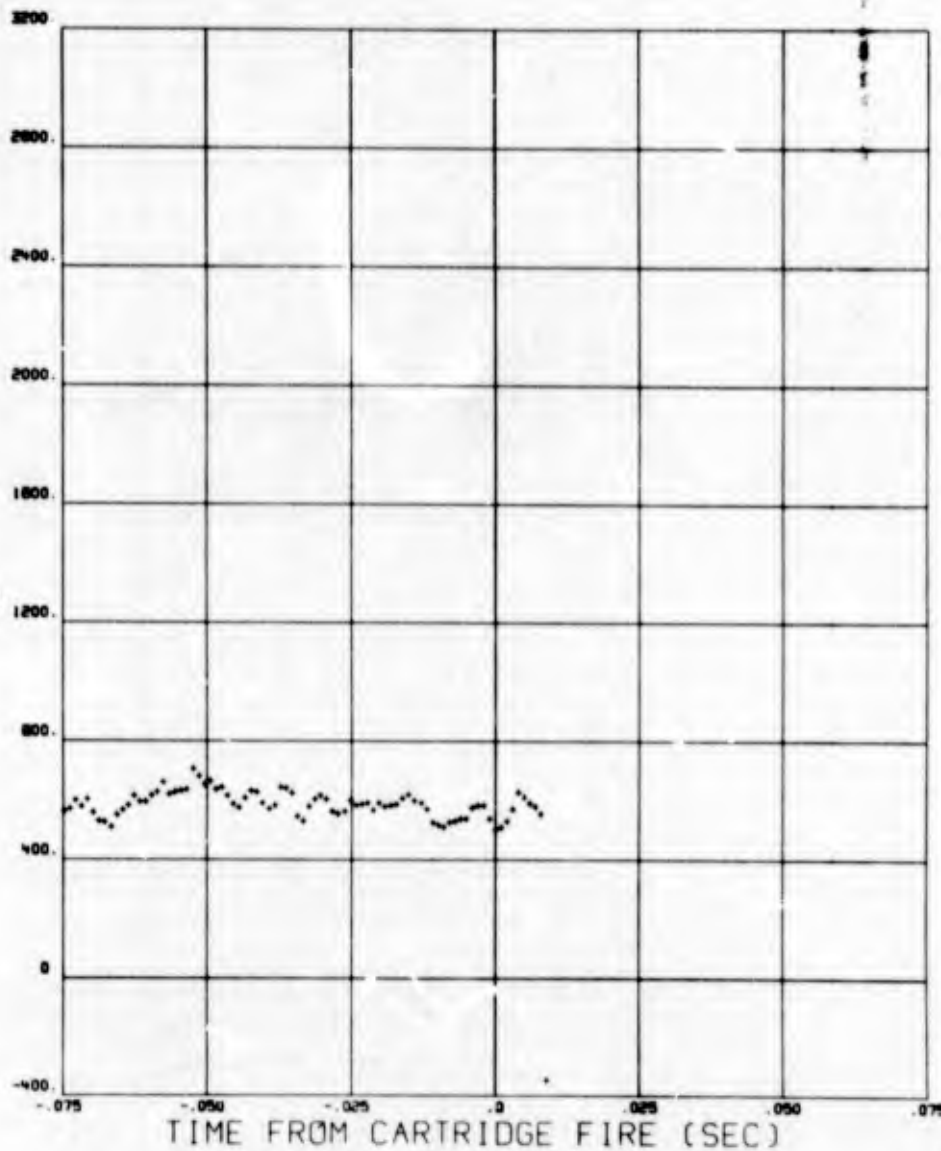
TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADIC

19/09/73 670AG018 18 AUG 71 MSN 43S BOMB

124

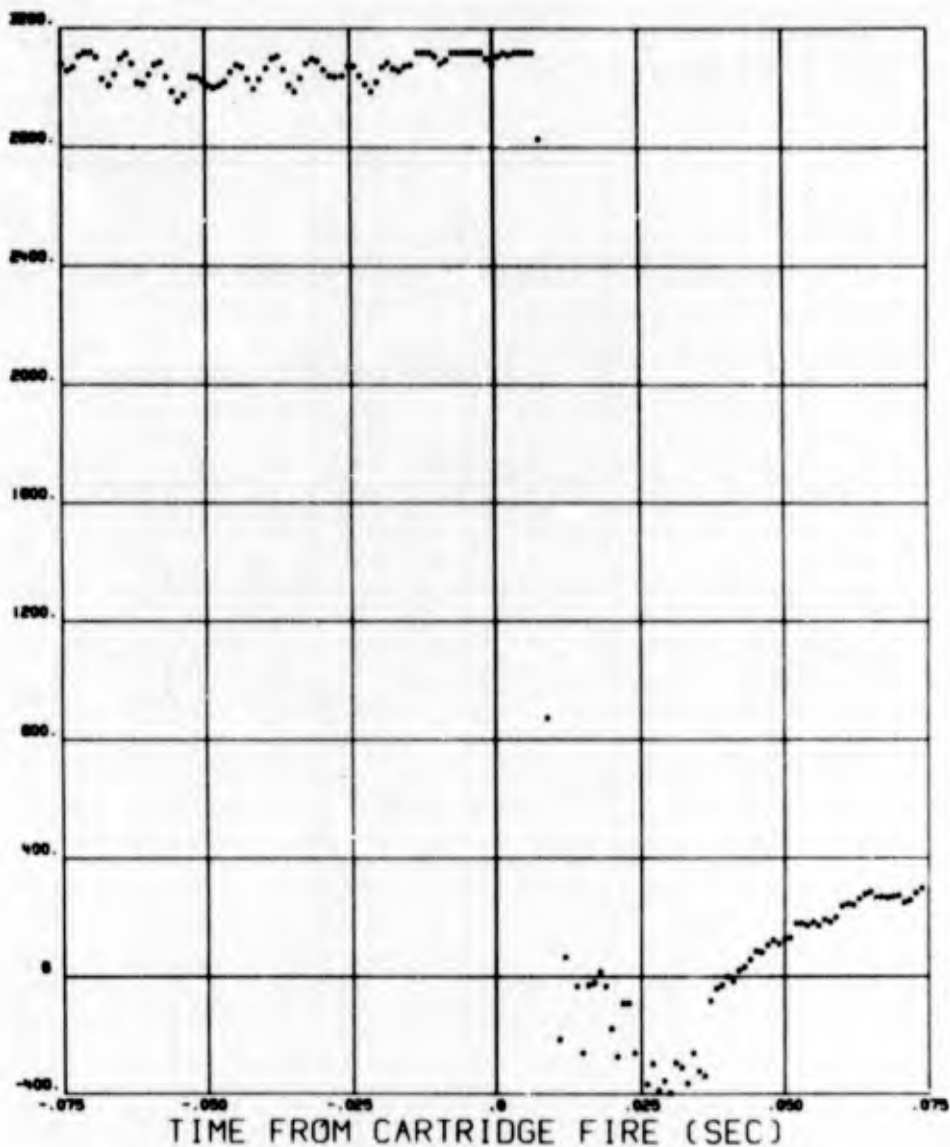
RELATIVE
HOOK
REACTION
(LBS)
+ = FORWARD



PLOT PREPARED BY TSK, ADTC

RELATIVE
HOOK
REACTION
(LBS)

* = AFT

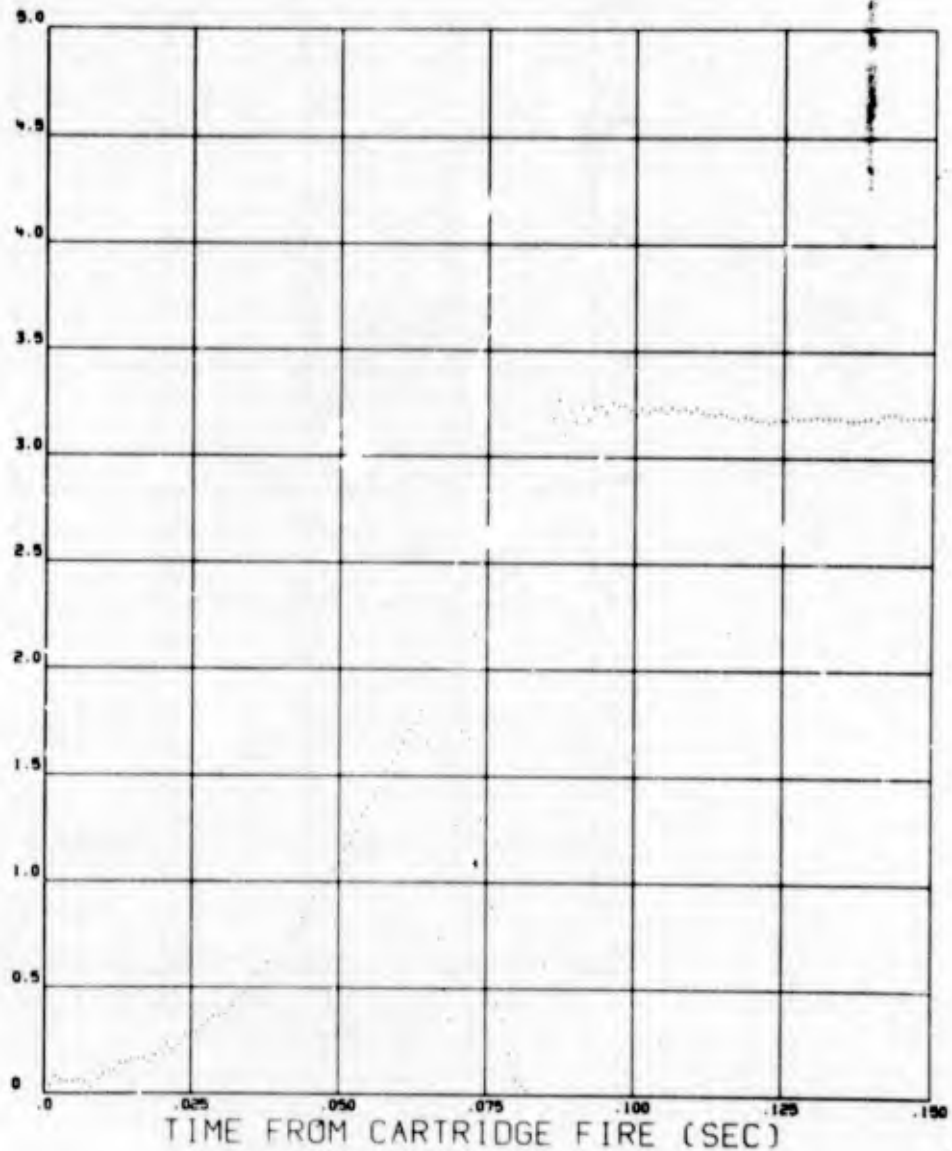


PLOT PREPARED BY TSX, ADTC

19/04/73 670AG018 18 AUG 71 MSN 43S BOMB

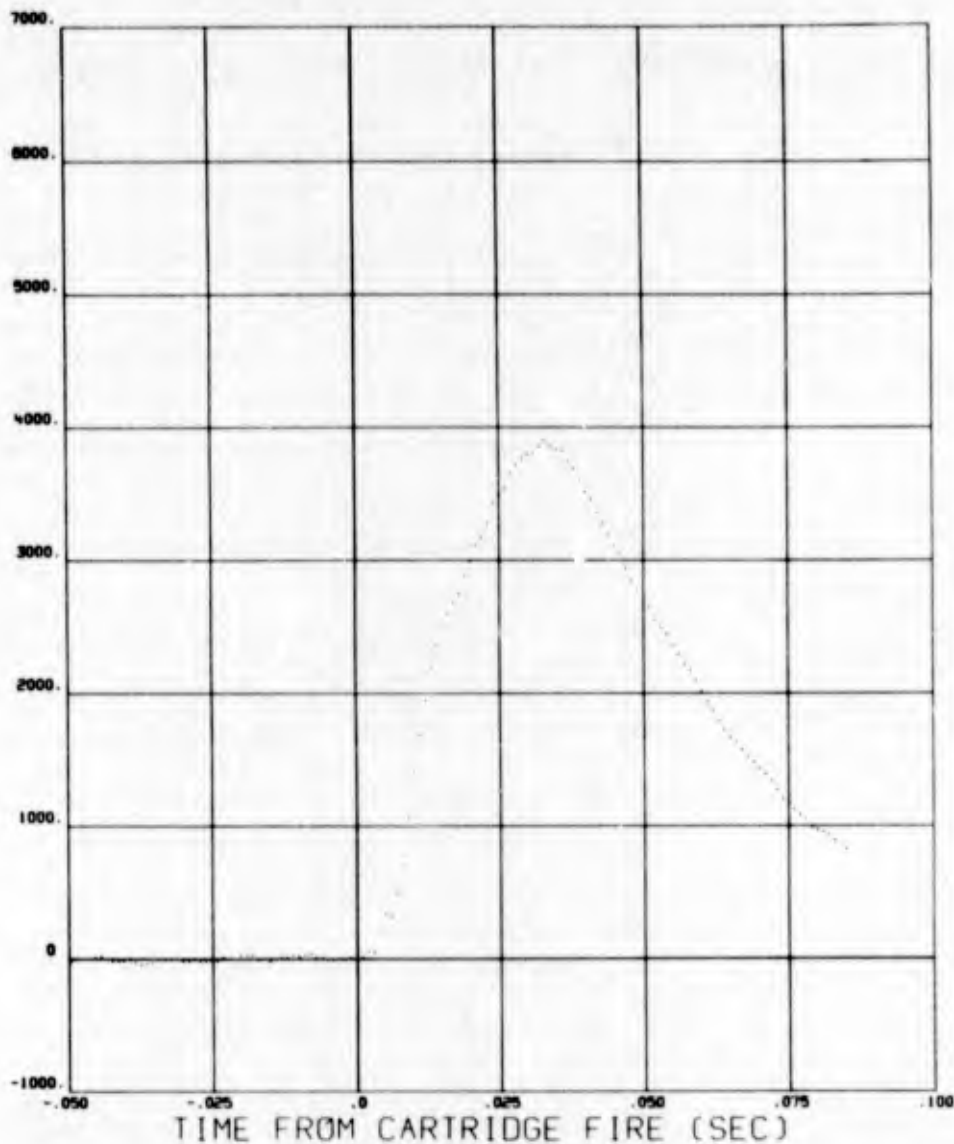
124 07

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY TSX, ADTC

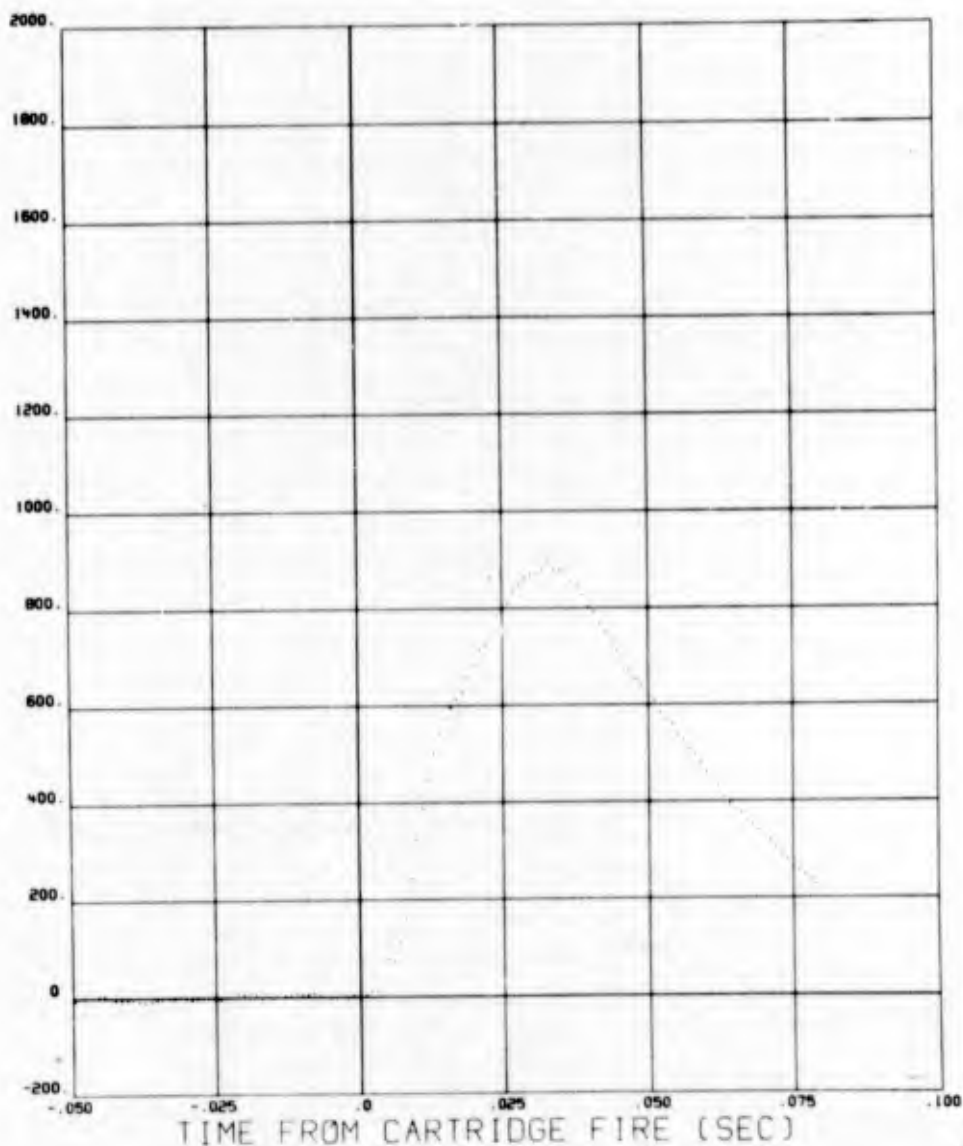
EJECTION
CHAMBER
PRESSURE
(PSI)



19/04/73 670AG018 18 AUG 71 MSN 43S BOMB

124 ^{R240} 72 0

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY TSX. ADTC

DATE 26 AUG 71 MISSION 47C BOMB ID 38 BOMB WEIGHT 509.50 LBS

EJECTOR MOMENT ARM 3.375 INCHES
 TIME OF EJECTOR STROKE .070 SEC
 A/C ANGLE OF ATTACK AT RELEASE 2.307 DEG
 A/C PITCH ANGLE AT RELEASE -1.170 DEG
 A/C ROLL ANGLE AT RELEASE 2.460 DEG
 RACK EJECTION ANGLE 0.000 DEG

[2] IMPACT RANGE DEFLECTION FEET FEET

RELEASE HISTORY
 PICKLE TIME
 CARTRIDGE FIRE
 INITIAL LINKAGE MOVEMENT
 EJECTOR FOOT (FIRST MOTION)
 STORE FIRST MOTION (FORWARD)
 STORE FIRST MOTION (AFT)
 EJECTOR FOOT FULL EXTENDED
 HOOK FIRST MOTION (FORWARD)
 HOOK FIRST MOTION (AFT)

HR	MIN	SEC
16	33	3.473
16	33	3.484
16	33	3.484
16	33	3.485
16	33	3.485
16	33	3.554
16	33	3.483

TIME DELAY
 MILLISECONDS
 0
 11
 11
 12
 12
 61

 10

MAXIMUM PRE-FLT GROUND TEMPERATURE
 MAXIMUM POST-FLT GROUND TEMPERATURE
 MAXIMUM BREECH AMBIENT TEMPERATURE

***** DEG F
 ***** DEG F
 92.64 DEG F

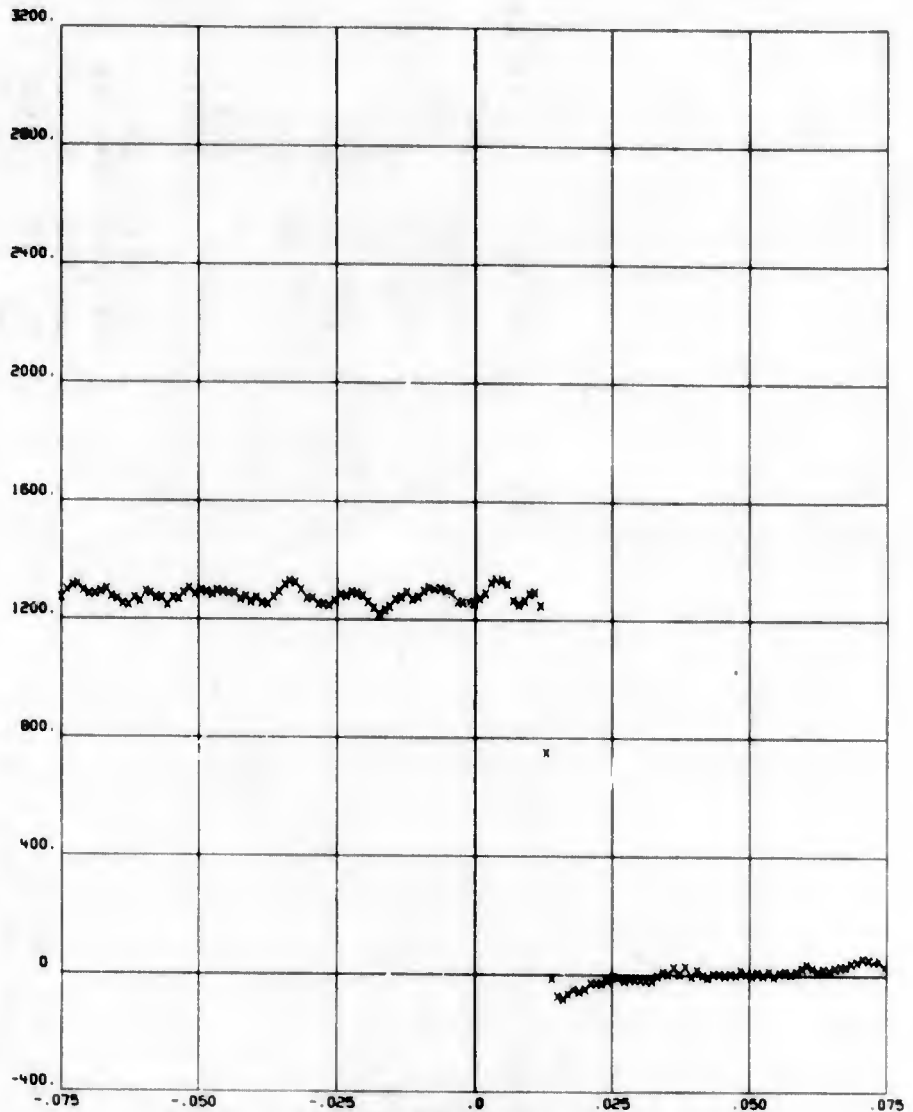
SEPARATION VELOCITY
 DISPLACEMENT METHOD
 PRESSURE METHOD

***** FT/SEC
 6.8 FT/SEC

20/04/73 670AG018 26 AUG 71 MSN 47C BOMB

38^{R245}, 07

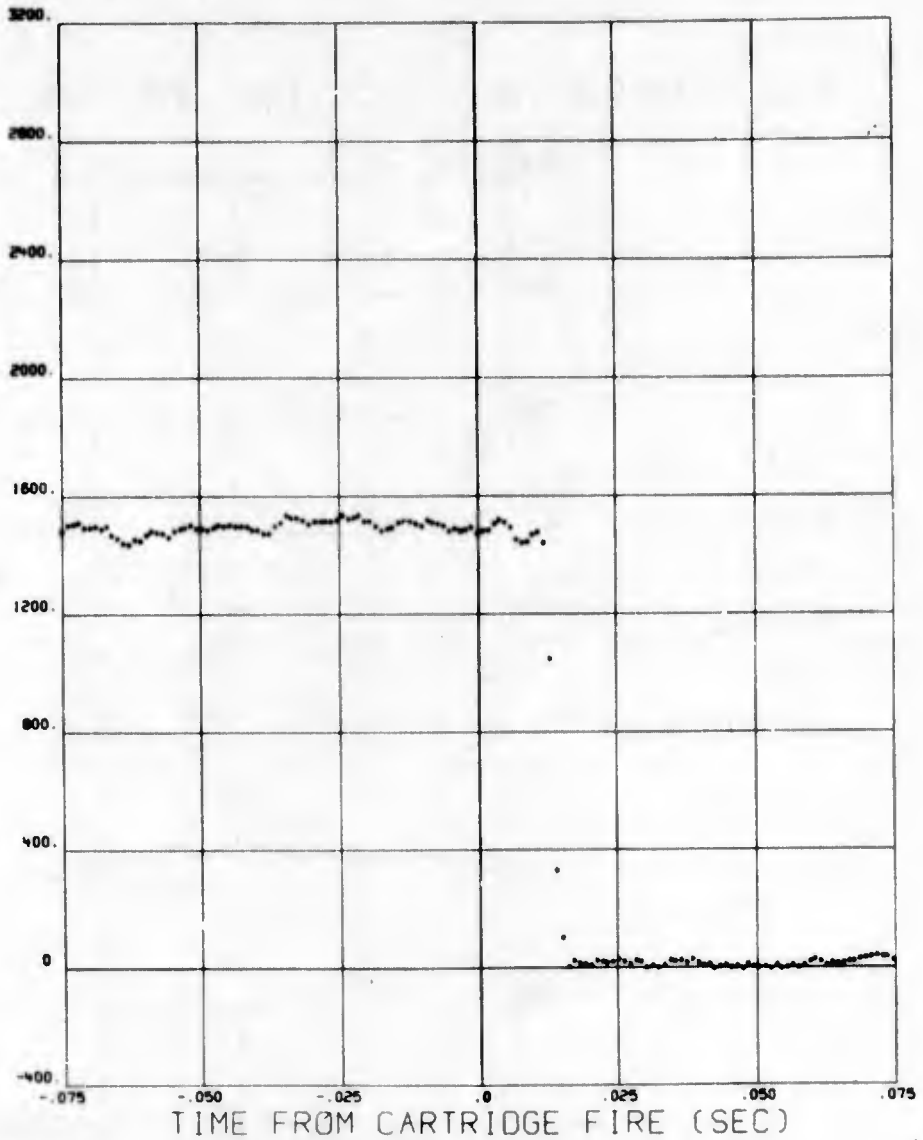
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

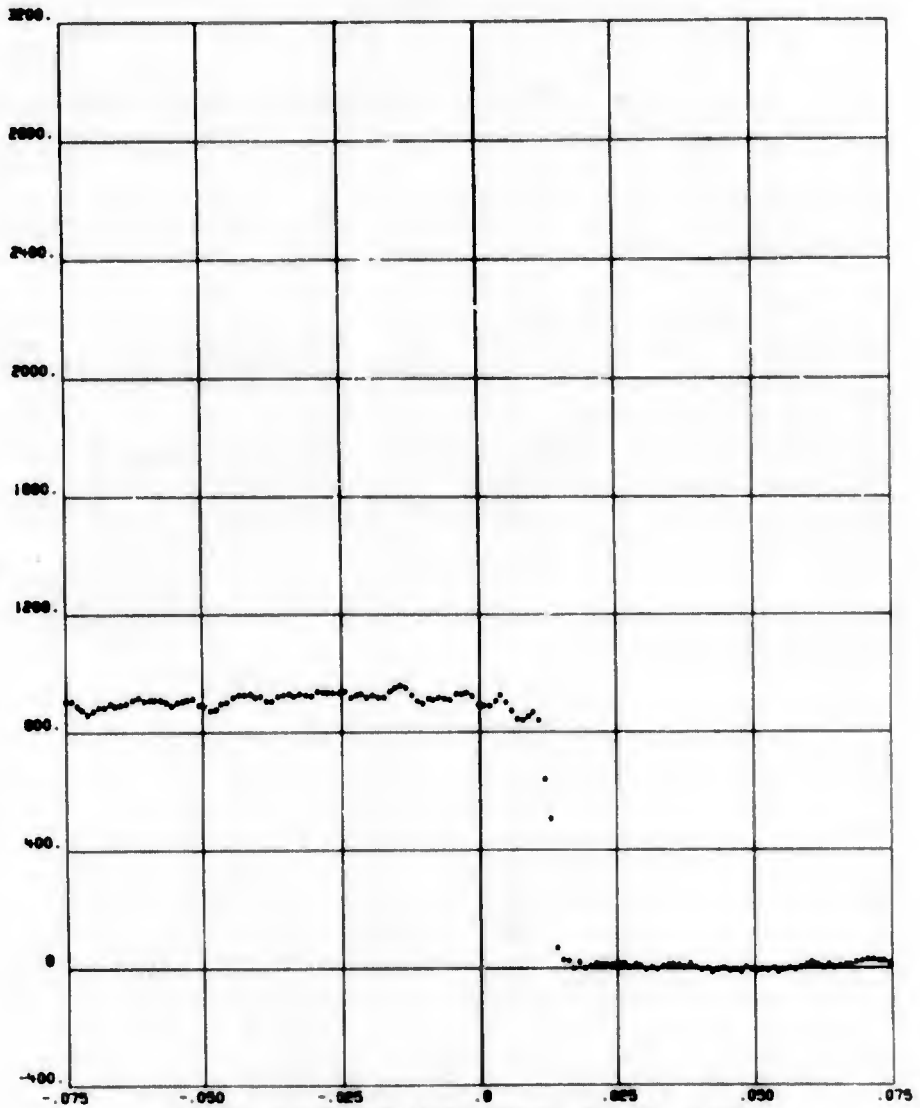
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

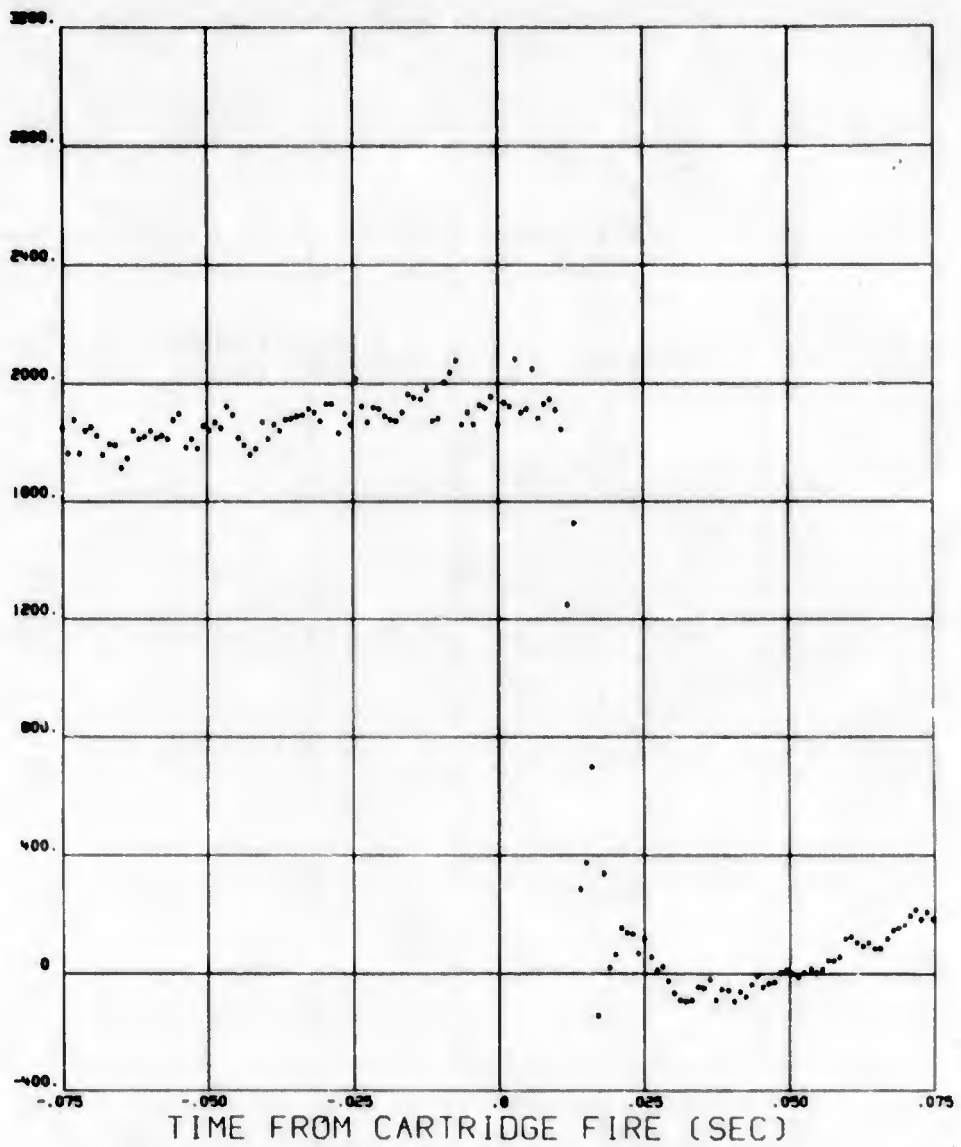
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

RELATIVE
HOOK
REACTION
(LBS)
* = AFT

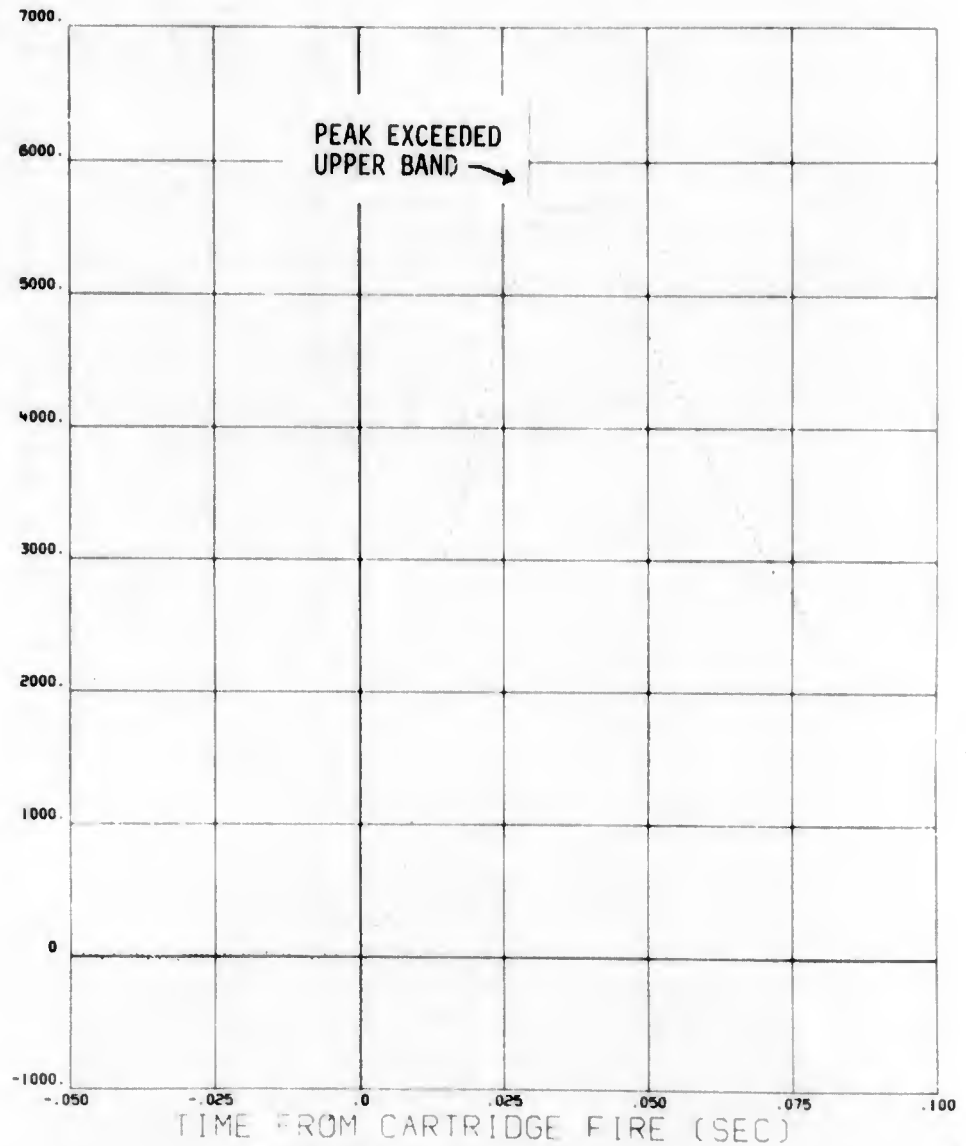


PLOT PREPARED BY TSN, ADTC

20/04/73 670AG018 26 AUG 71 MSN 47C BOMB

38^{R245} 0 7

EJECTION
CHAMBER
PRESSURE
(PSI)

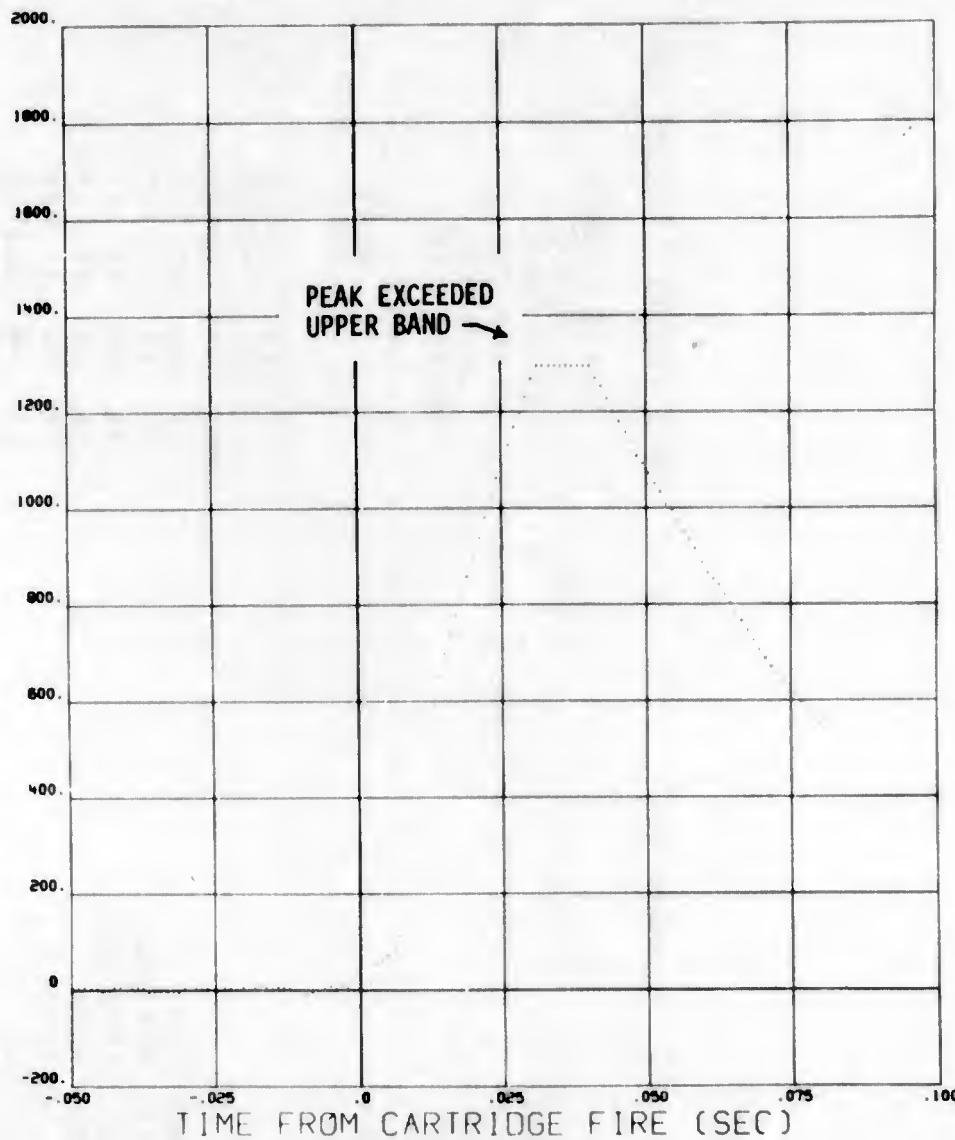


PLOT PREPARED BY 15A, ADTC

20/04/73 670AG018 26 AUG 71 MSN 47C BOMB

38^{R245} 9 0

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY TSX, ADTC

DATE 26 AUG 71 MISSION 47S BOMB ID 10 BOMB WEIGHT 506.50 LBS

EJECTOR MOMENT ARM 3.313 INCHES
TIME OF EJECTOR STROKE .075 SEC
A/C ANGLE OF ATTACK AT RELEASE 2.490 DEG
A/C PITCH ANGLE AT RELEASE -.840 DEG
A/C ROLL ANGLE AT RELEASE .550 DEG
RACK EJECTION ANGLE --48.000 DEG

IMPACT RANGE FEET
DEFLECTION FEET

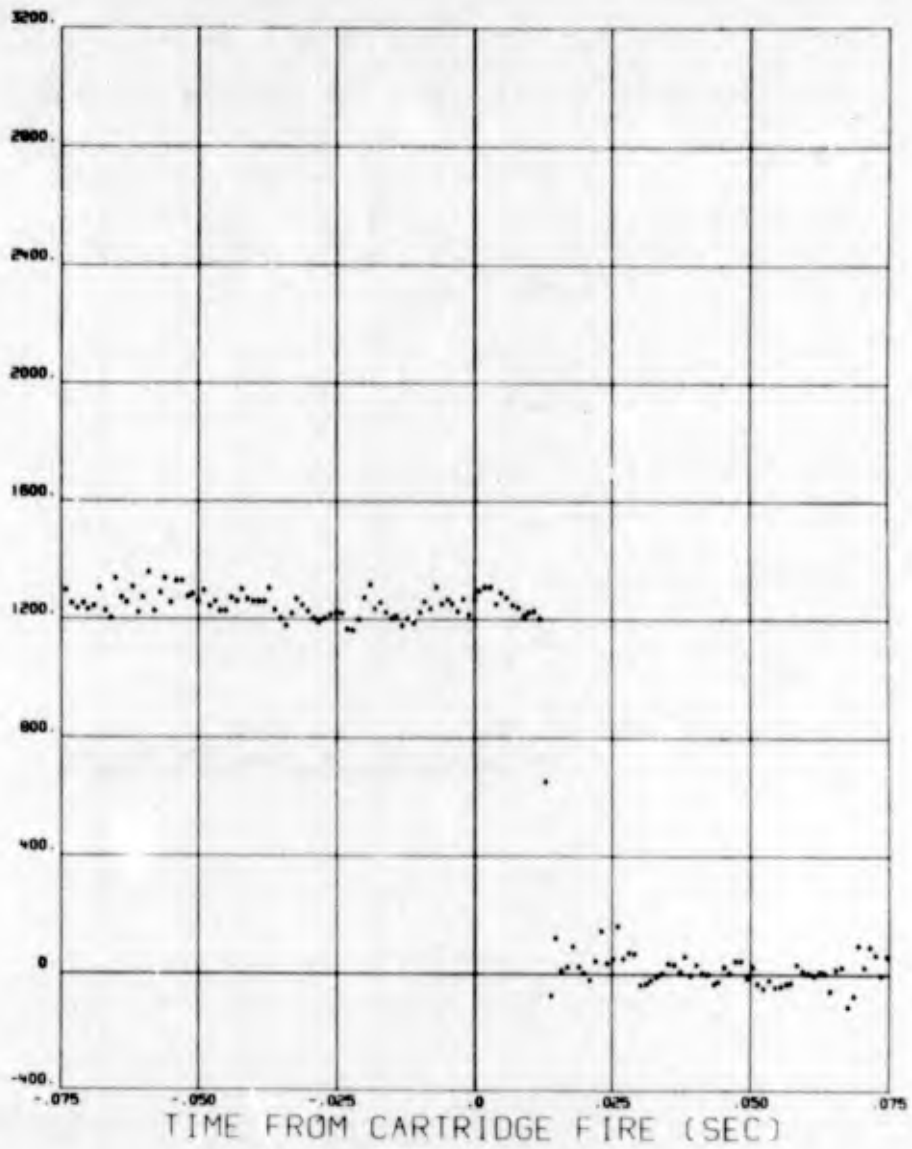
RELEASE HISTORY
PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

HR	MIN	SEC	TIME DELAY
16	49	30.775	0
16	49	30.775	0
16	49	30.775	0
16	49	30.775	0
16	49	30.850	75
16	49	30.775	0
16	49	30.775	0

MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD

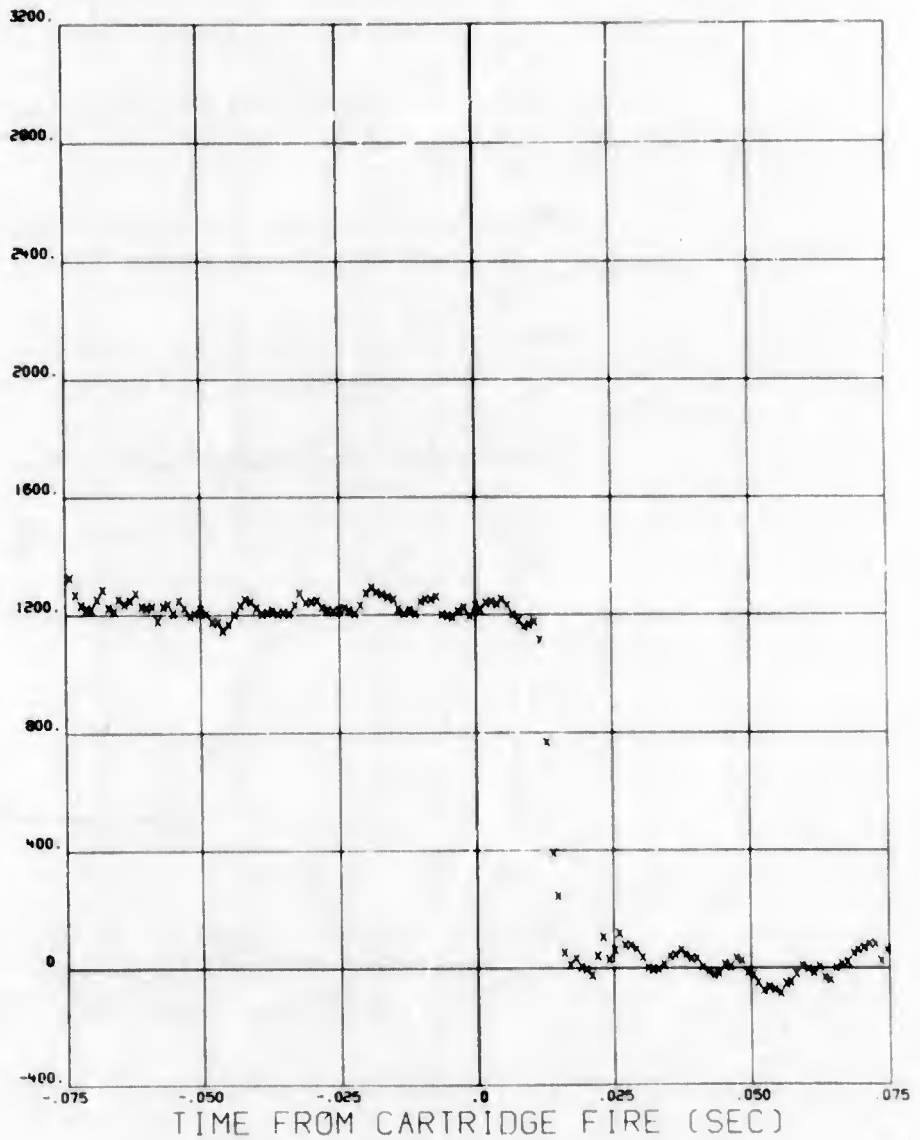


PLT PREPARED BY TSX, ADTC

20/04/73 670AG018 26 AUG 71 MSN 47S BOMB

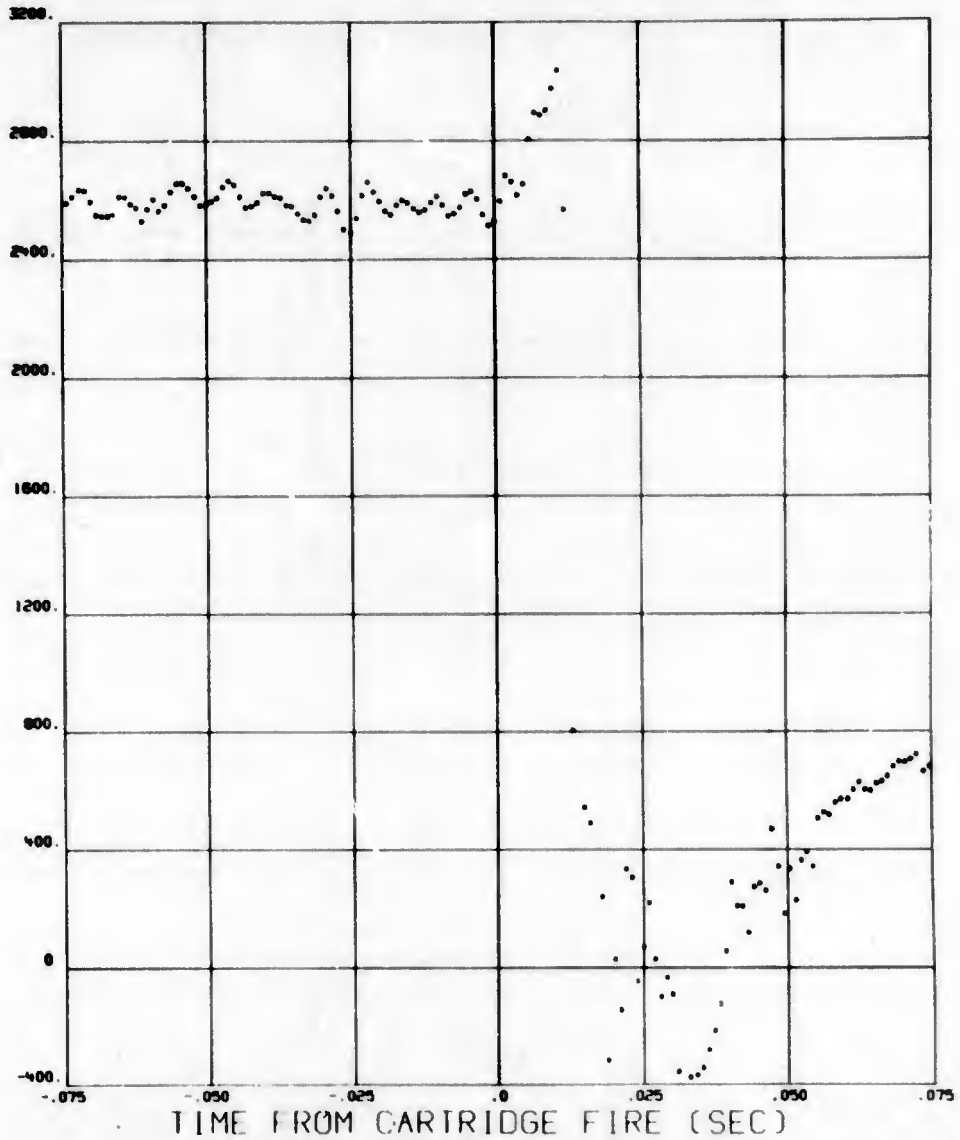
10^{R245}₁₂ 07

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



PLOT PREPARED BY TSX, ADTC

RELATIVE
HOOK
REACTION
(LBS)
* = AFT

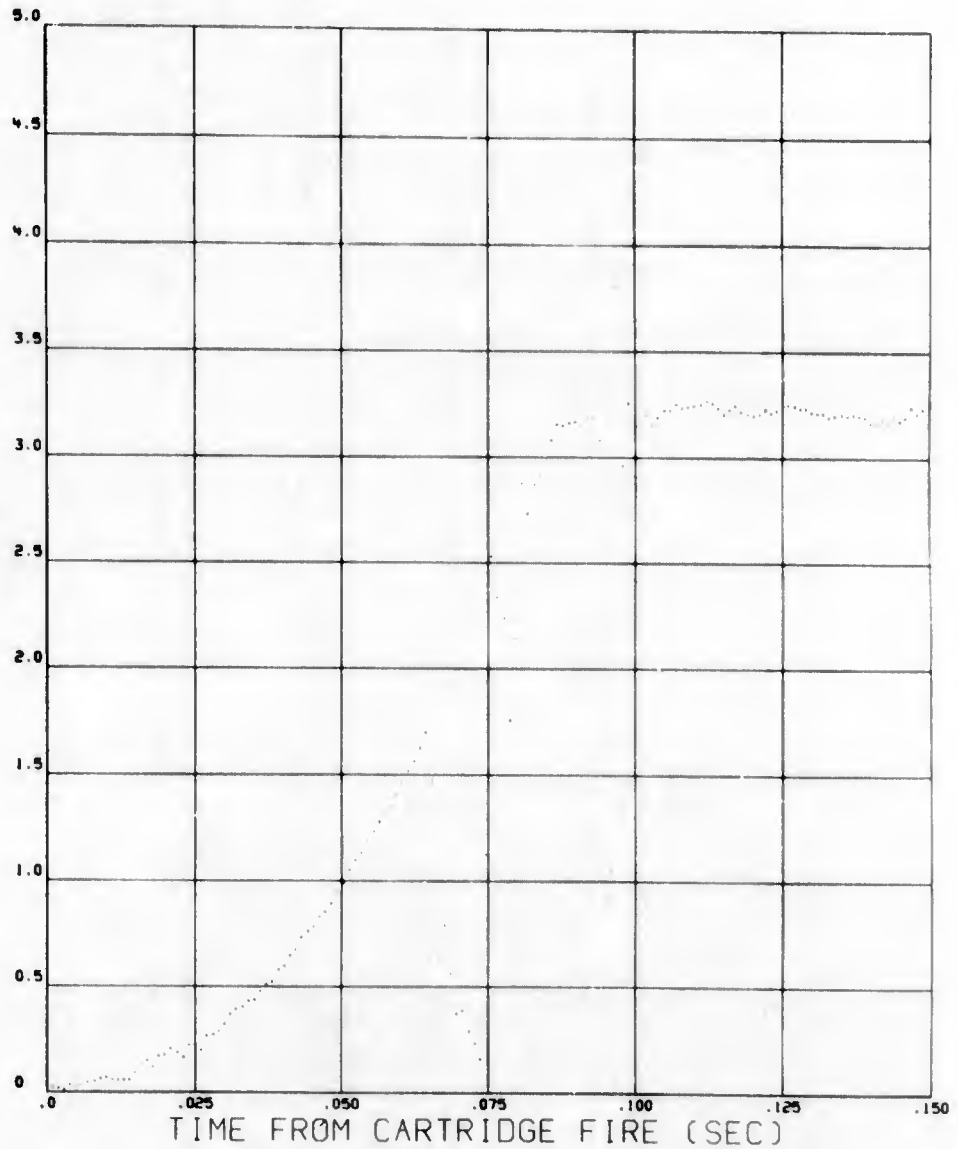


PLOT PREPARED BY TSX, ADTC

20/04/73 670AG018 26 AUG 71 MSN 47S BOMB

10^{R245} 16 07

EJECTOR
FOOT
POSITION
(INCHES)

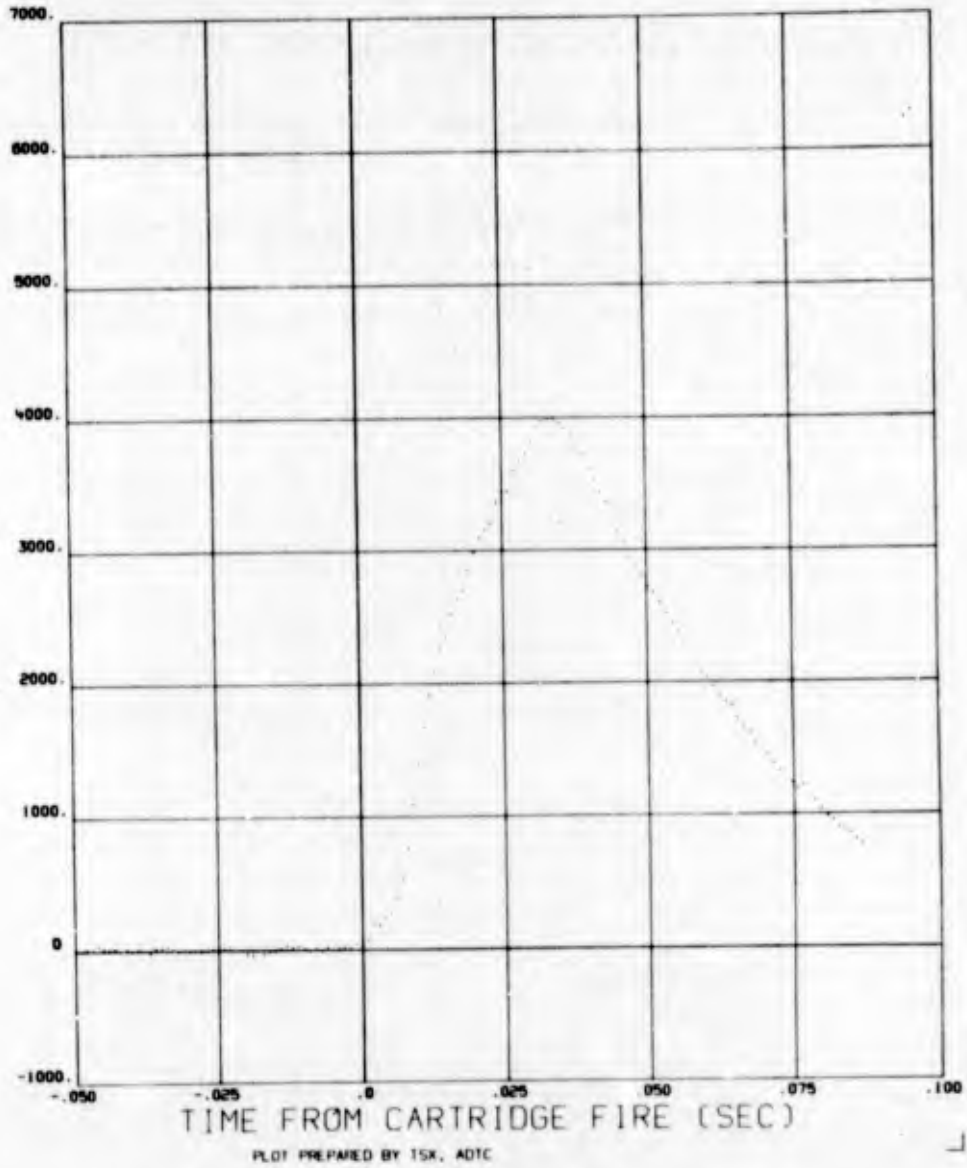


PLOT PREPARED BY TSX, ADTC

20/04/73 670AG018 26 AUG 71 MSN 47S BOMB

10^{R245} 17 07

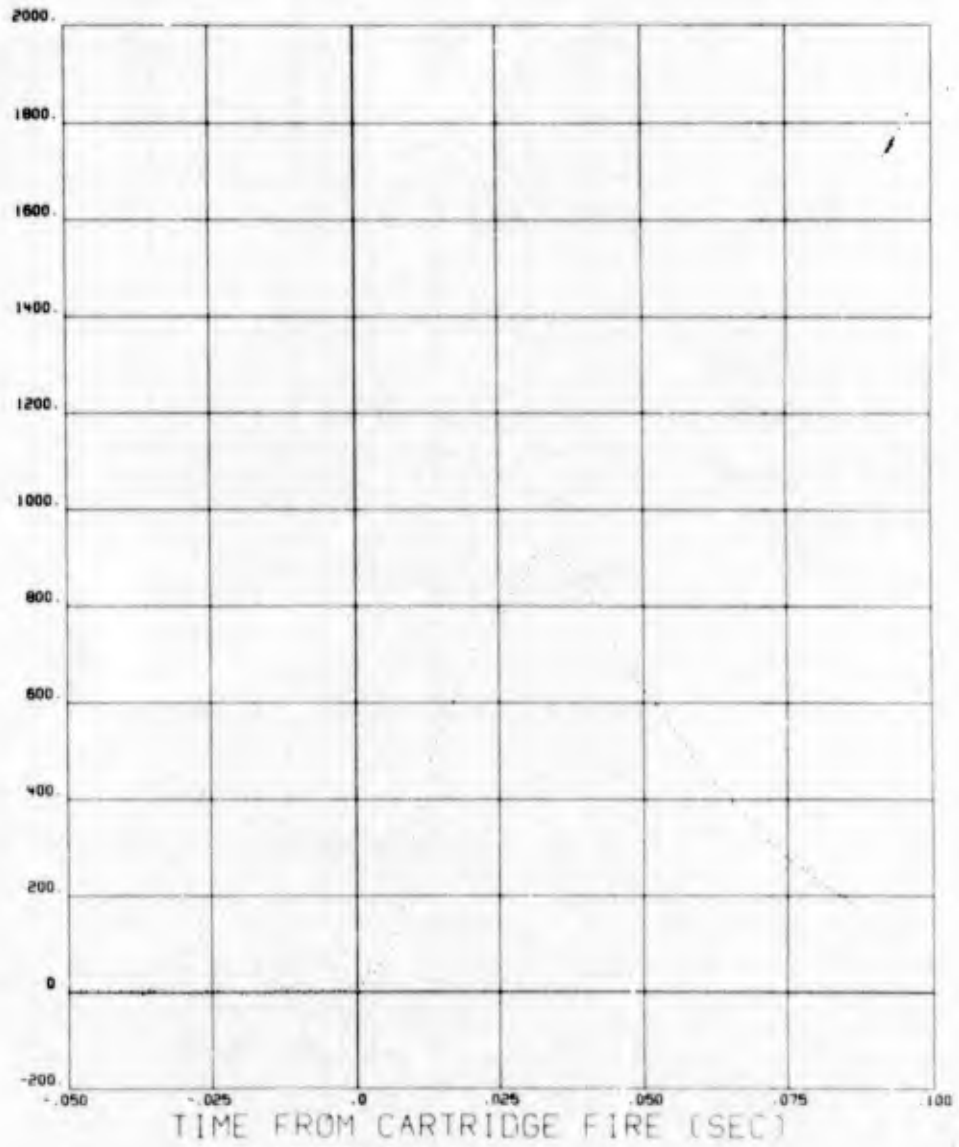
EJECTION
CHAMBER
PRESSURE
(PSI)



20/04/73 670AG018 26 AUG 71 MSN 47S BOMB

10⁰²⁴⁵ 19 07

EJECTOR
FOOT
FORCE
(LBS.)



PLOT PREPARED BY TSK, ADTC

DATE 1 SEPT 71 MISSION 50C BOMB ID 78 BOMB HEIGHT 506.50 LBS

EJECTOR MOMENT ARM
 TIME OF EJECTOR STROKE 3.125 INCHES
 A/C ANGLE OF ATTACK AT RELEASE 2.341 DEG
 A/C PITCH ANGLE AT RELEASE .390 DEG
 A/C ROLL ANGLE AT RELEASE -3.500 DEG
 RACK EJECTION ANGLE 0.000 DEG

IMPACT RANGE DEFLECTION FEET FEET

RELEASE HISTORY
 PICKLE TIME 15 45 57.410
 CARTRIDGE FIRE 15 45 57.417
 INITIAL LINKAGE MOVEMENT
 EJECTOR FOOT (FIRST MOTION) 15 45 57.418
 STORE FIRST MOTION (FORWARD) 15 45 57.417
 STORE FIRST MOTION (AFT)
 EJECTOR FOOT FULL EXTENDED
 HOOK FIRST MOTION (FORWARD)
 HOOK FIRST MOTION (AFT)

TIME DELAY
 MILLISECCNDS
 0
 7

 8
 7

 7

MAXIMUM PRE-FLT GROUND TEMPERATURE
 MAXIMUM POST-FLT GROUND TEMPERATURE
 MAXIMUM BREECH AMBIENT TEMPERATURE

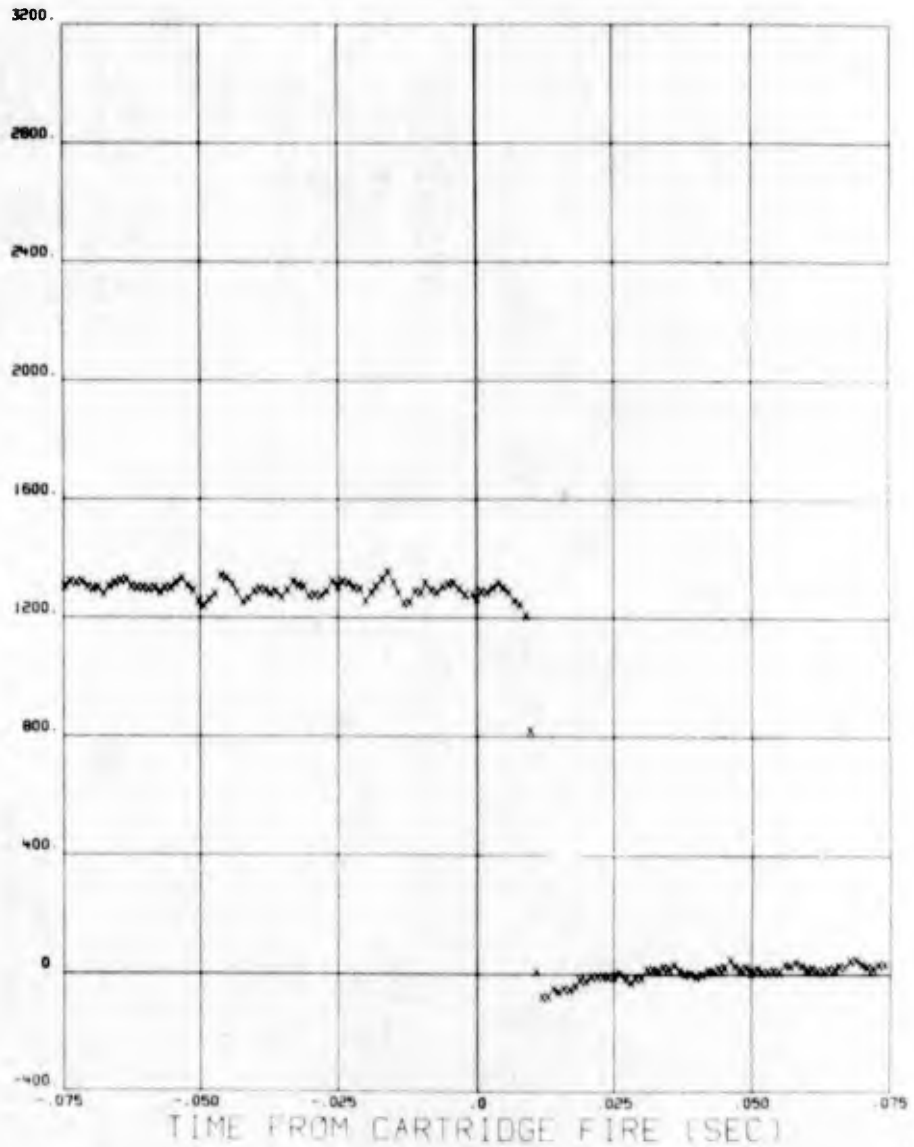
SEPARATION VELOCITY
 DISPLACEMENT METHOD
 PRESSURE METHOD

***** FT/SEC
 6.2 FT/SEC

20/04/73 670AG018 1 SEPT 71 MSN 500 BOMB

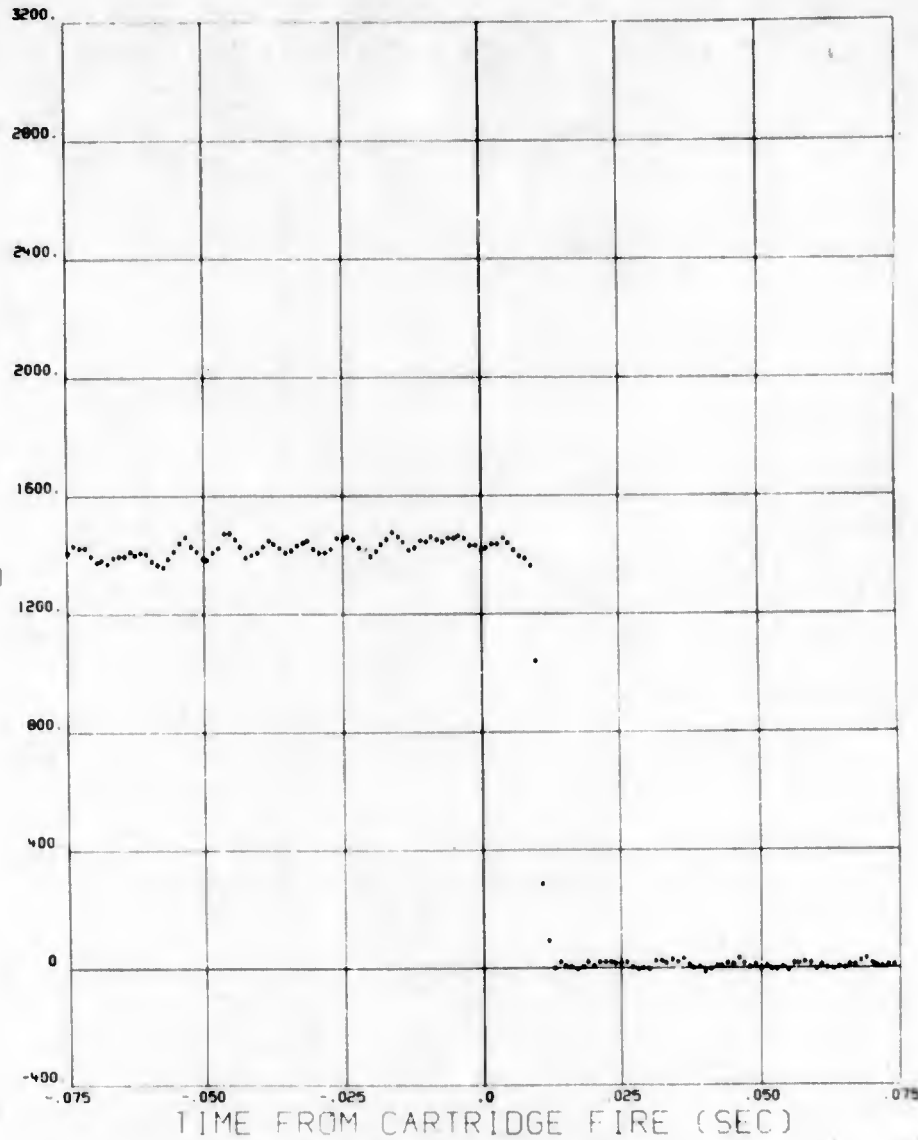
78^{R245}₁₉ 0 7

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



PLOT PREPARED BY TSX, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
• = RIGHT FWD

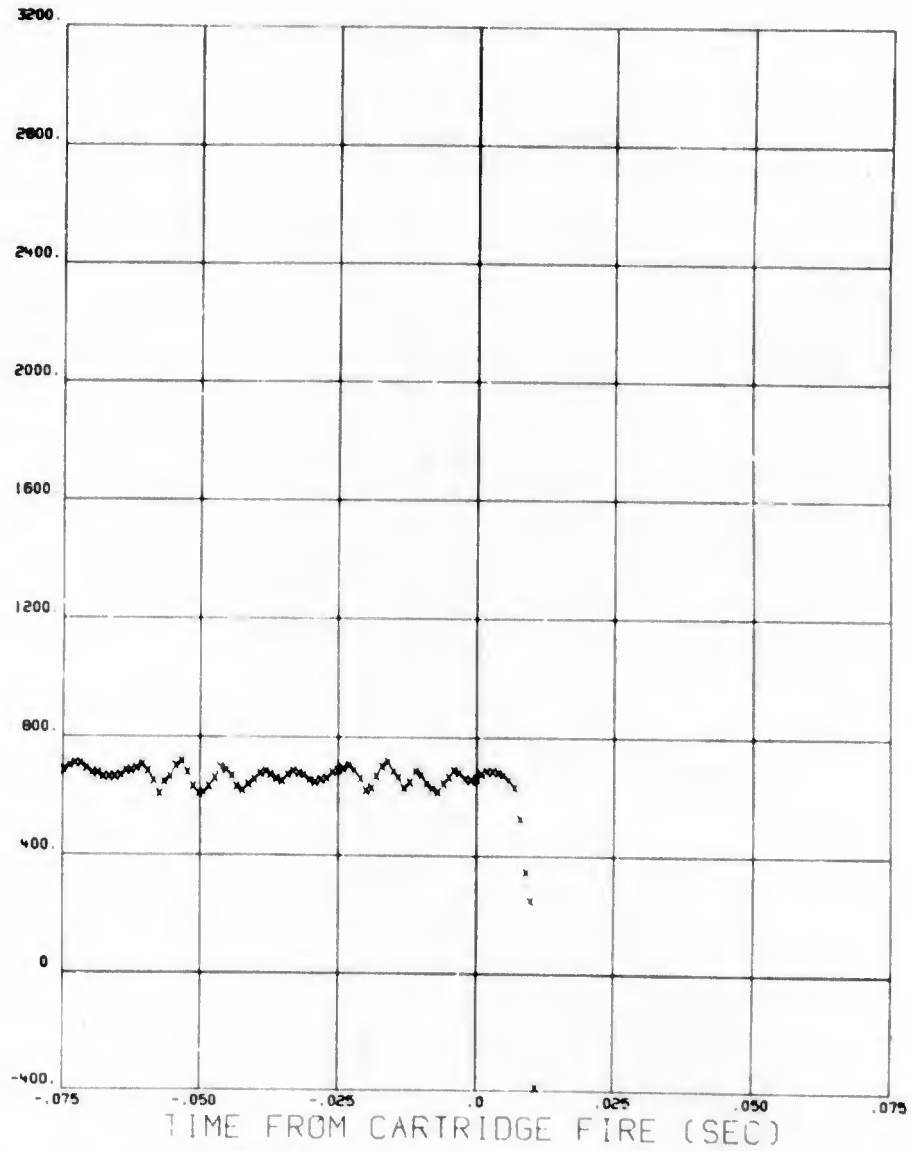


PLOT PREPARED BY TSX ADTC

20/04/73 670AG018 1 SEPT 71 MSN 50C BOMB

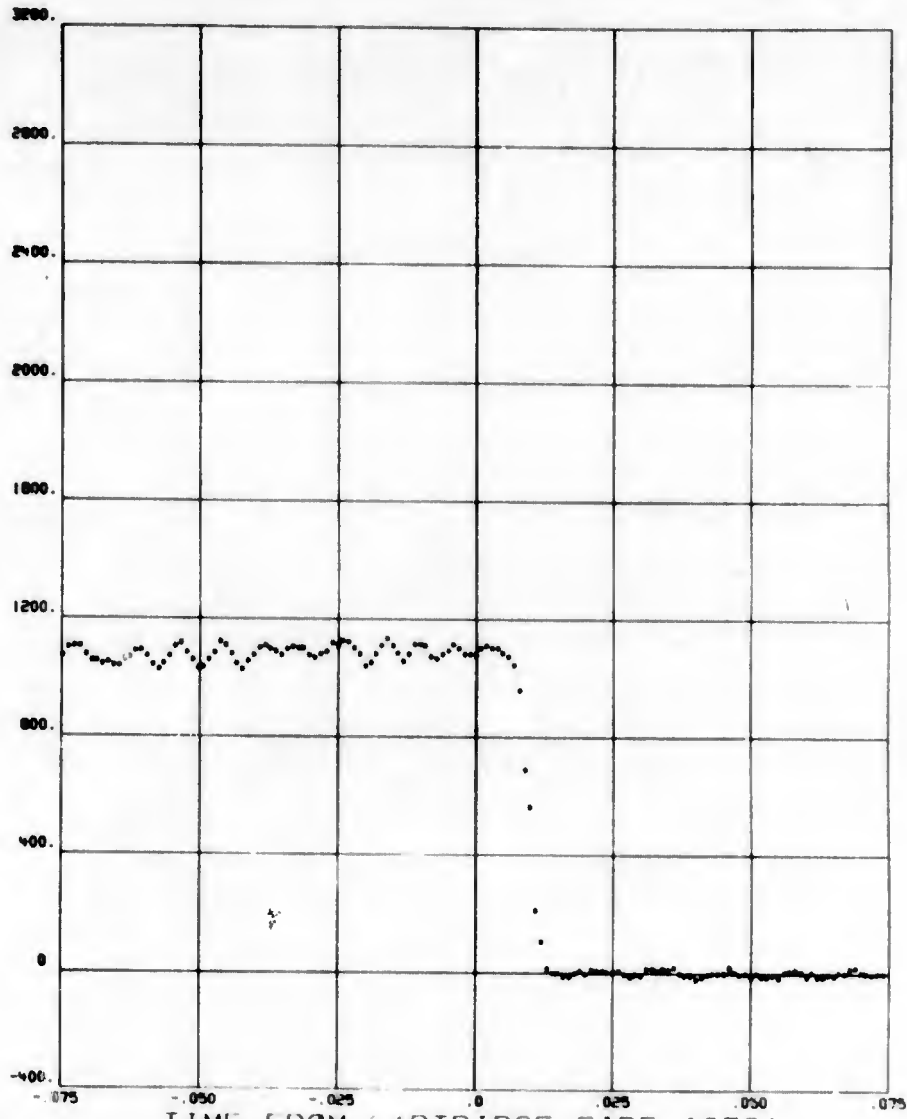
78^{R245} 21 0 7

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



PLOT PREPARED BY TSX, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



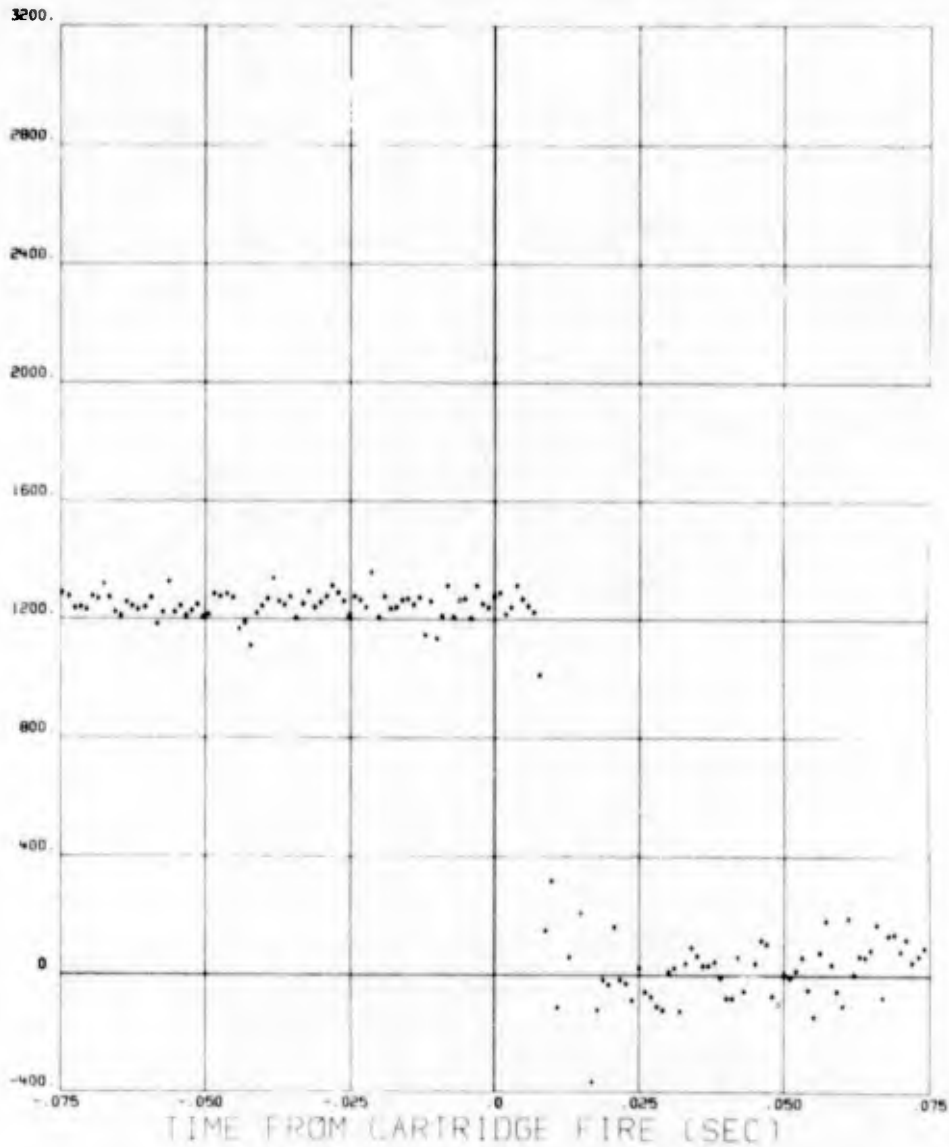
TIME FROM (CARTRIDGE FIRE (SEC)

PLOT PREPARED BY T54, ADTC

20/04/73 670AG018 1 SEPT 71 MSN 500 BOMB

78^{R245}₂₄ 0

RELATIVE
HOOK
REACTION
(LBS)
* = AFT



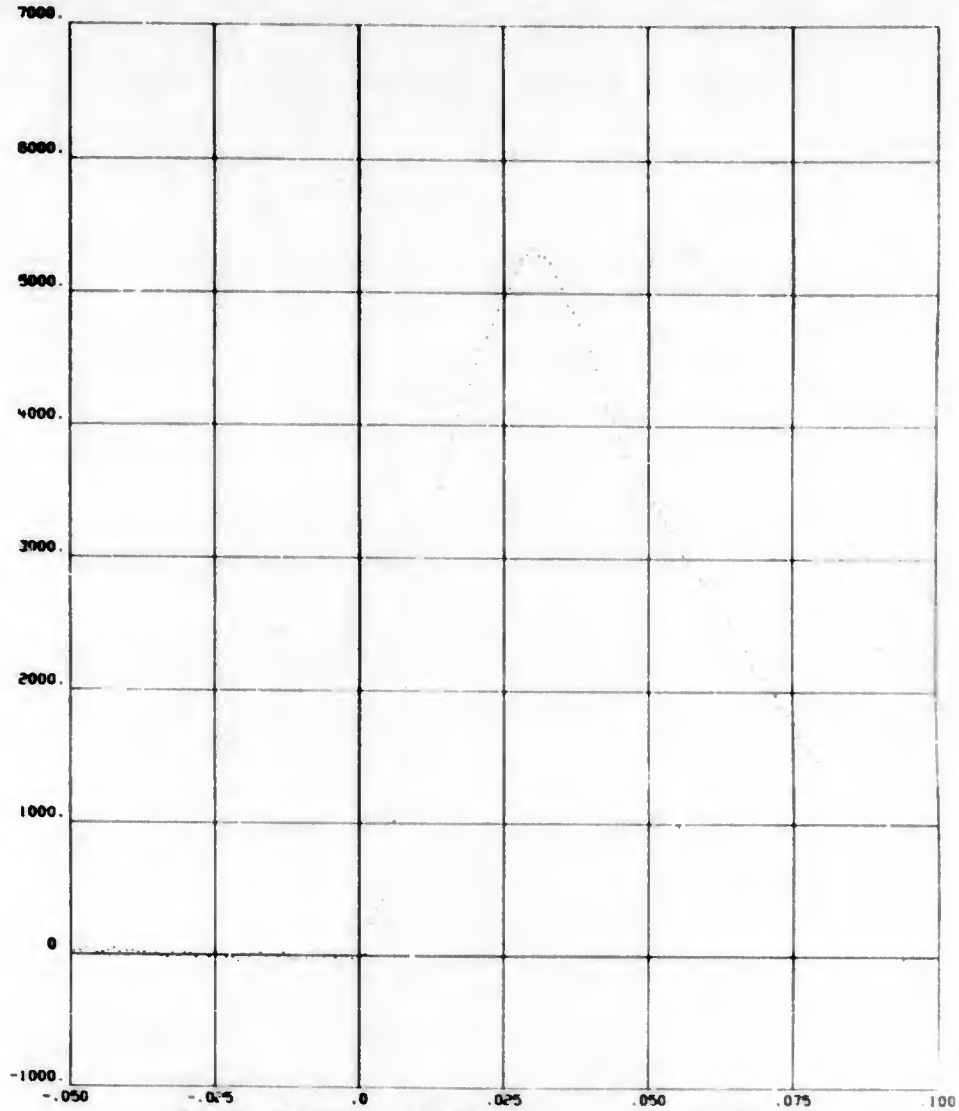
PLT PREPARED BY TSK, ADTC

20/04/73 670AG018

1 SEPT 71 MSN 50C BOMB

78⁰²⁴⁵ 26 0 1

EJECTION
CHAMBER
PRESSURE
(PSI)



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY 15X, ADIC

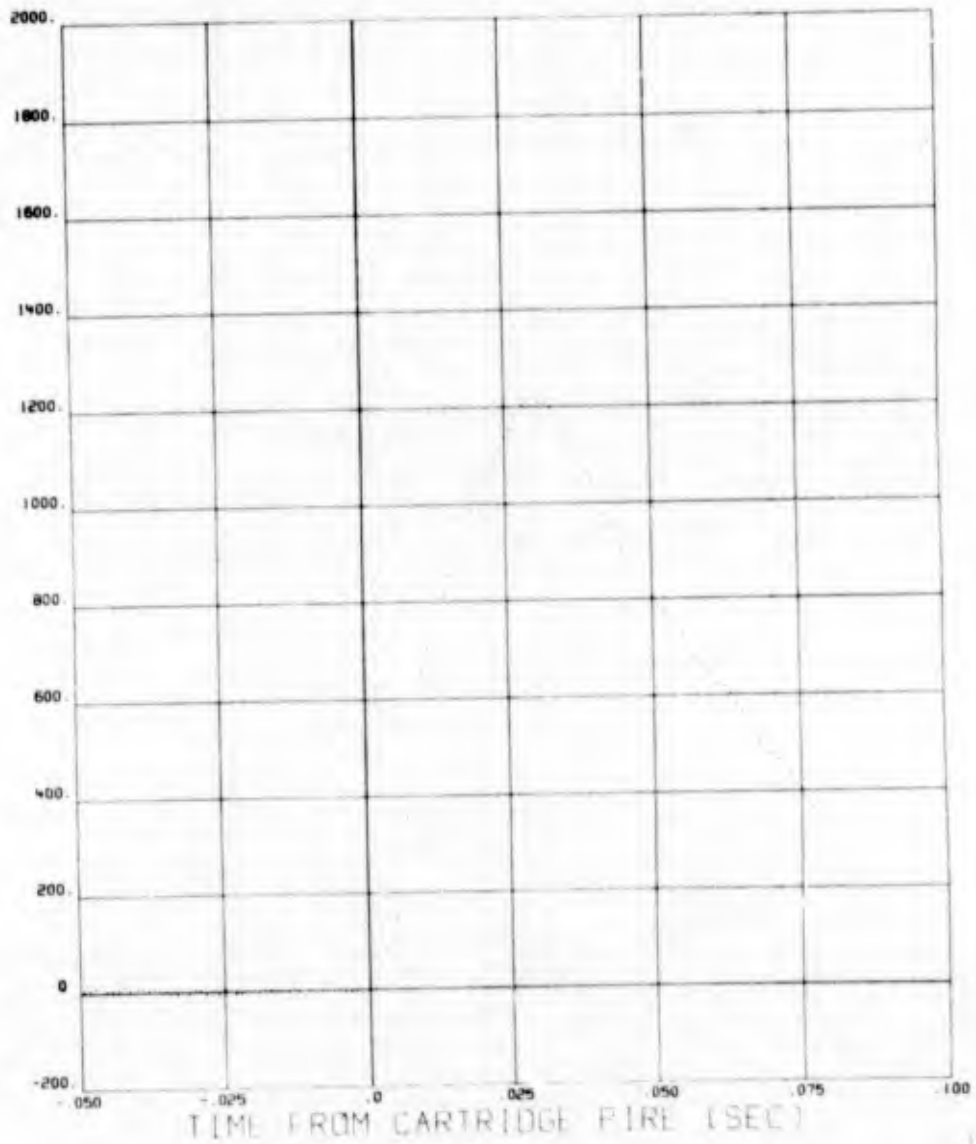
20/04/73

670AG018

1 SEPT 71 MSN 50C BOMB

78^{R245}₂₇ 0 7

EJECTOR
FOOT
FORCE
(LBS)



DATE 1 SEPT 71 MISSION 50S BOMB ID 7 BOMB HEIGHT 516.00 LBS

EJECTOR MOMENT ARM 3.063 INCHES
 TIME OF EJECTOR STROKE .074 SEC
 A/C ANGLE OF ATTACK AT RELEASE 2.163 DEG
 A/C PITCH ANGLE AT RELEASE -.310 DEG
 A/C ROLL ANGLE AT RELEASE -1.300 DEG
 RACK EJECTION ANGLE -.48.000 DEG

IMPACT RANGE FEET
 DEFLECTION FEET

RELEASE HISTORY
 PICKLE TIME
 CARTRIDGE FIRE
 INITIAL LINKAGE MOVEMENT
 EJECTOR FOOT (FIRST MOTION)
 STORE FIRST MOTION (FORWARD)
 STORE FIRST MOTION (AFT)
 EJECTOR FOOT FULL EXTENDED
 HOOK FIRST MOTION (FORWARD)
 HOOK FIRST MOTION (AFT)

MAXIMUM PRE-FLT GROUND TEMPERATURE
 MAXIMUM POST-FLT GROUND TEMPERATURE
 MAXIMUM BREECH AMBIENT TEMPERATURE

SEPARATION VELOCITY
 DISPLACEMENT METHOD
 PRESSURE METHOD

TIME DELAY
 MILLISECONDS

 0
 1
 1
 1
 75

 1

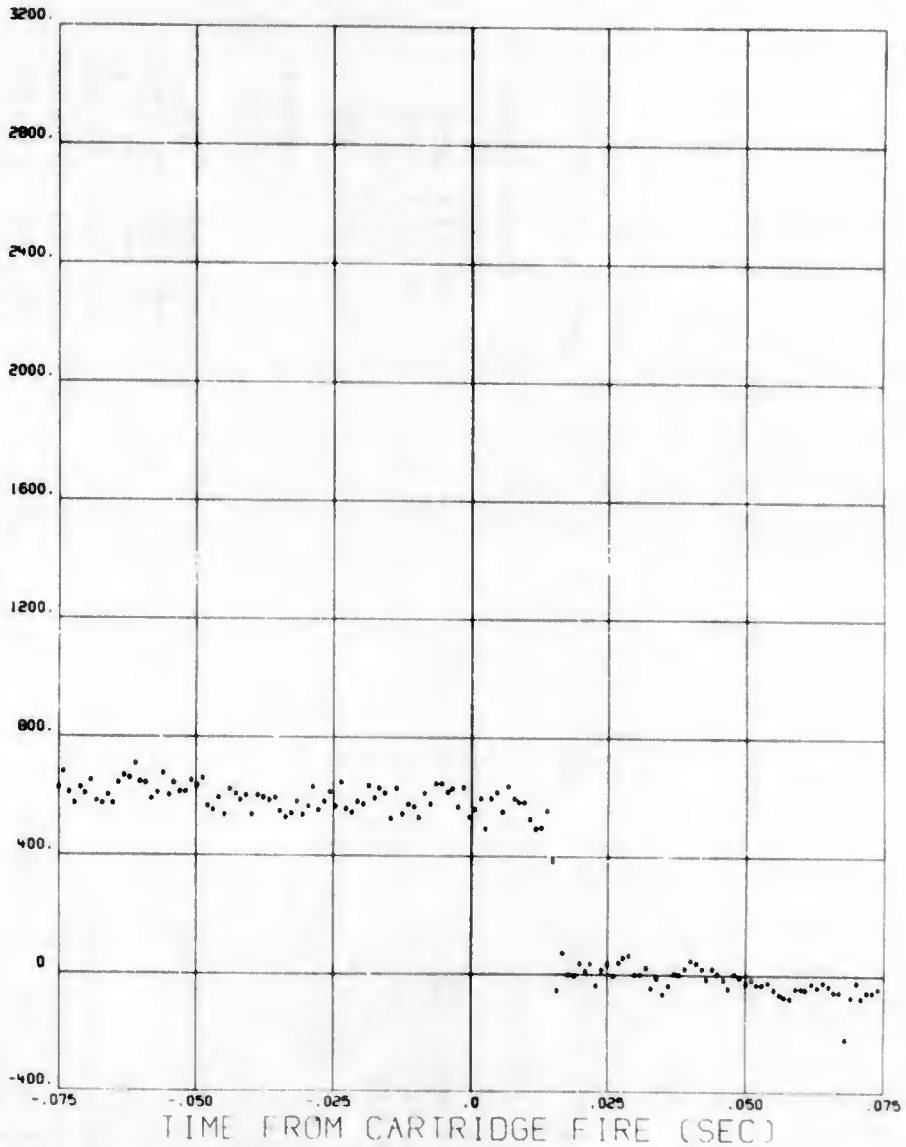
HR MIN SEC
 *** **
 *** **
 15 54 35.255
 15 54 35.256
 15 54 35.256
 15 54 35.256
 15 54 35.330
 *** **
 15 54 35.256
 ***** DEG F
 ***** DEG F
 102.98 DEG F

***** FT/SEC
 5.0 FT/SEC

20/04/73 670AG018 1 SEPT 71 MSN 50S BOMB

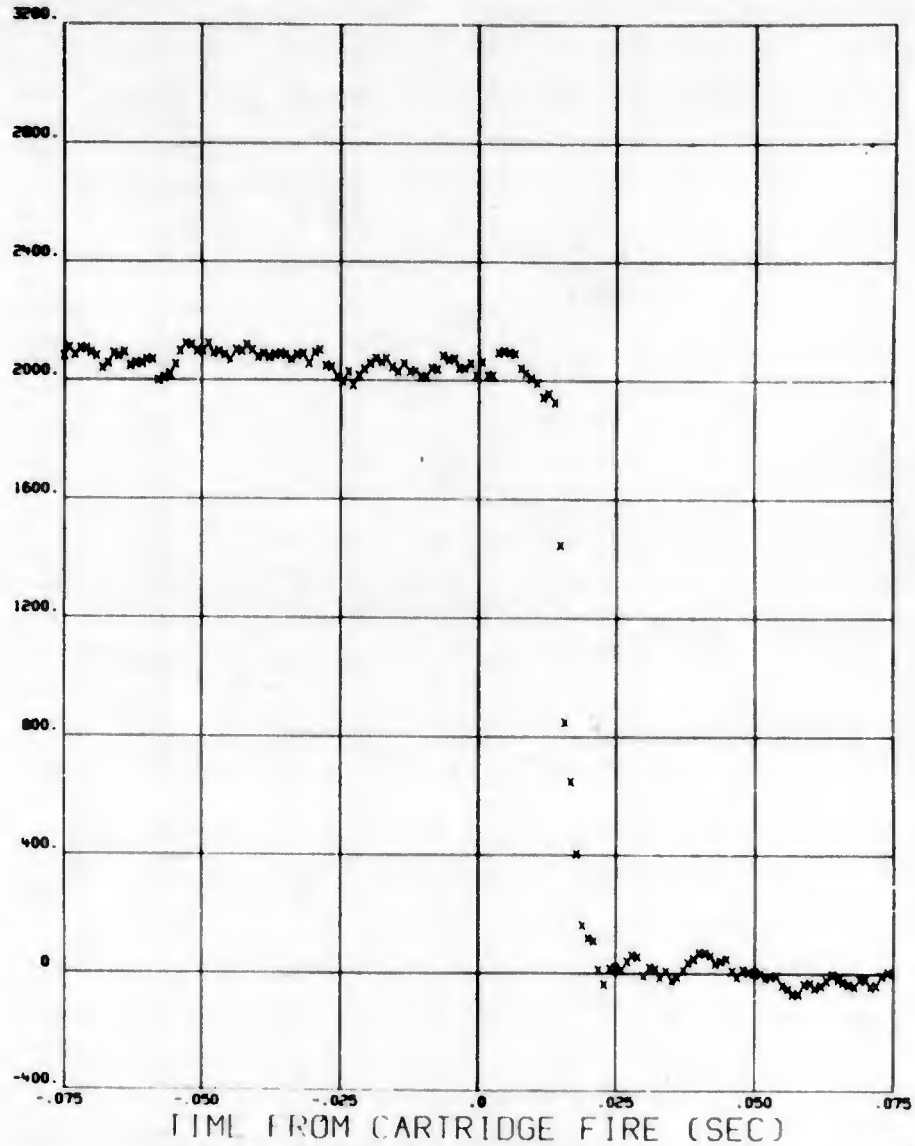
7^{R245} 29 0 7

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



PLOT PREPARED BY 15X, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



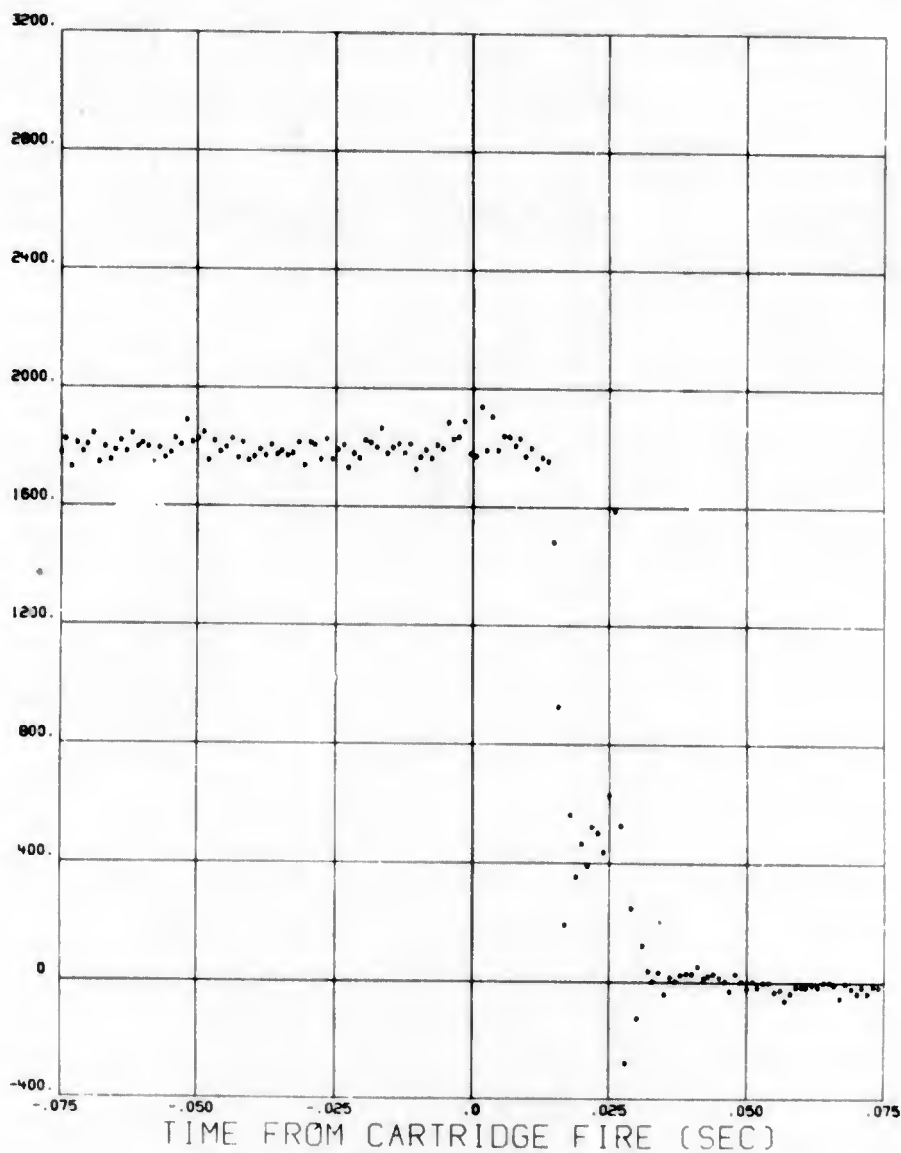
TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY 15X, ADTC

20/04/73 670AG018 1 SEPT 71 MSN 50S BOMB

7^{R245}₃₁ 0

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT

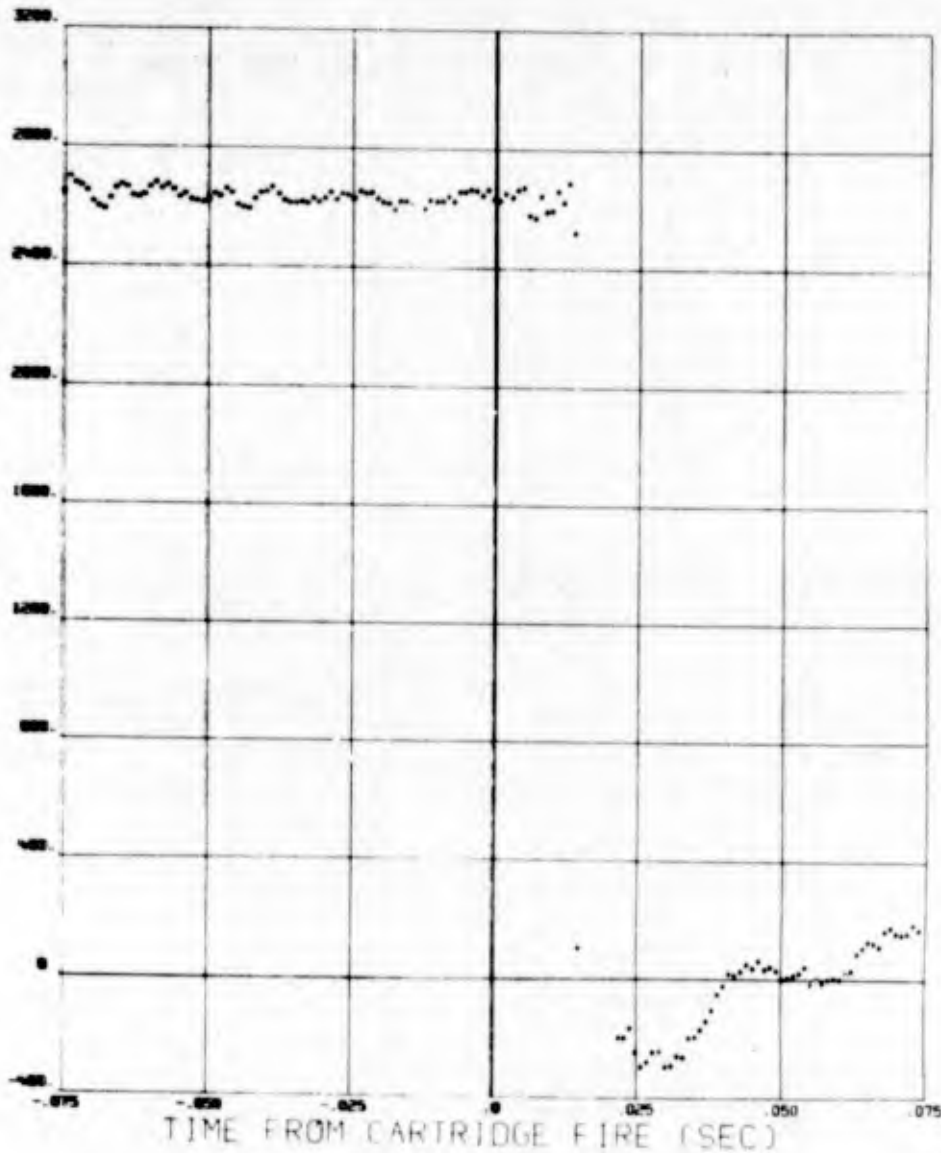


PLOT PREPARED BY ISX, ADTC

67043018 1 SEPT 71 MSN 50S BOMB

7^{R245}₃₃ 07

RELATIVE
ACQ
REACTION
LOGS
♦ = AFT



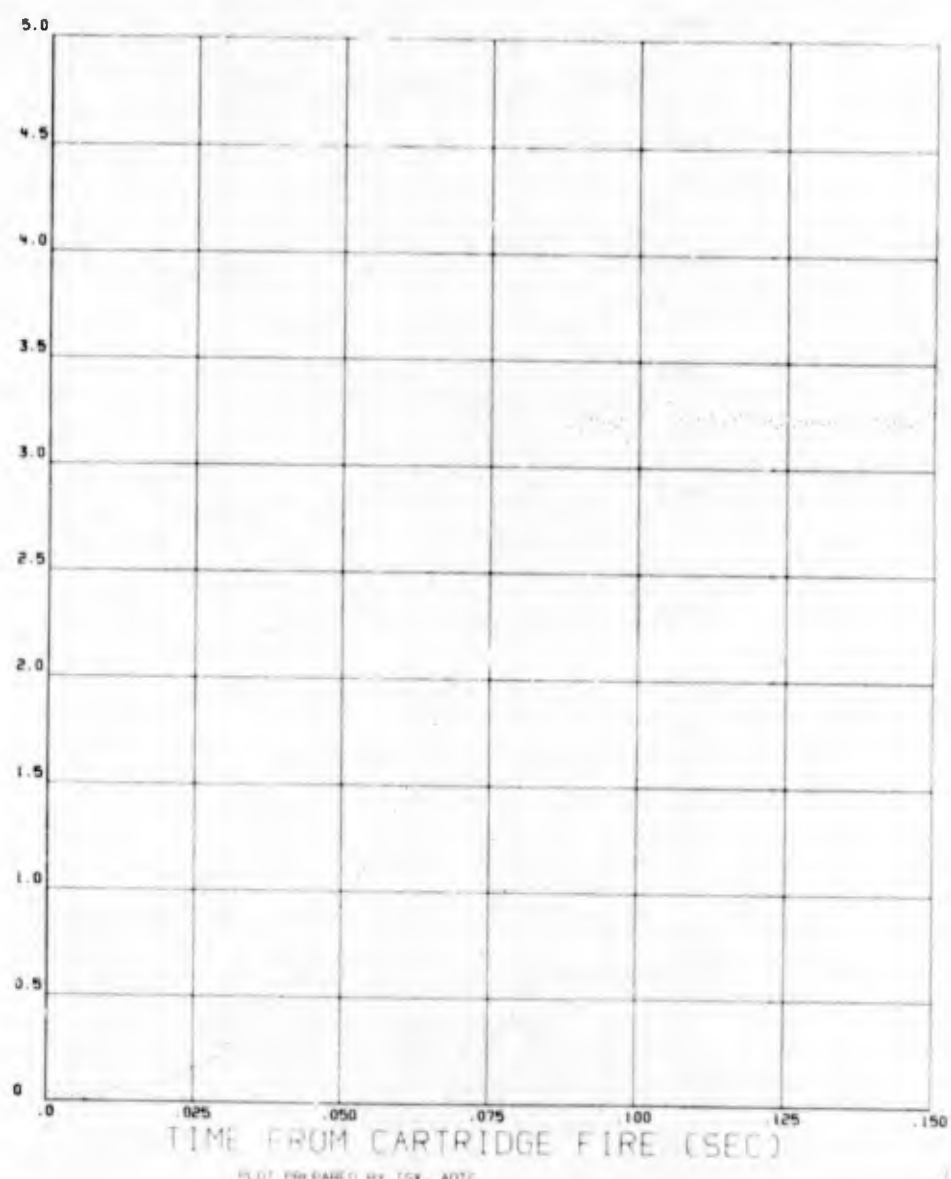
TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY 15N, ADTC

20/04/73 670AG018 1 SEPT 71 MSN 50S BOMB

7 REV 5

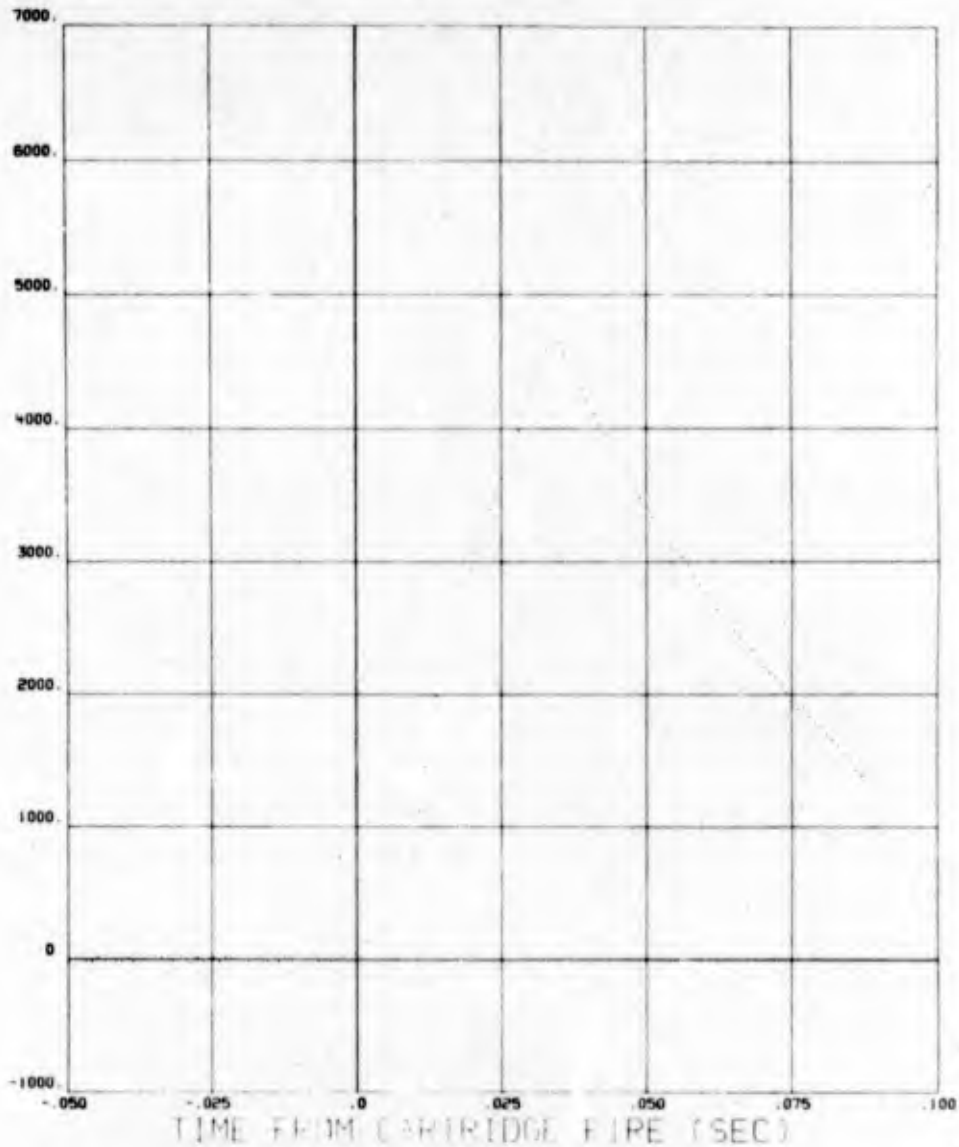
EJECTOR
FOOT
POSITION
(INCHES)



20/04/73 670AG018 1 SEPT 71 MSN 50S BOMB

7 Rev 5 35 0

EJECTION
CHAMBER
PRESSURE
(PSI)

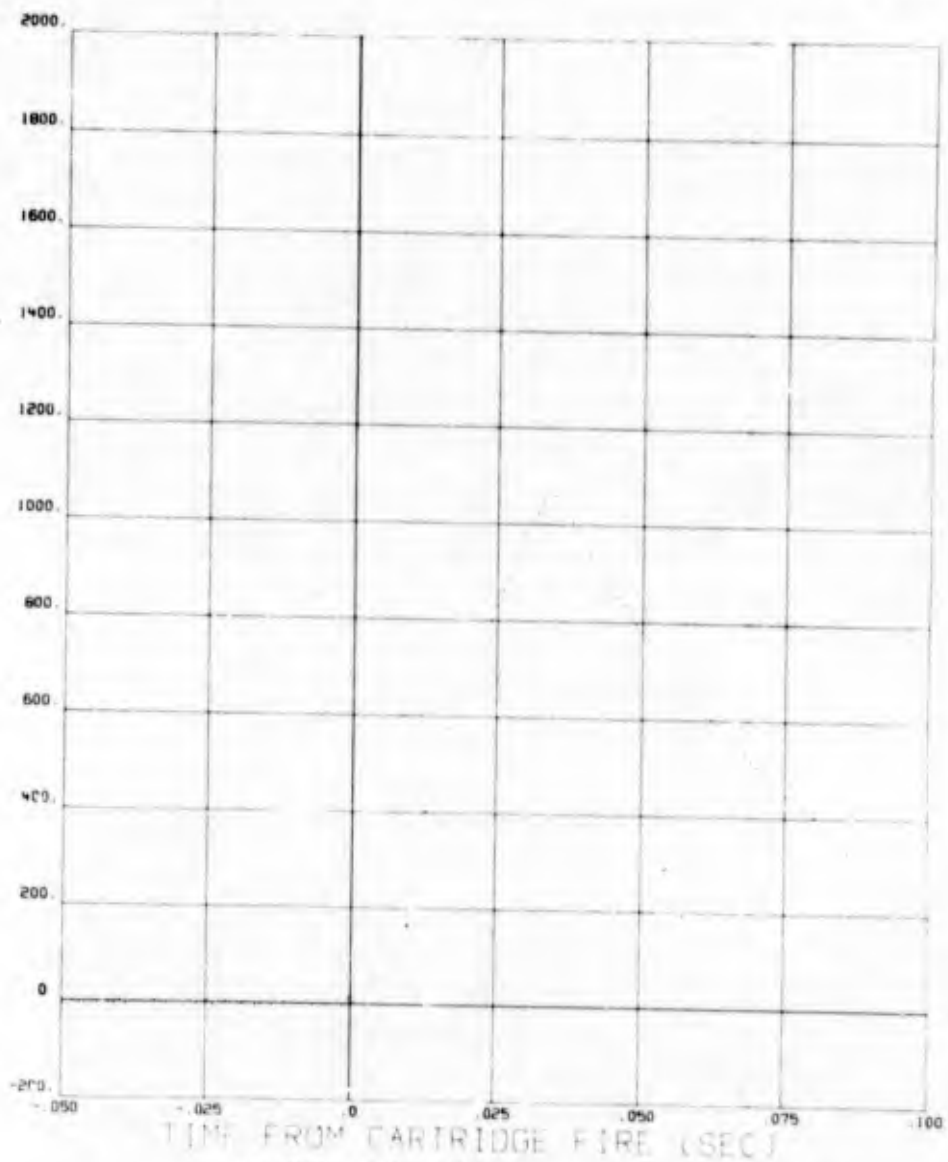


PLT PREPARED BY J.W. ADG

670AG018 1 SEPT 71 MSN 505 BOMB

7 245 36 0 1

EJECTOR
FOOT
FORCE
(LBS)



FORM PREPARED BY T5A, AOT.

DATE 2 SEPT 71 MISSION 51C BOMB ID 20 BOMB WEIGHT 501.50 LBS

EJECTOR MOMENT ARM 3.438 INCHES
 TIME OF EJECTOR STROKE ***** SEC
 A/C ANGLE OF ATTACK AT RELEASE 2.181 DEG
 A/C PITCH ANGLE AT RELEASE .300 DEG
 A/C ROLL ANGLE AT RELEASE -.770 DEG
 RACK EJECTION ANGLE 0.000 DEG

IMPACT RANGE FEET
 DEFLECTION FEET

RELEASE HISTORY
 PICKLE TIME
 CARTRIDGE FIRE
 INITIAL LINKAGE MOVEMENT
 EJECTOR FOOT (FIRST MOTION)
 STORE FIRST MOTION (FORWARD)
 STORE FIRST MOTION (AFT)
 EJECTOR FOOT FULL EXTENDED
 HOOK FIRST MOTION (FCRWARD)
 HOOK FIRST MOTION (AFT)

HR	MIN	SEC	TIME DELAY MILLISECCNDS
19	37	29.204	0
19	37	29.209	5
19	37	29.211	7
19	37	29.209	5
19	37	29.210	6

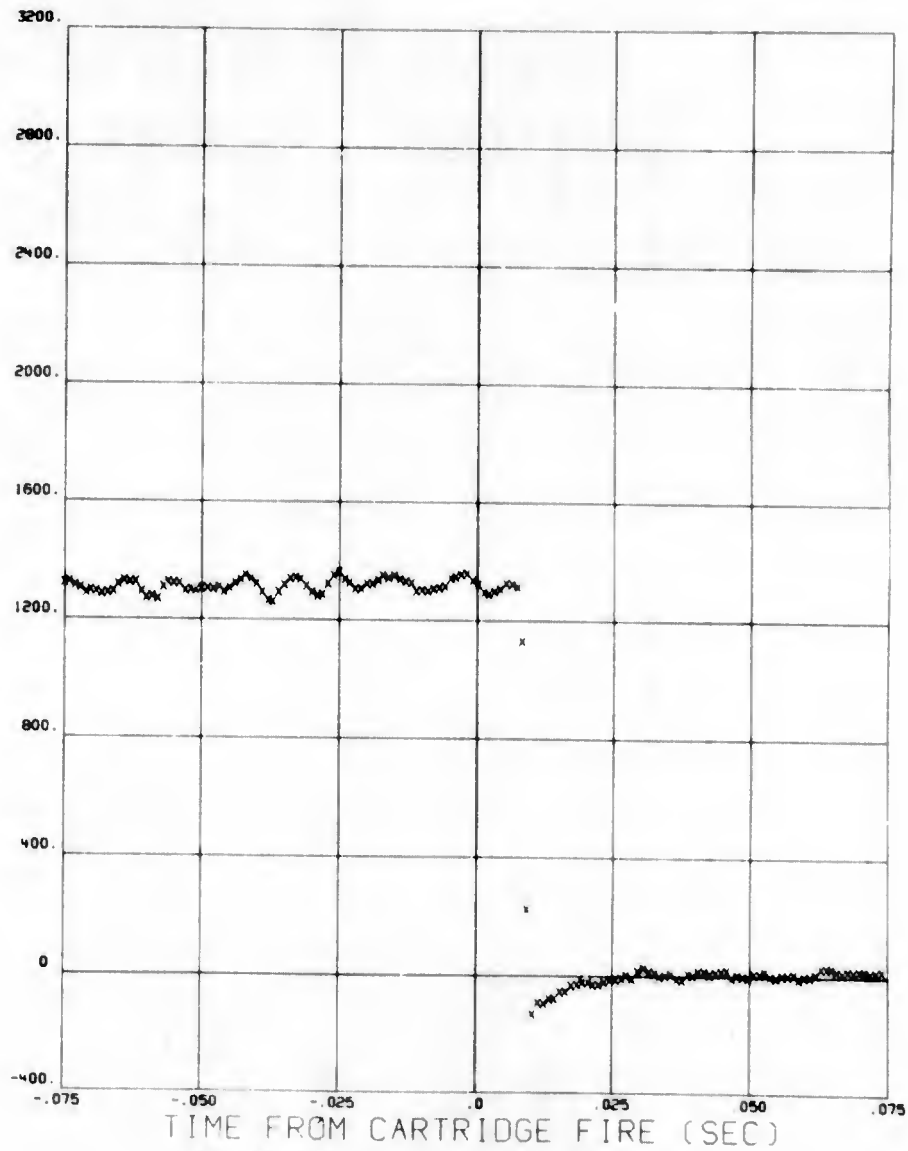
MAXIMUM PRE-FLT GROUND TEMPERATURE ***** DEG F
 MAXIMUM POST-FLT GROUND TEMPERATURE ***** DEG F
 MAXIMUM BREECH AMBIENT TEMPERATURE 100.87 DEG F

SEPARATION VELOCITY ***** FT/SEC
 DISPLACEMENT METHOD 6.2 FT/SEC
 PRESSURE METHOD

20/04/73 670AG018 2 SEPT 71 MSN 51C BOMB

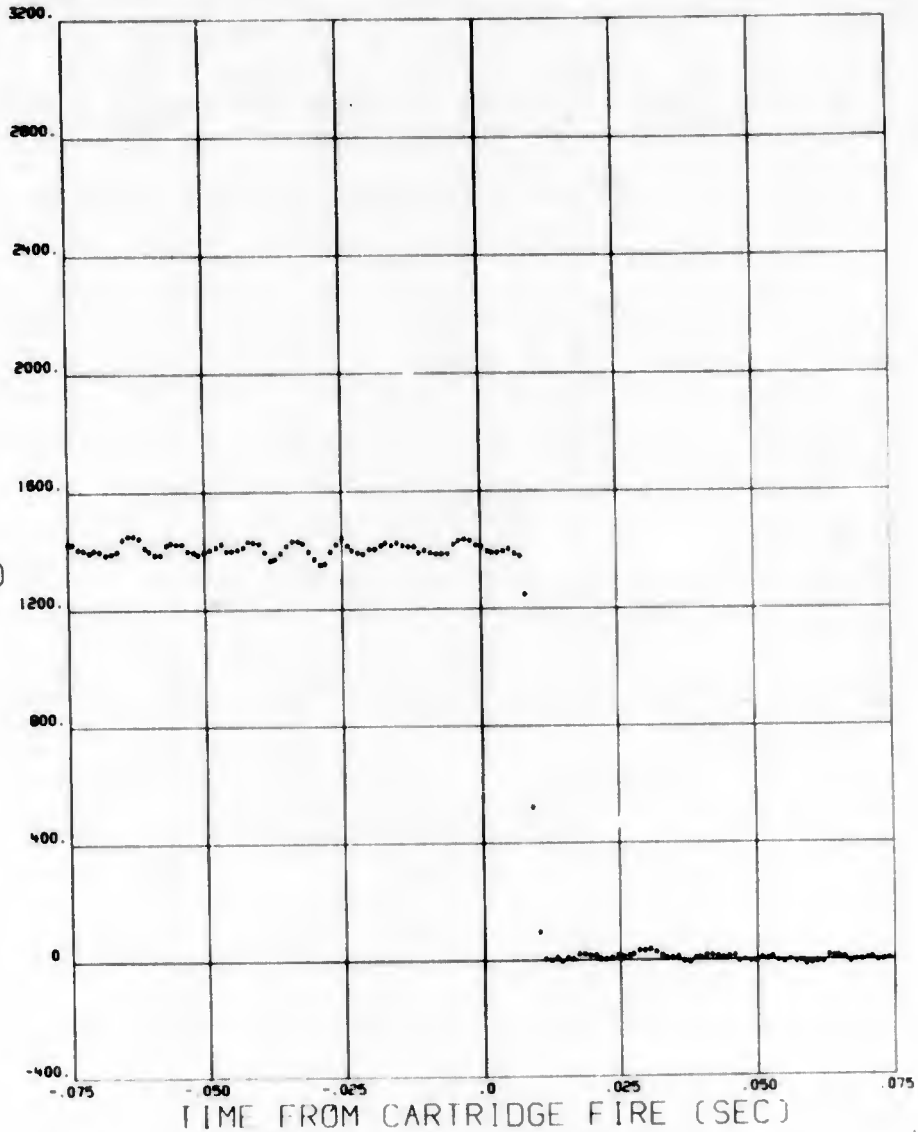
20^{R245}₃₇ 0⁻¹

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



LOT PREPARED BY TSX, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD

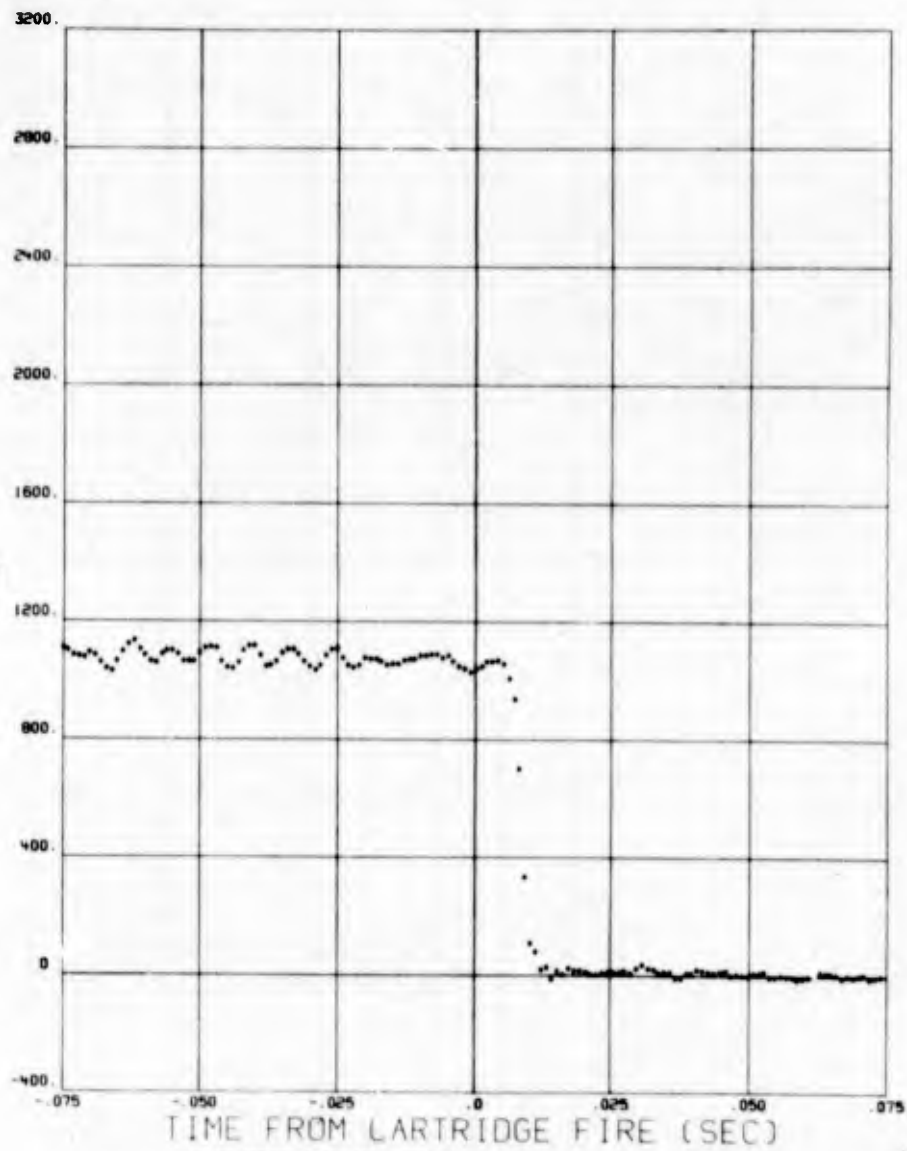


PLUT PREPARED BY TSX, ADTC

20/04/73 670AG018 2 SEPT 71 MSN 51C BOMB

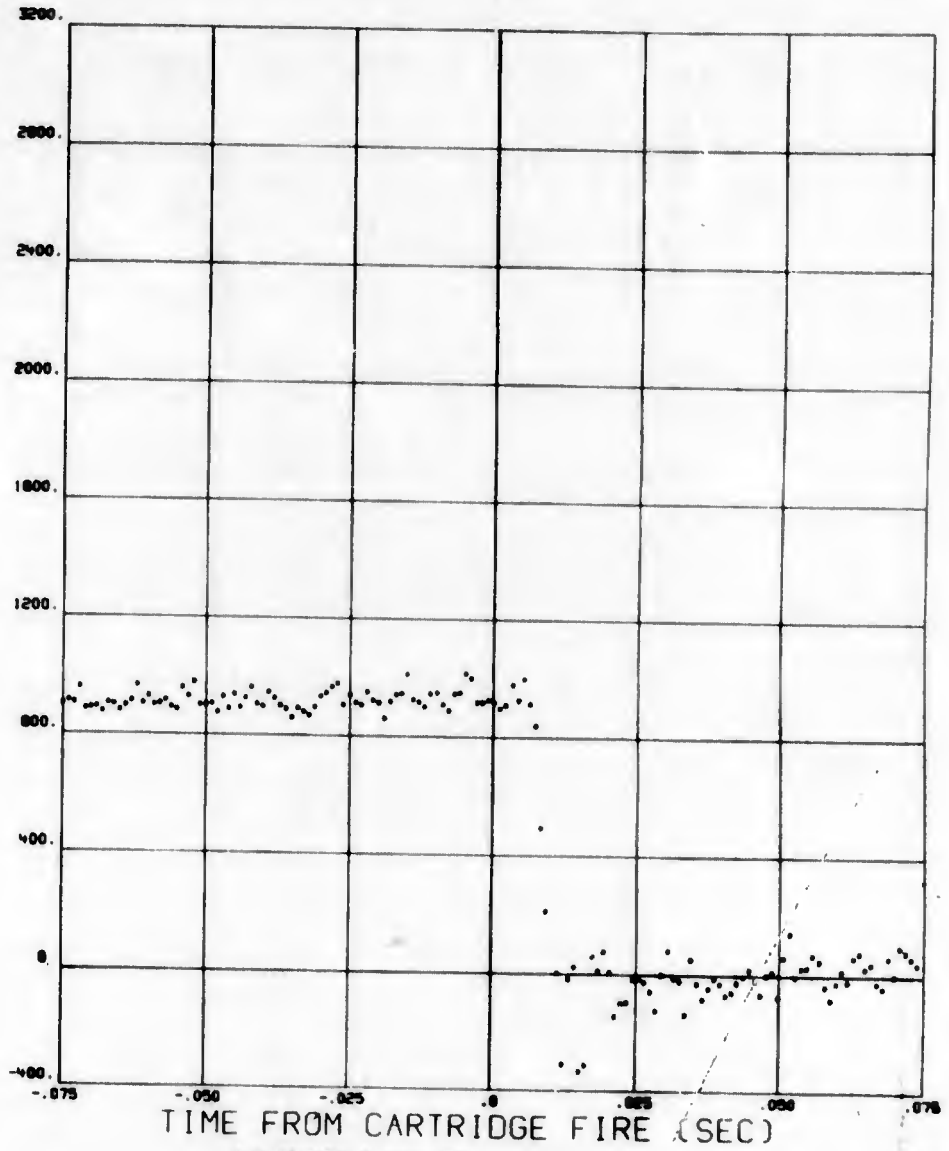
20^{R245} 0 7

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



PLOT PREPARED BY TSN, ADTC

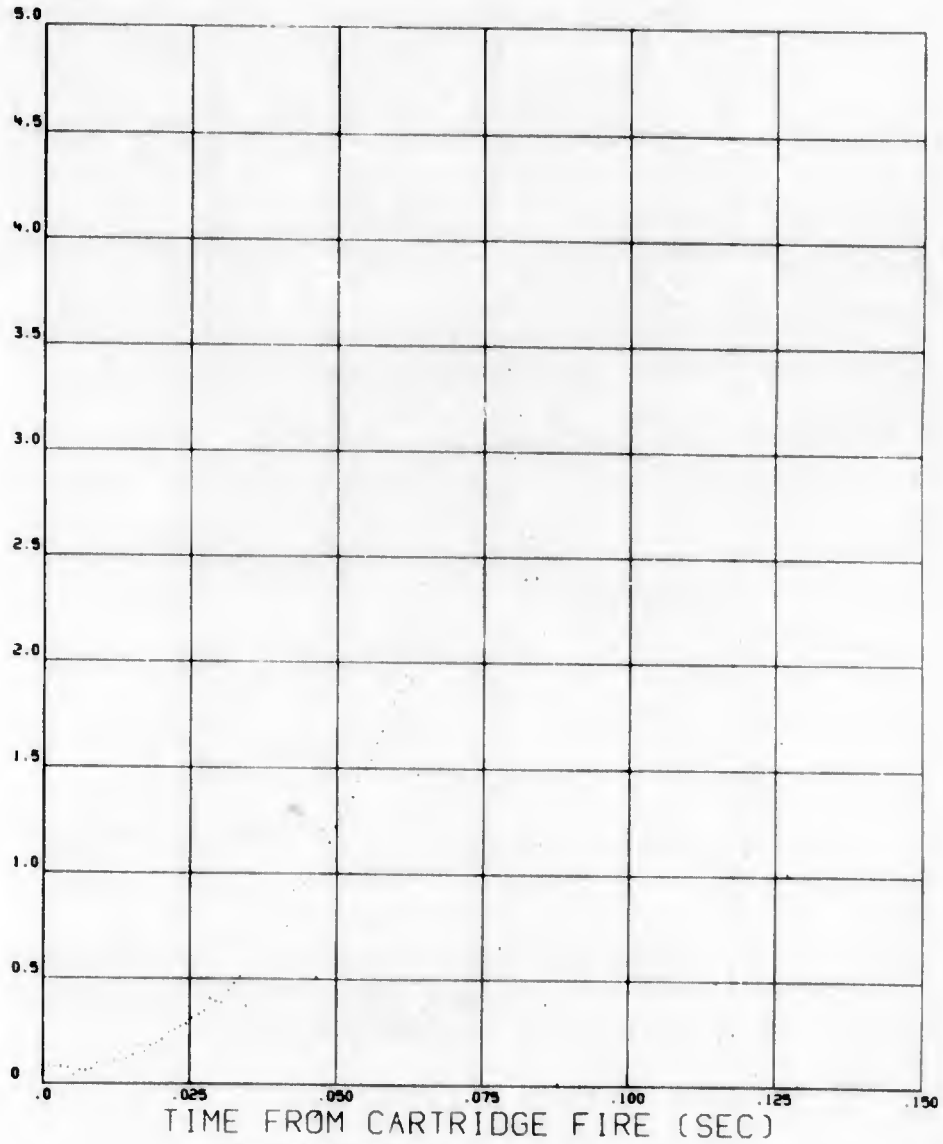
RELATIVE
HOOK
REACTION
(LBS)
* = AFT



20/04/73 670AG018 2 SEPT 71 MSN 51C BOMB

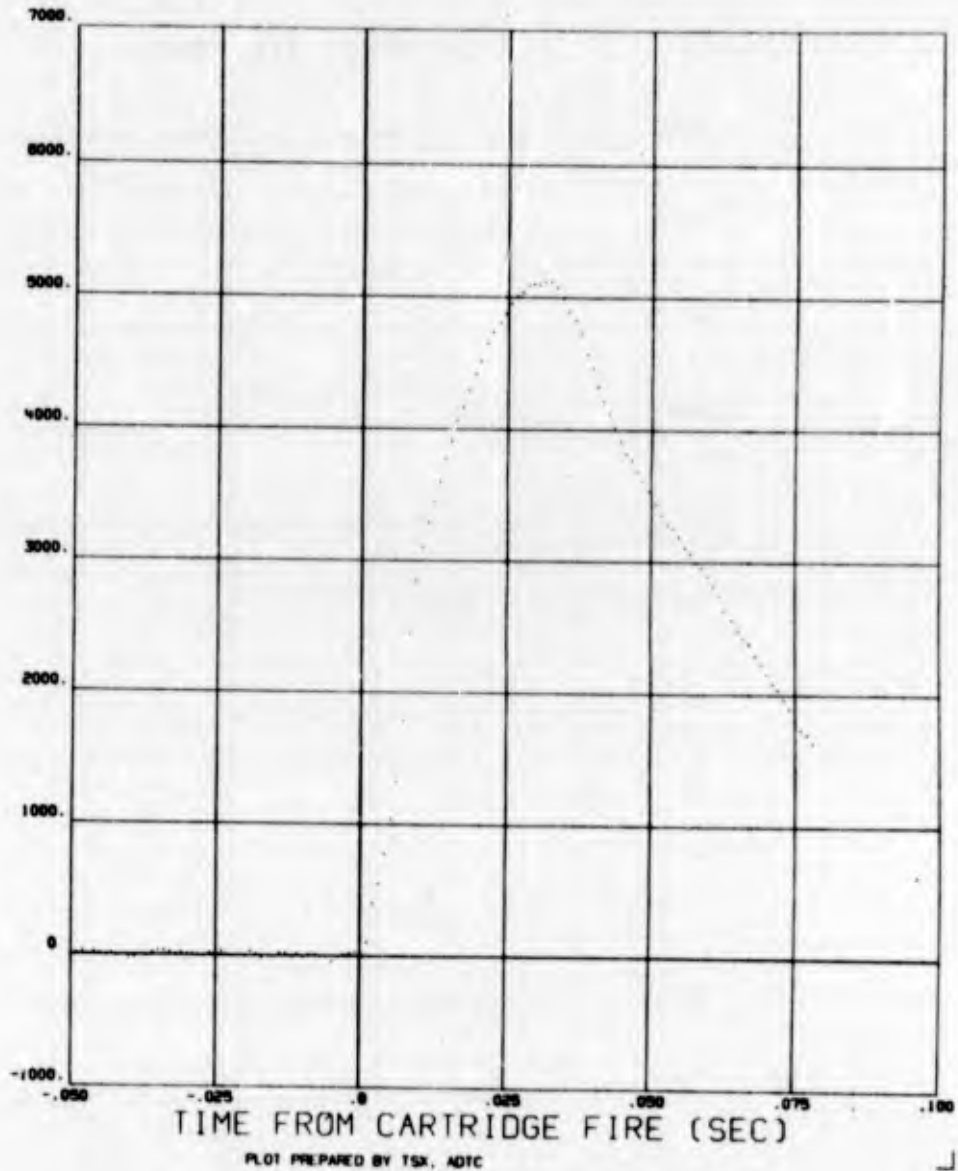
20^{REV}₄₃ 07

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY TSX, ADTC

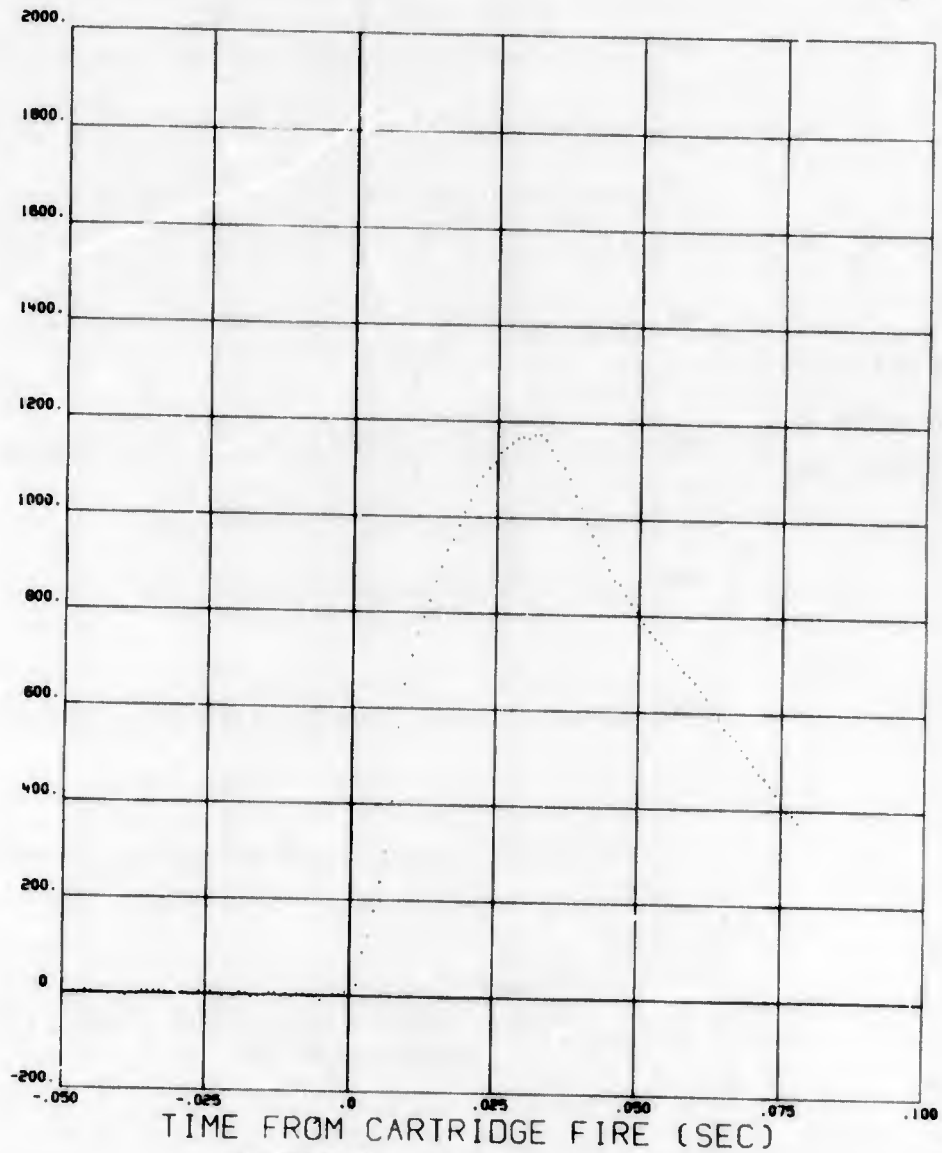
EJECTION
CHAMBER
PRESSURE
(PSI)



20/04/73 670AG018 2 SEPT 71 MSN 51C BOMB

20^{R245}₄₅ 07

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY TSX, ADTC

DATE 2 SEPT 71 MISSION 51S BOMB ID 36 BOMB WEIGHT 505.75 LBS

EJECTOR MOMENT ARM 3.125 INCHES
TIME OF EJECTOR STROKE .075 SEC
A/C ANGLE OF ATTACK AT RELEASE 1.696 DEG
A/C PITCH ANGLE AT RELEASE -.310 DEG
A/C ROLL ANGLE AT RELEASE -2.130 DEG
RACK EJECTION ANGLE -48.000 DEG

IMPACT RANGE DEFLECTION
FEET FEET

RELEASE HISTORY
PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

HR MIN SEC
*** ** *
*** ** *
19 50 33.588
19 50 33.588
19 50 33.588
19 50 33.588
19 50 33.663
19 50 33.588
19 50 33.588

TIME DELAY
MILLISECONDS

0
0
0
0
75
0
0

MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE

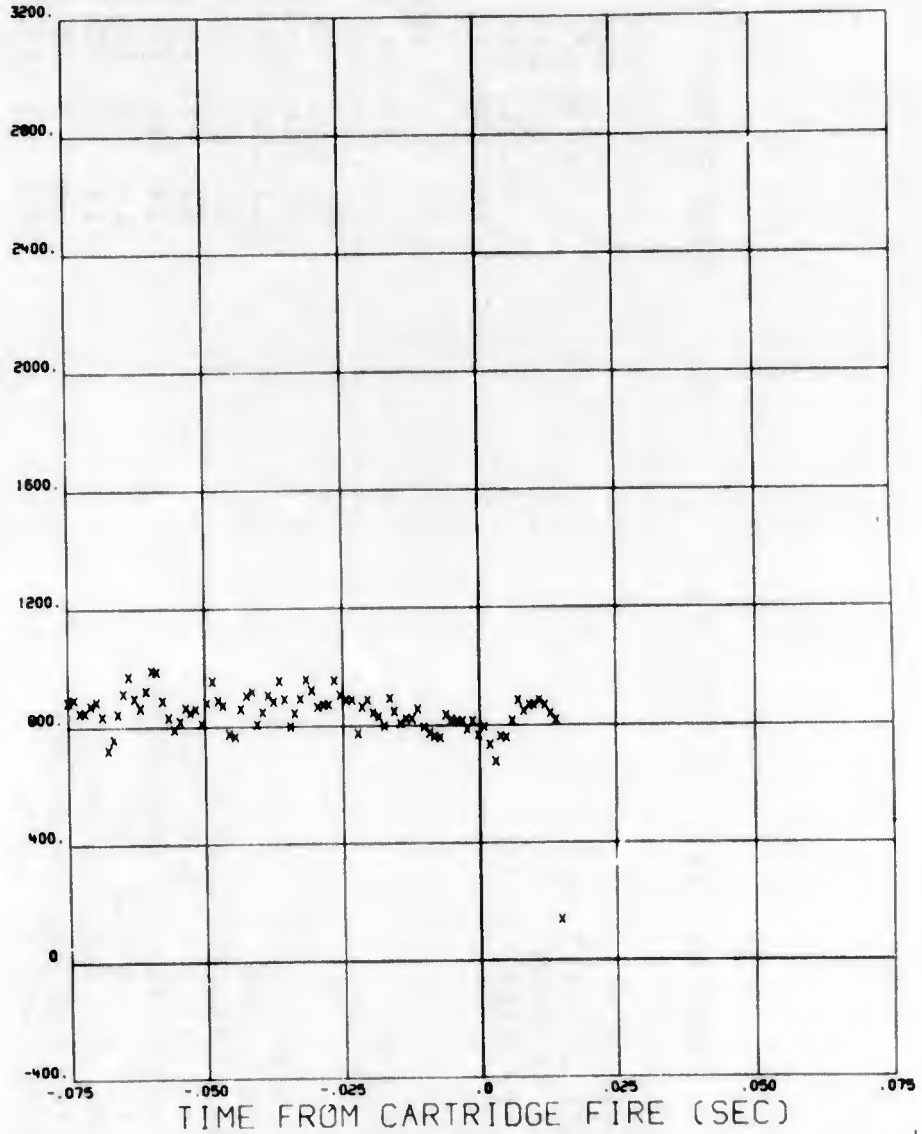
SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

***** DEG F
***** DEG F
114.82 DEG F
***** FT/SEC
5.0 FT/SEC

20/04/73 670AG018 2 SEPT 71 MSN 51S BOMB

36^{R245}₄₆ 07

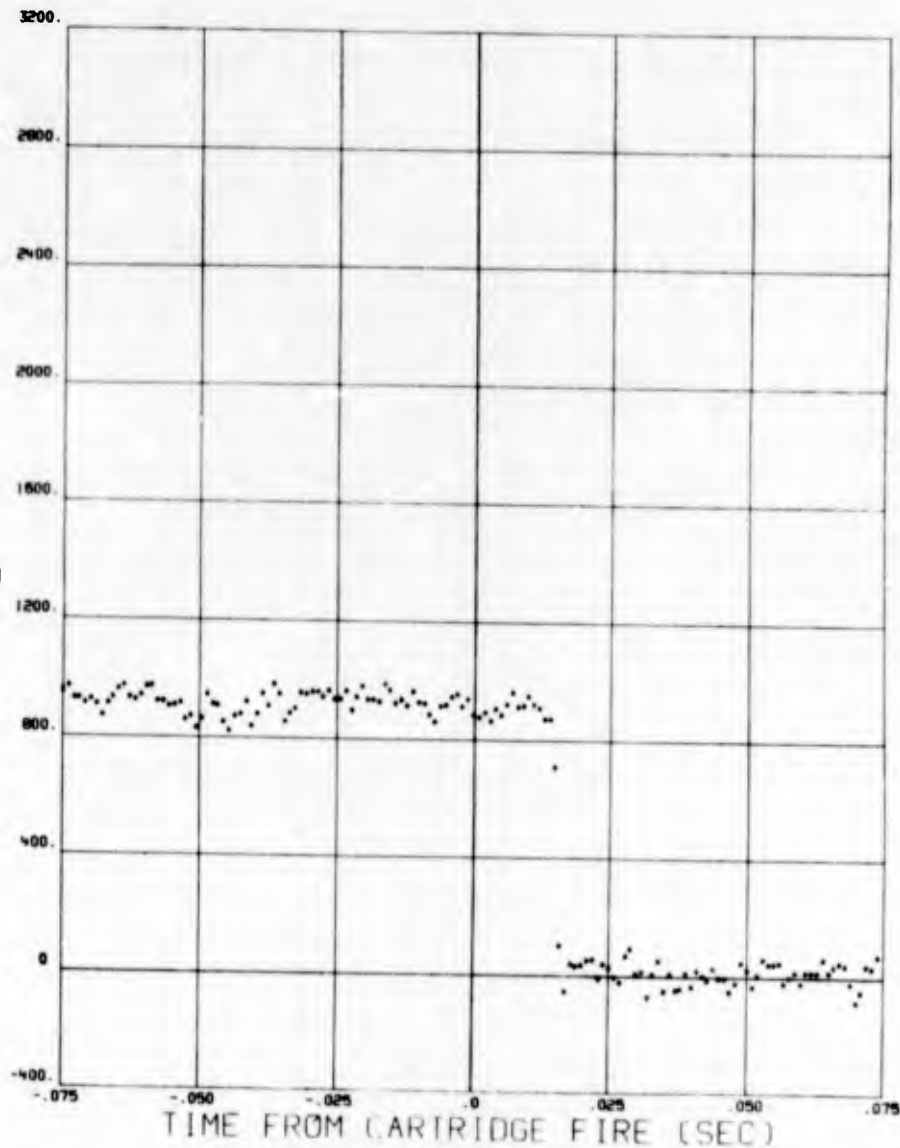
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD

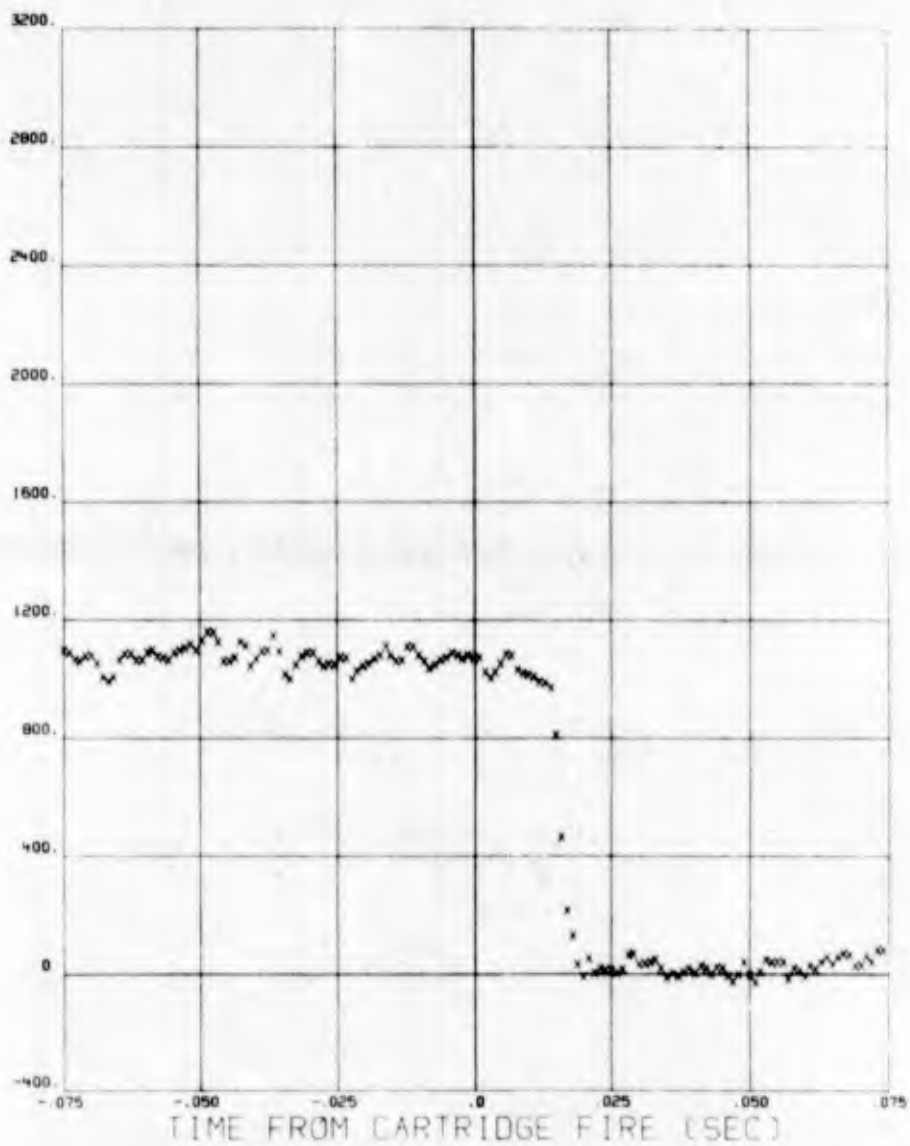


PLOT PREPARED BY 1SX, ADTC

670AG018 2 SEPT 71 MSN 515 BOMB

36^{R-25}₄₈

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



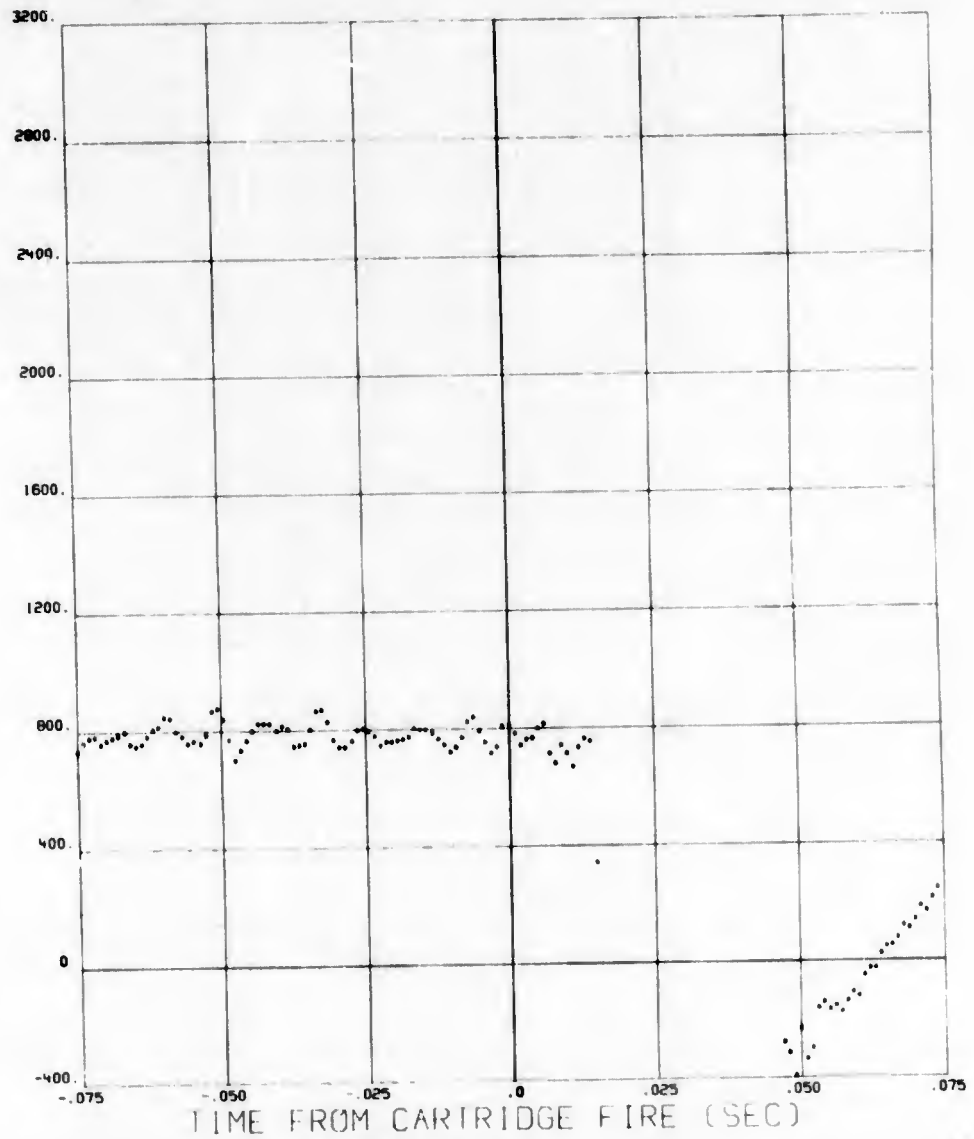
PLOT PREPARED BY 15X, ADTC

67046018

2 SEPT 71 MSN 51S BOMB

36^{R245}₅₁

RELATIVE
HOOK
REACTION
(LBS)
* = AFT

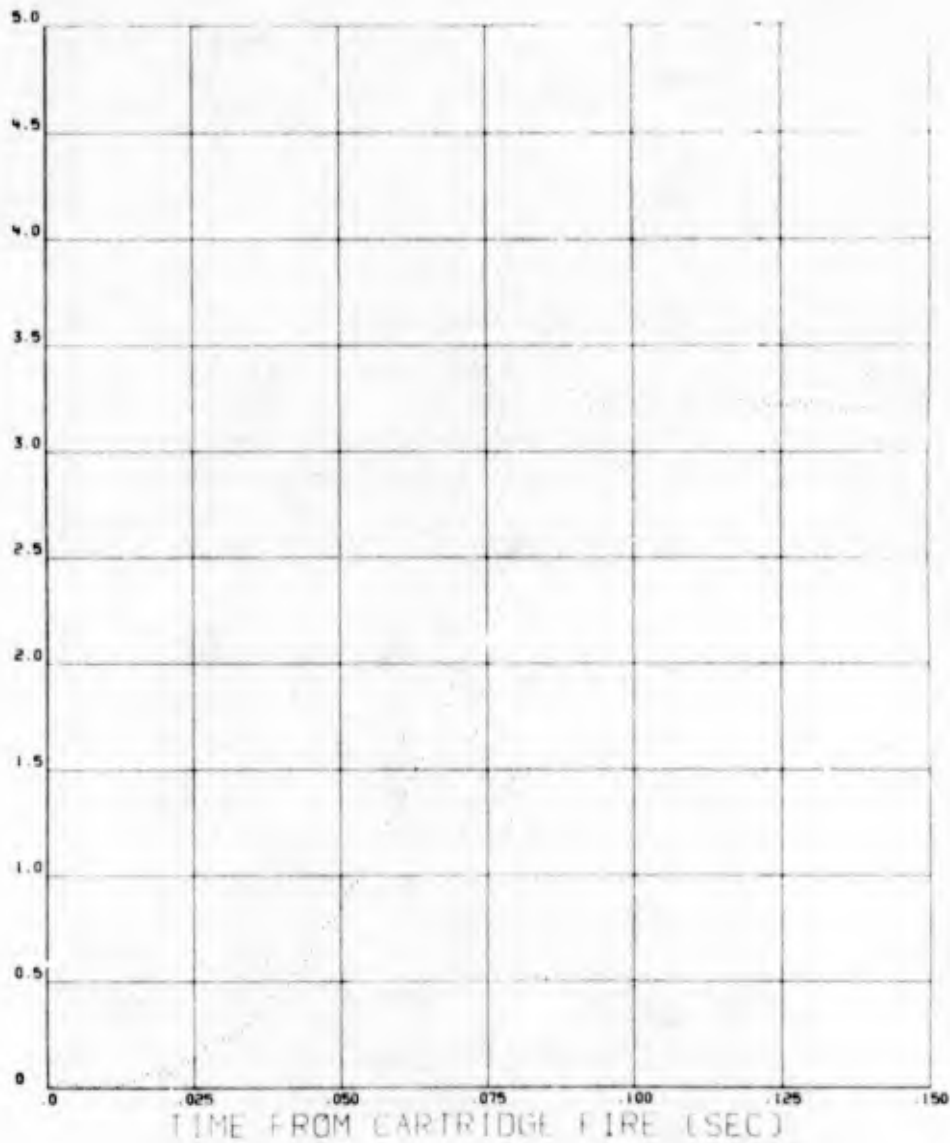


PLOT PREPARED BY TSX, ADIC

67045118 2 SEP 71 MSN 519 BOMB

3877

EJECTOR
FOOT
POSITION
(INCHES)

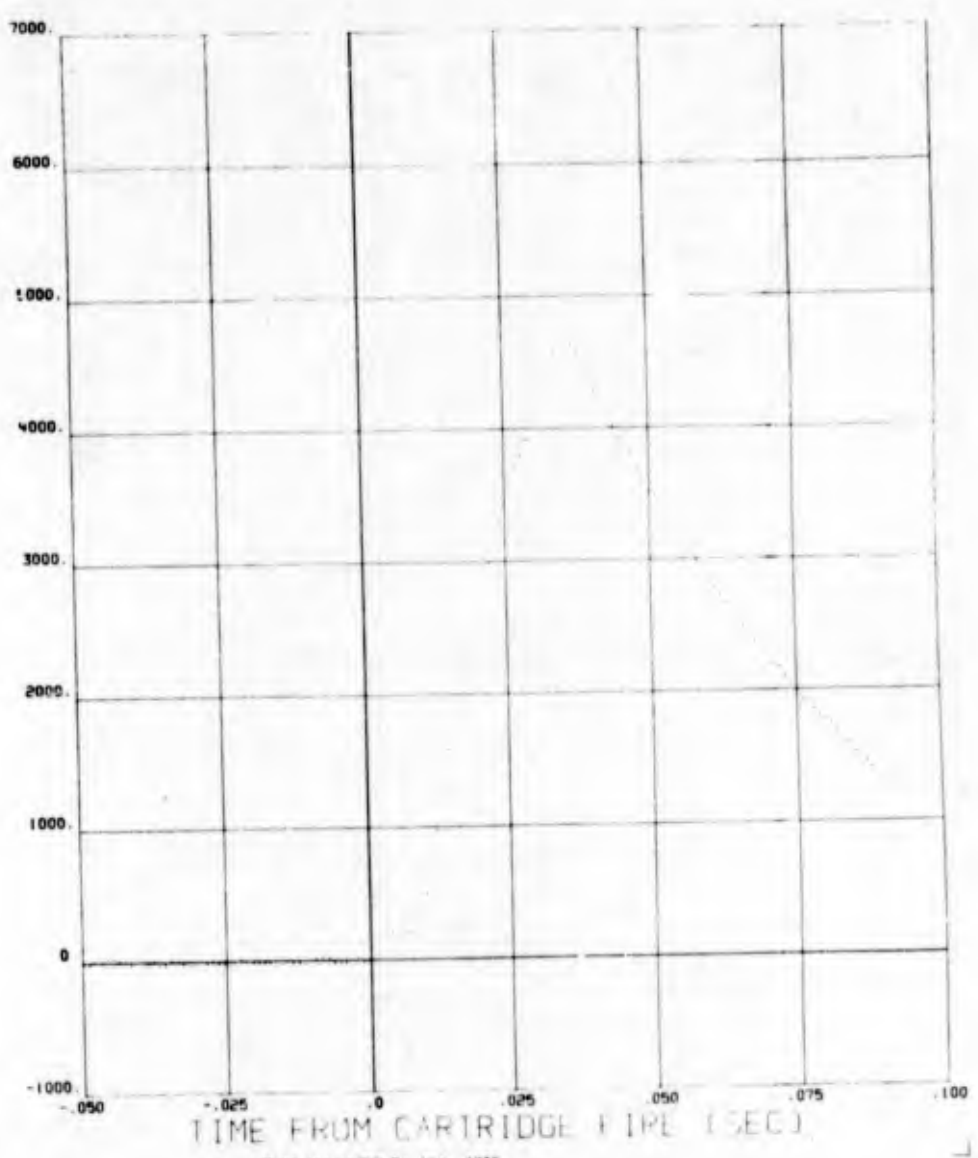


PLOT PREPARED BY ISX. ADIC

ATTOR 5018 2 SEPT 71 MSW 515 BOMB

36 ^{REV} 53 0 1

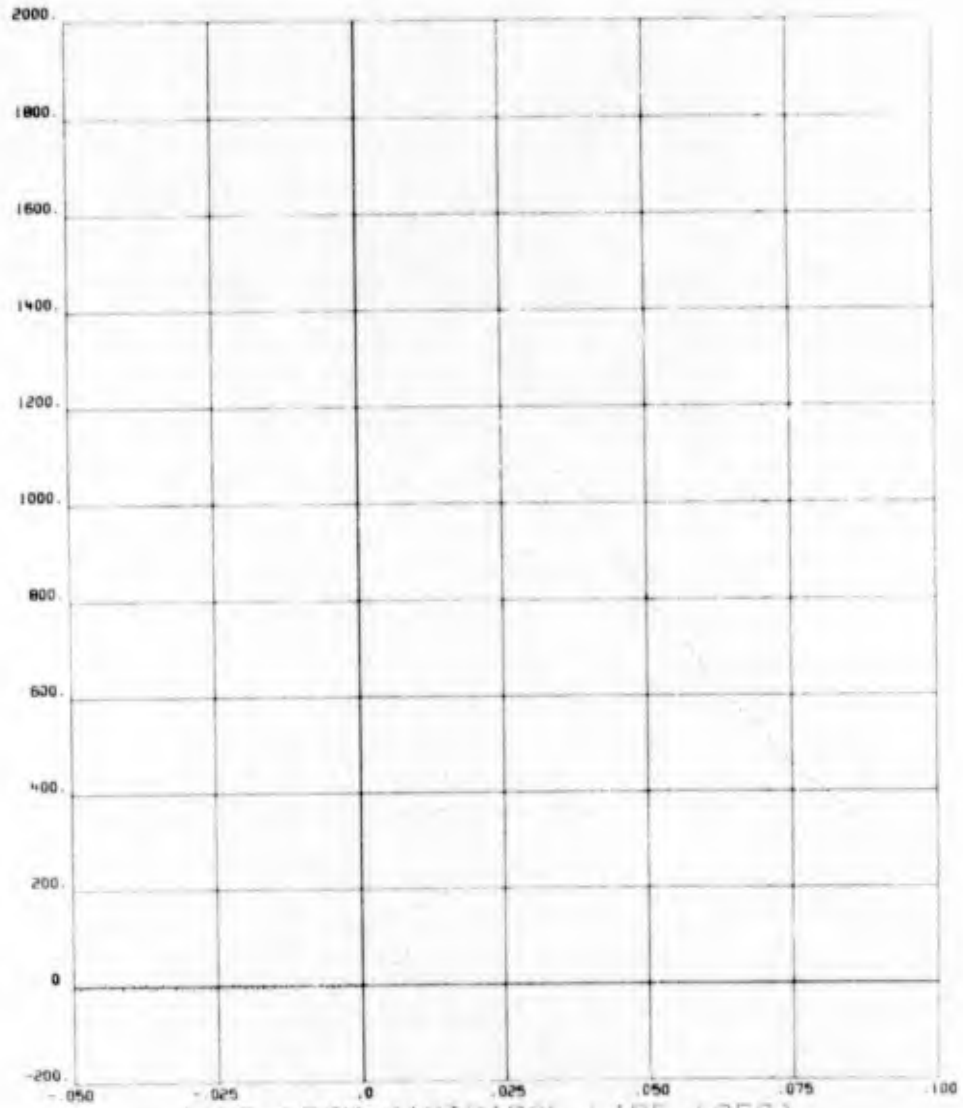
EJECTION
CHAMBER
PRESSURE
(PSI)



20/04/71 670AG018 2 SEPT 71 MSN 515 BOMB

36 REV 5

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY TSK, AOTC

DATE 3 SEPT 71 MISSION 52C BOMB ID 80 BOMB WEIGHT 511.25 LBS
 EJECTOR MOMENT ARM 3.563 INCHES
 TIME OF EJECTOR STROKE ***** SEC
 A/C ANGLE OF ATTACK AT RELEASE 2.202 DEG
 A/C PITCH ANGLE AT RELEASE -.930 DEG
 A/C ROLL ANGLE AT RELEASE .720 DEG
 RACK EJECTION ANGLE 0.000 DEG

IMPACT RANGE DEFLECTION FEET FEET

RELEASE HISTORY PICKLE TIME
 CARTRIDGE FIRE ***** SEC
 INITIAL LINKAGE MOVEMENT 22 42 59.848
 EJECTOR FOOT (FIRST MOTION) 22 42 59.861
 STORE FIRST MOTION (FORWARD) *****
 STORE FIRST MOTION (AFT) 22 42 59.863
 EJECTOR FOOT FULL EXTENDED 22 42 59.860
 HOOK FIRST MOTION (FCRWARD) 22 42 59.938
 HOOK FIRST MOTION (AFT) *****
 ***** DEG F
 ***** DEG F
 92.46 DEG F

MAXIMUM PRE-FLT GROUND TEMPERATURE ***** FT/SEC
 MAXIMUM POST-FLT GROUND TEMPERATURE ***** FT/SEC
 MAXIMUM BREECH AMBIENT TEMPERATURE 6.4 FT/SEC
 SEPARATION VELOCITY
 DISPLACEMENT METHOD
 PRESSURE METHOD

TIME DELAY
 MILLISECONDS
 0
 13

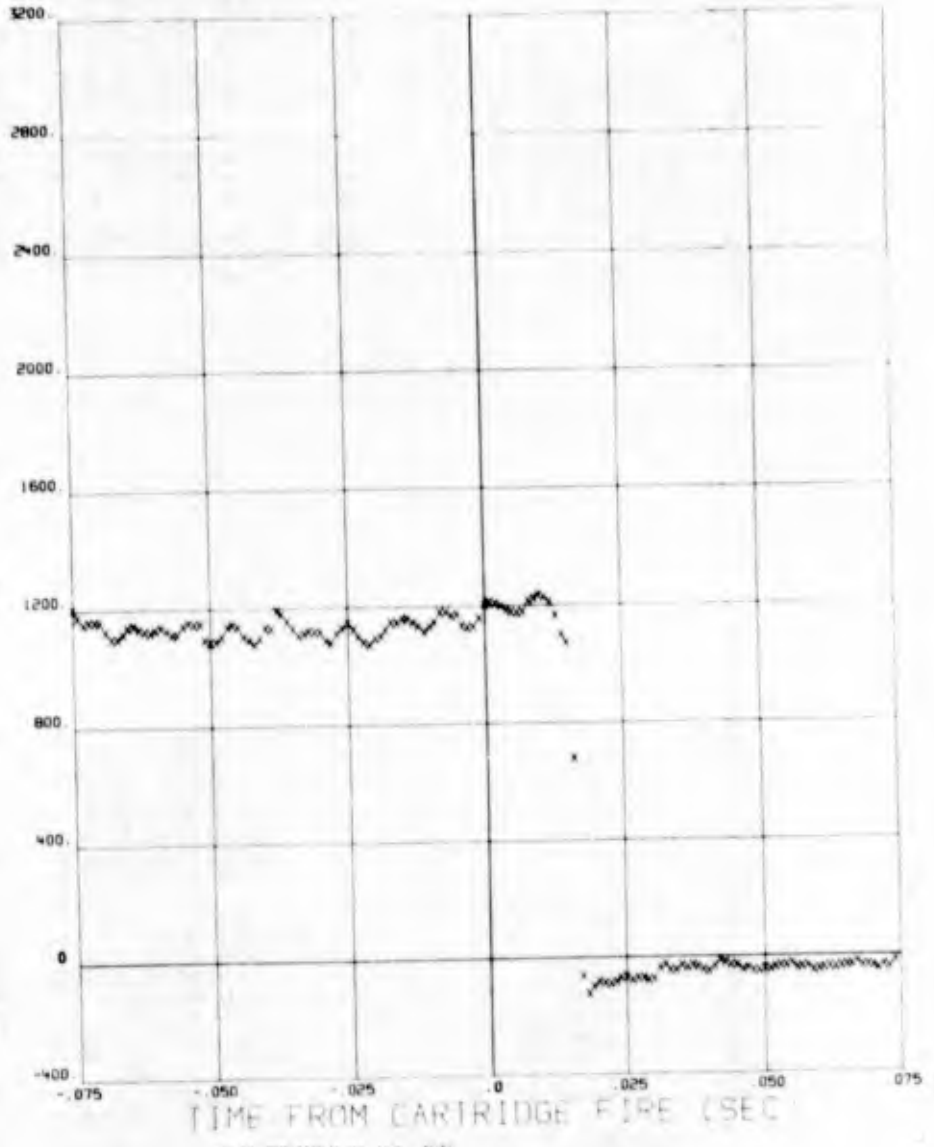
 15
 12
 90

 12

670AG018 3 SEPT 71 MSN 520 BOMB

80 ^{R245} 55

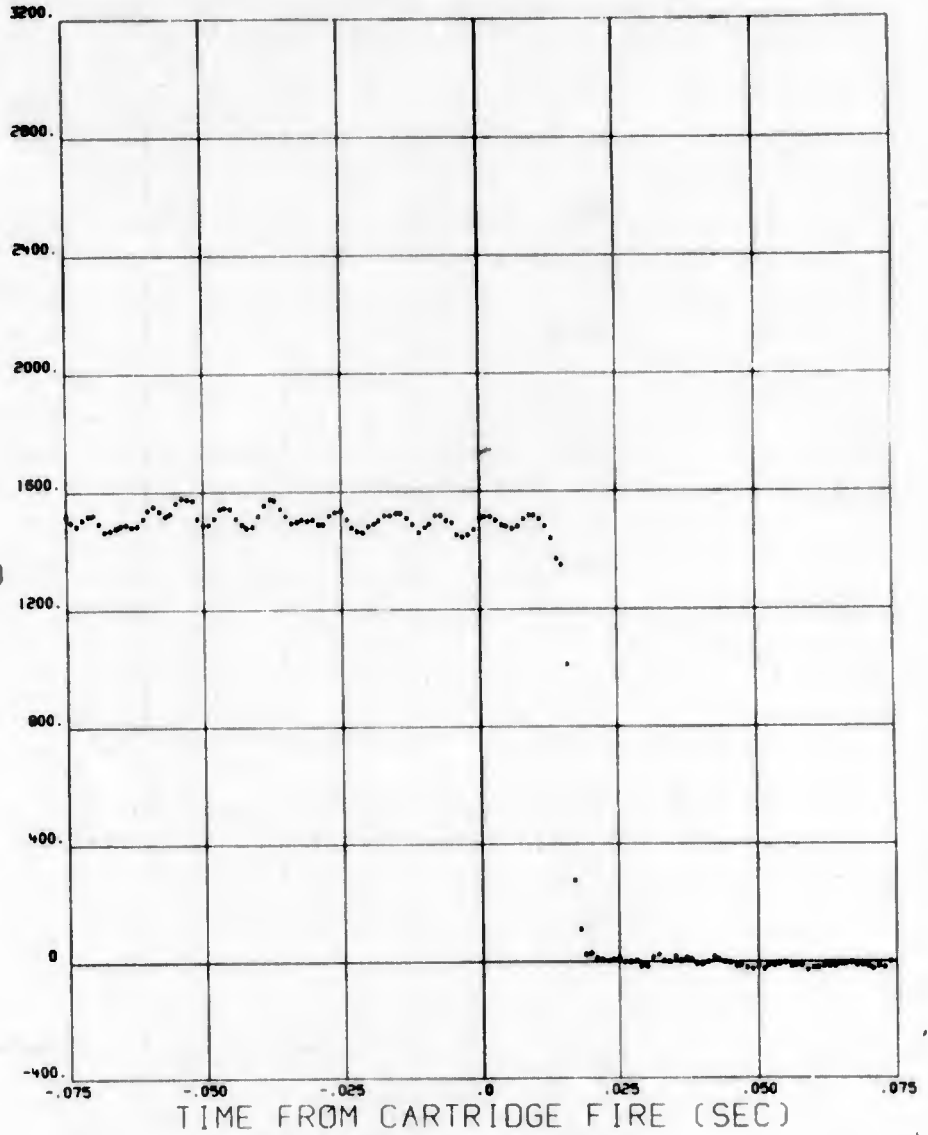
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
x = LEFT FWD



20/04/73 670AG018 3 SEPT 71 MSN 52C BOMB

80^{REV 56} 0.7

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD

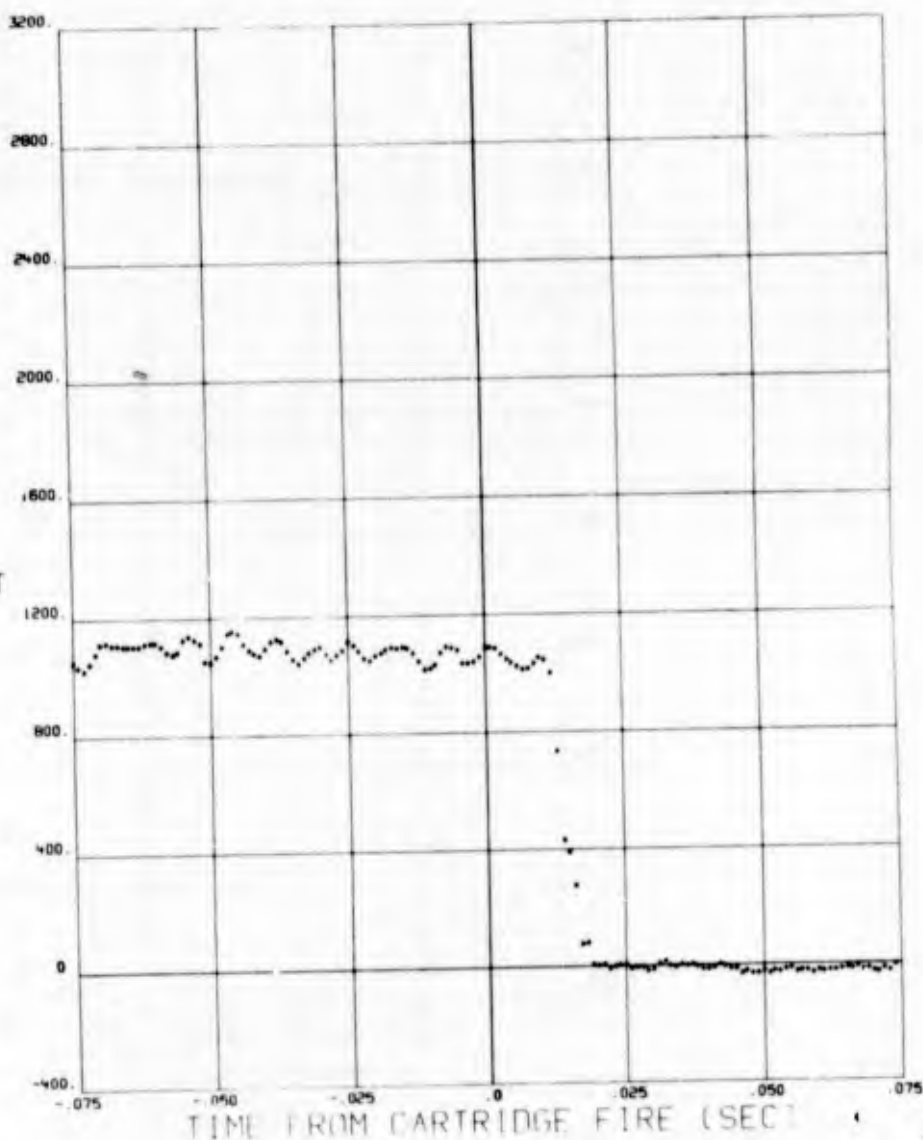


PLOT PREPARED BY TSX, ADTC

20/04/73 670AG018 3 SEPT 71 MSN 52C BOMB

80^{R245} 58 0 1

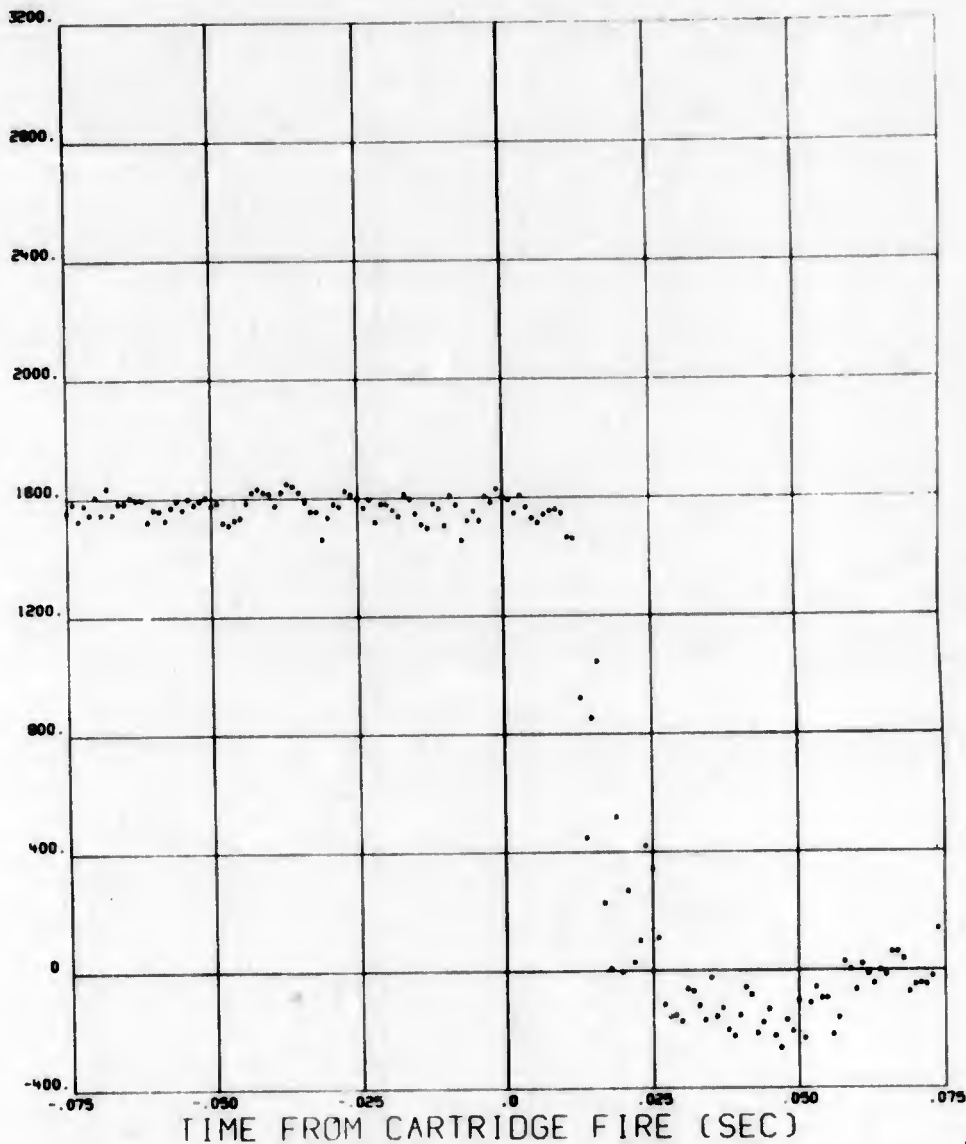
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



TIME FROM CARTRIDGE FIRE (SEC)

NOT PREPARED BY ITC, AFPC

RELATIVE
HOOK
REACTION
(LBS)
* = AFT



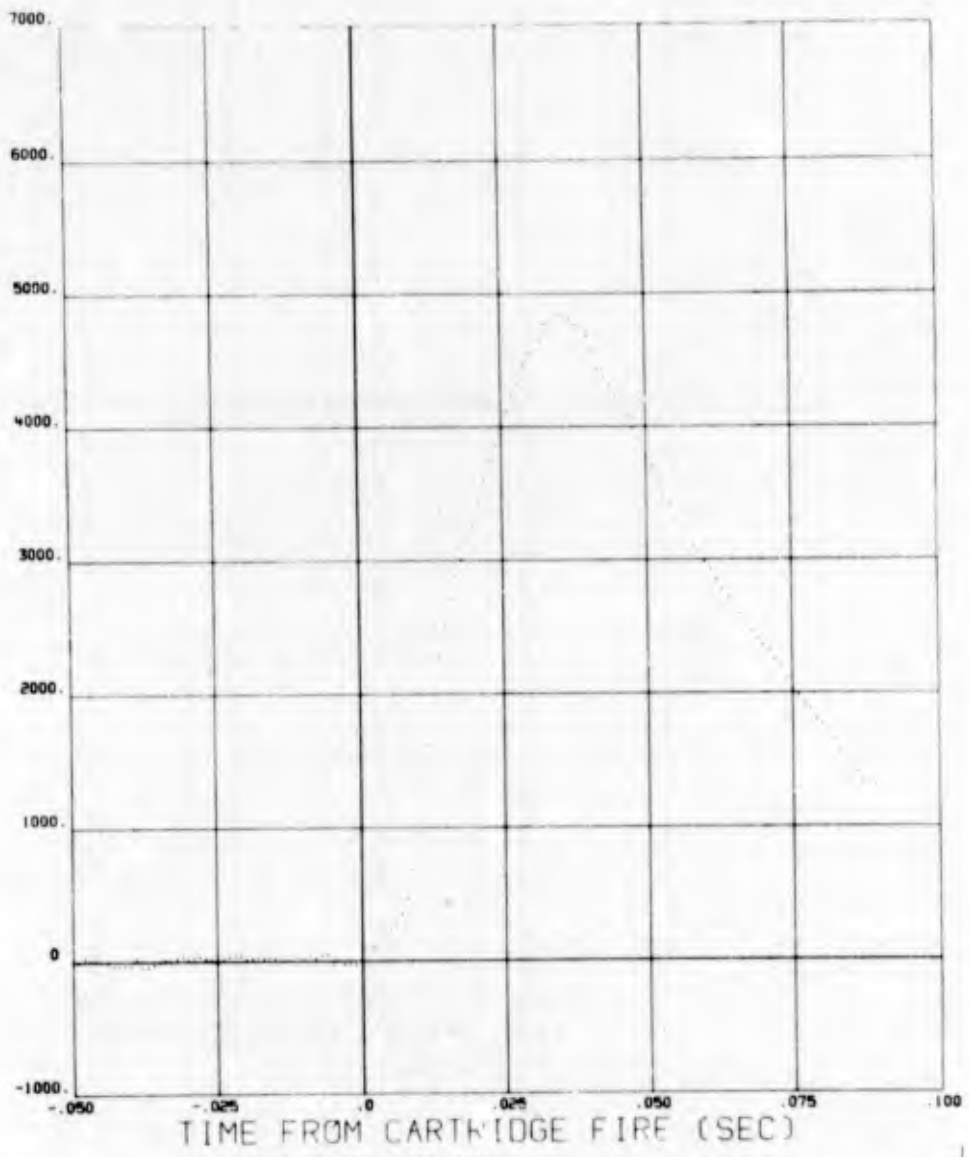
PL0T PREPARED BY ISX, ADIC

W 400AG018

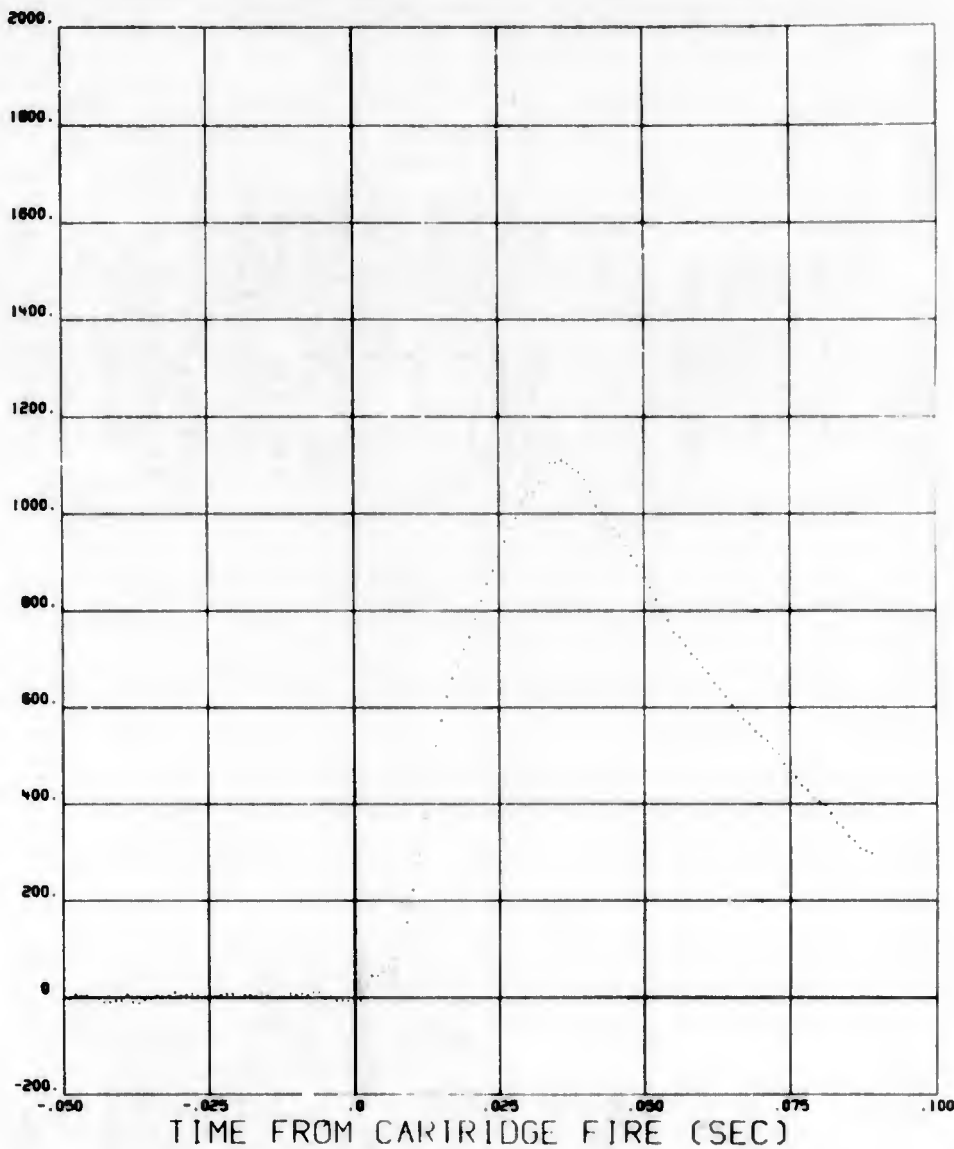
3 SEPT 71 MON 520 BOMB

80^{R245}
62 0 7

EJECTION
CHAMBER
PRESSURE
(PSI)



EJECTOR
FOOT
FORCE
(LBS)



PLT PREPARED BY TSX, ADTC

DATE 3 SEPT 71 MISSION 52S BOMB ID 14 BOMB WEIGHT 503.25 LBS

EJECTOR MOMENT ARM
TIME OF EJECTOR STROKE
A/C ANGLE OF ATTACK AT RELEASE
A/C PITCH ANGLE AT RELEASE
A/C ROLL ANGLE AT RELEASE
RACK EJECTION ANGLE

3.250 INCHES
***** SEC
2.260 DEG
-.160 DEG
.660 DEG
-48.000 DEG

IMPACT RANGE DEFLECTION

FEET FEET

RELEASE HISTORY
PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

HR MIN SEC

22 43 16.613

22 43 16.615
22 43 16.615

22 43 16.614

TIME DELAY
MILLISECONDS

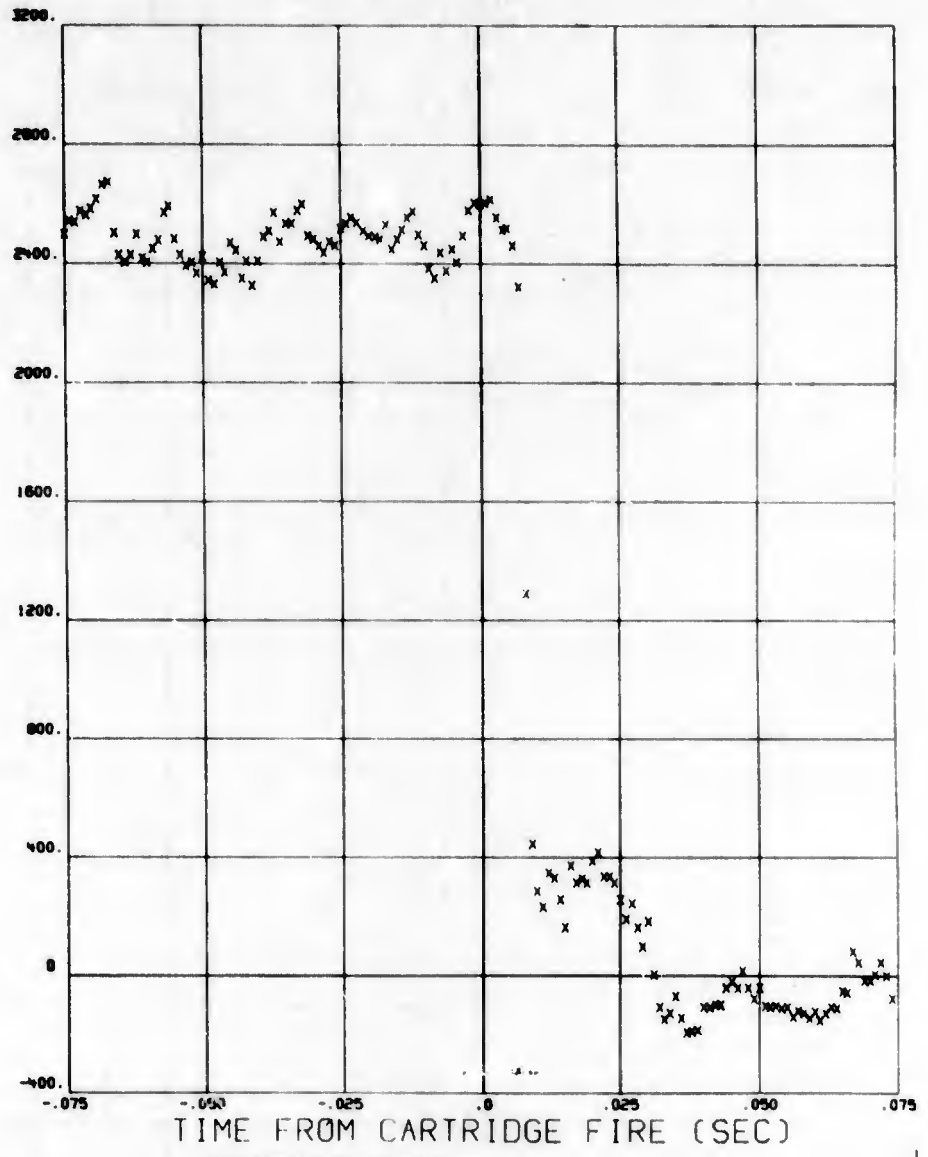
MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE

***** DEG F
***** DEG F
95.29 DEG F

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

***** FT/SEC
***** FT/SEC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



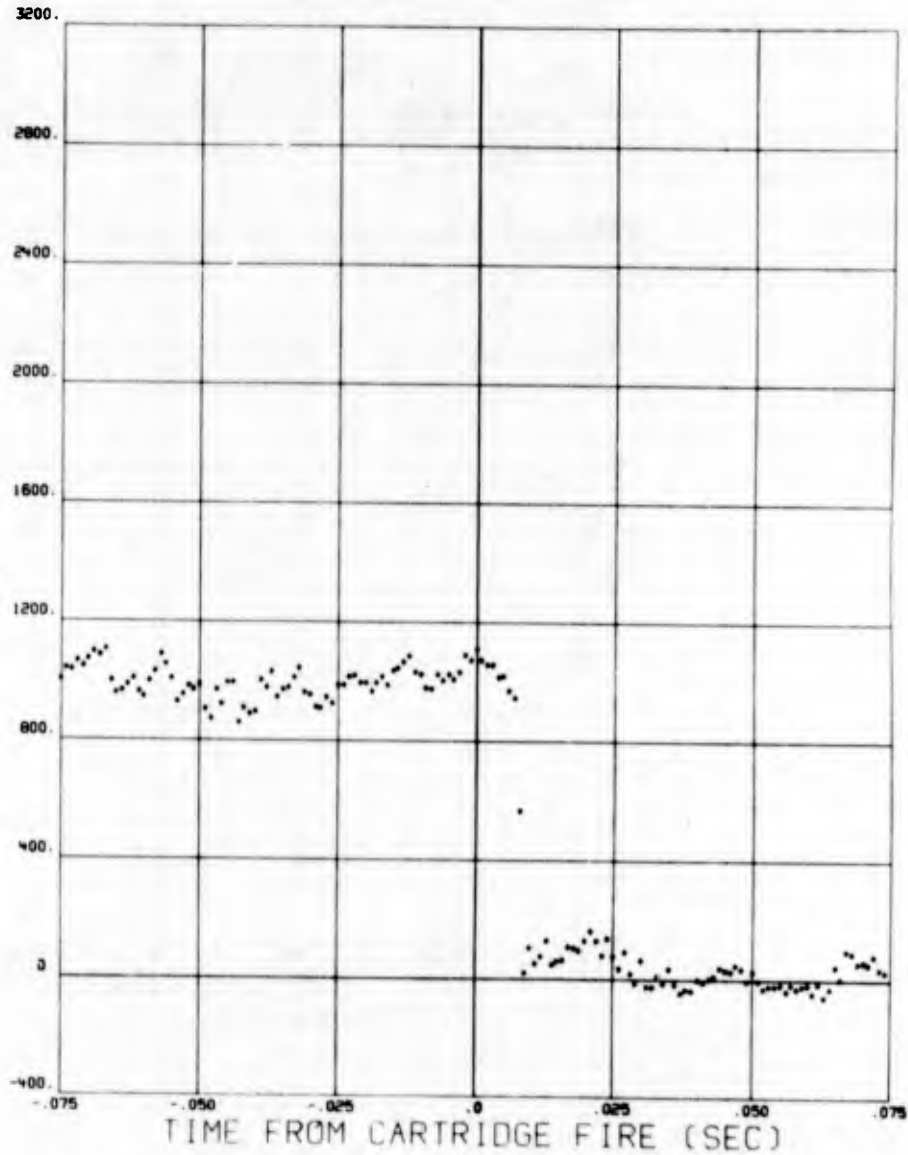
TIME FROM CARTRIDGE FIRE (SEC)
PLOT PREPARED BY TSX, ADTC

20/04/73 670AG018 3 SEPT 71 MSN 52S BOMB

14^{R245}₆₅ 07

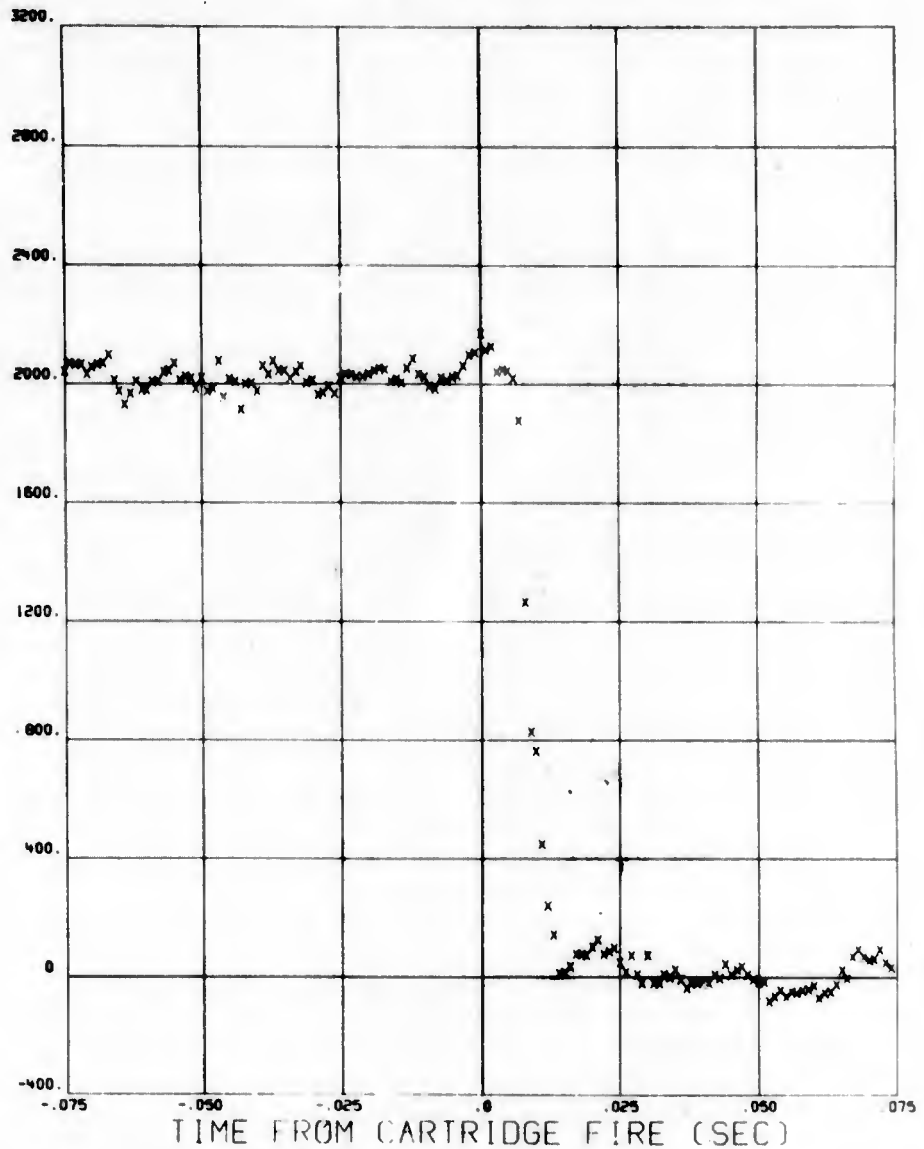
RELATIVE
SWAY
BRACE
STRAIN
(LBS)

* = RIGHT FWD



PLOT PREPARED BY ISX, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X - LEFT AFT

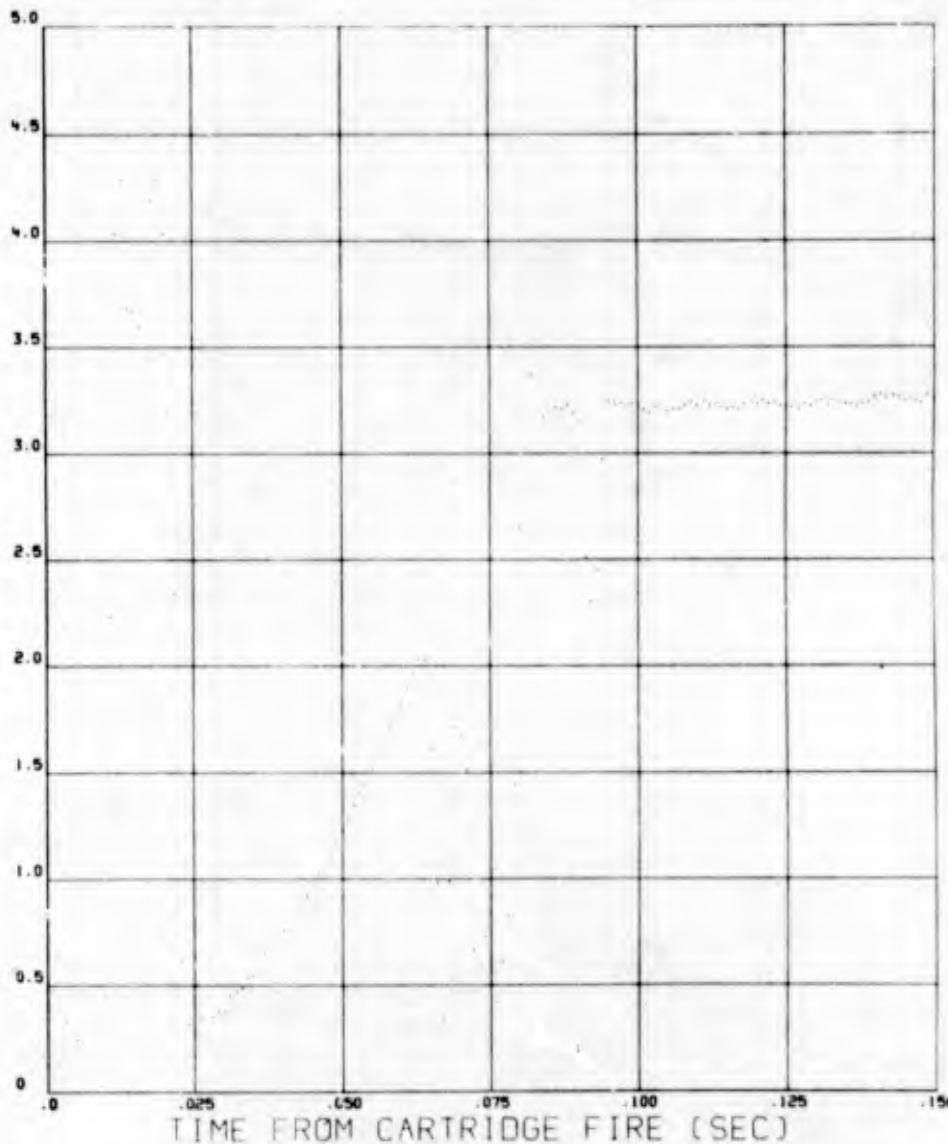


PLQT PREPARED BY ISX, ADIC

20/04/73 670AG018 3 SEPT 71 MSN 52S BOMB

14^{R245} 70 0 1

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY TSX, ADIC

DATE 28 OCT 71 MISSION 57C BOMB ID 121 BOMB WEIGHT 505.00 LBS

EJECTOR MOMENT ARM
 TIME OF EJECTOR STROKE 3.063 INCHES
 A/C ANGLE OF ATTACK AT RELEASE .063 SEC
 A/C PITCH ANGLE AT RELEASE 2.117 DEG
 A/C ROLL ANGLE AT RELEASE -1.490 DEG
 RACK EJECTION ANGLE 0.000 DEG

IMPACT	RANGE	DEFLECTION	FEET	FEET
RELEASE HISTORY			HR MIN	SEC
PICKLE TIME			***	*****
CARTRIDGE FIRE			7 16	9.863
INITIAL LINKAGE MOVEMENT			7 16	9.866
EJECTOR FOOT (FIRST MOTION)			7 16	9.878
STORE FIRST MOTION (FORWARD)			7 16	9.874
STORE FIRST MOTION (AFT)			7 16	9.868
EJECTOR FOOT FULL EXTENDED			7 16	9.941
HOOK FIRST MOTION (FORWARD)			7 16	9.874
HOOK FIRST MOTION (AFT)			7 16	9.867

TIME DELAY
 MILLISECCNDS
 0
 3
 15
 11
 5
 78
 11
 4

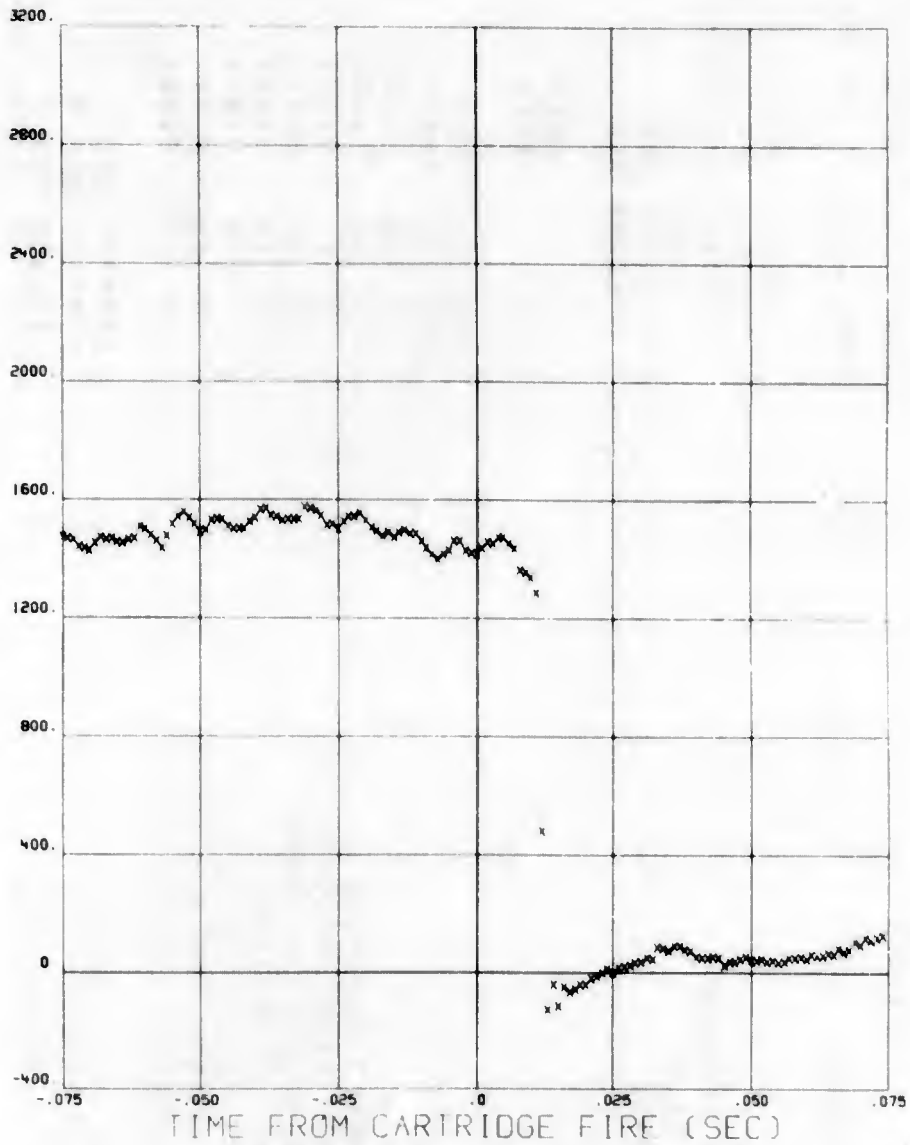
MAXIMUM PRE-FLT GROUND TEMPERATURE ***** DEG F
 MAXIMUM POST-FLT GROUND TEMPERATURE ***** DEG F
 MAXIMUM BREECH AMBIENT TEMPERATURE 106.52 DEG F

SEPARATION VELOCITY
 DISPLACEMENT METHOD 6.4 FT/SEC
 PRESSURE METHOD ***** FT/SEC

20.04.73 670AG018 28 OCT 71 MSN 57C BOMB

121^{R245}₇₃ 07

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD

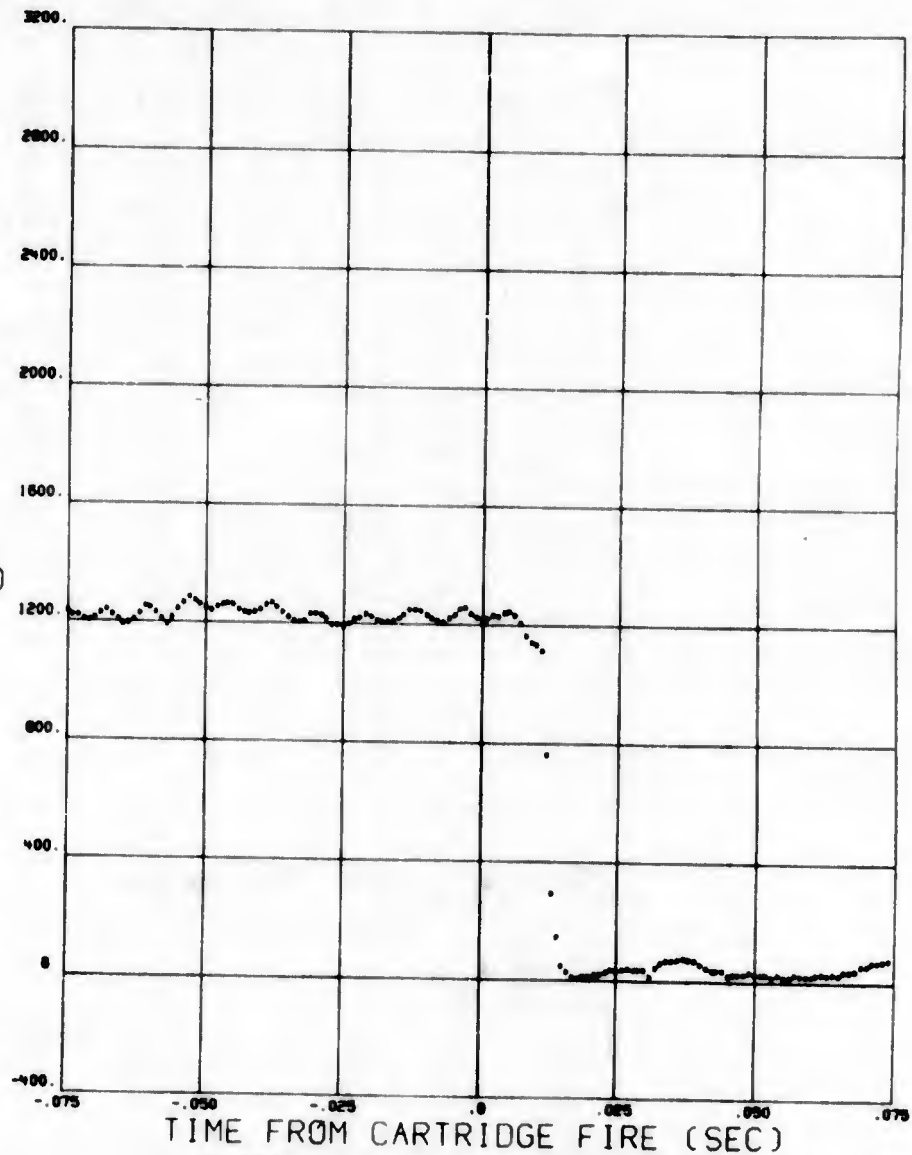


PLOT PREPARED BY TSK, ADIC

20/04/73 670AG018 28 OCT 71 MSN 57C BOMB

121^{R245}₇₄ 0

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD

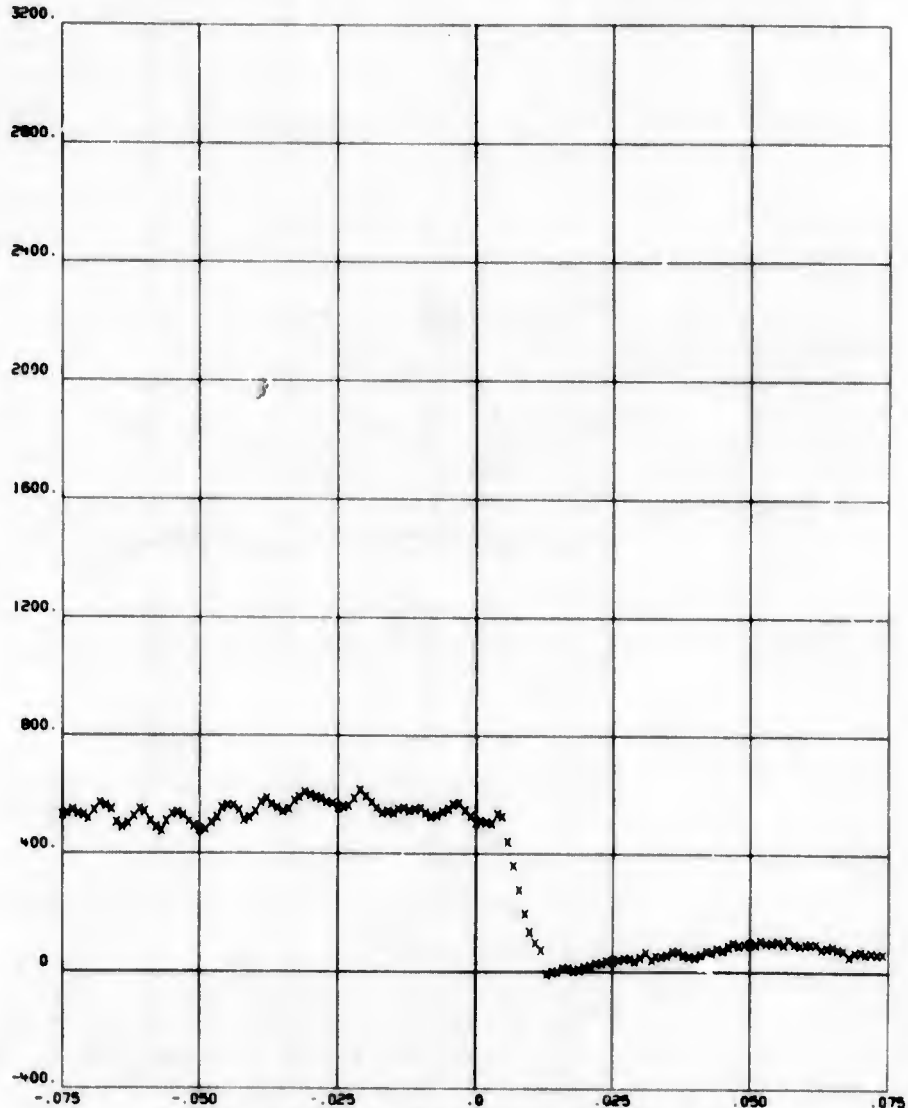


PLOT PREPARED BY TSX, AOTC

20/04/73 670AG018 28 OCT 71 MSN 57C BOMB

121 R245 75 0 7

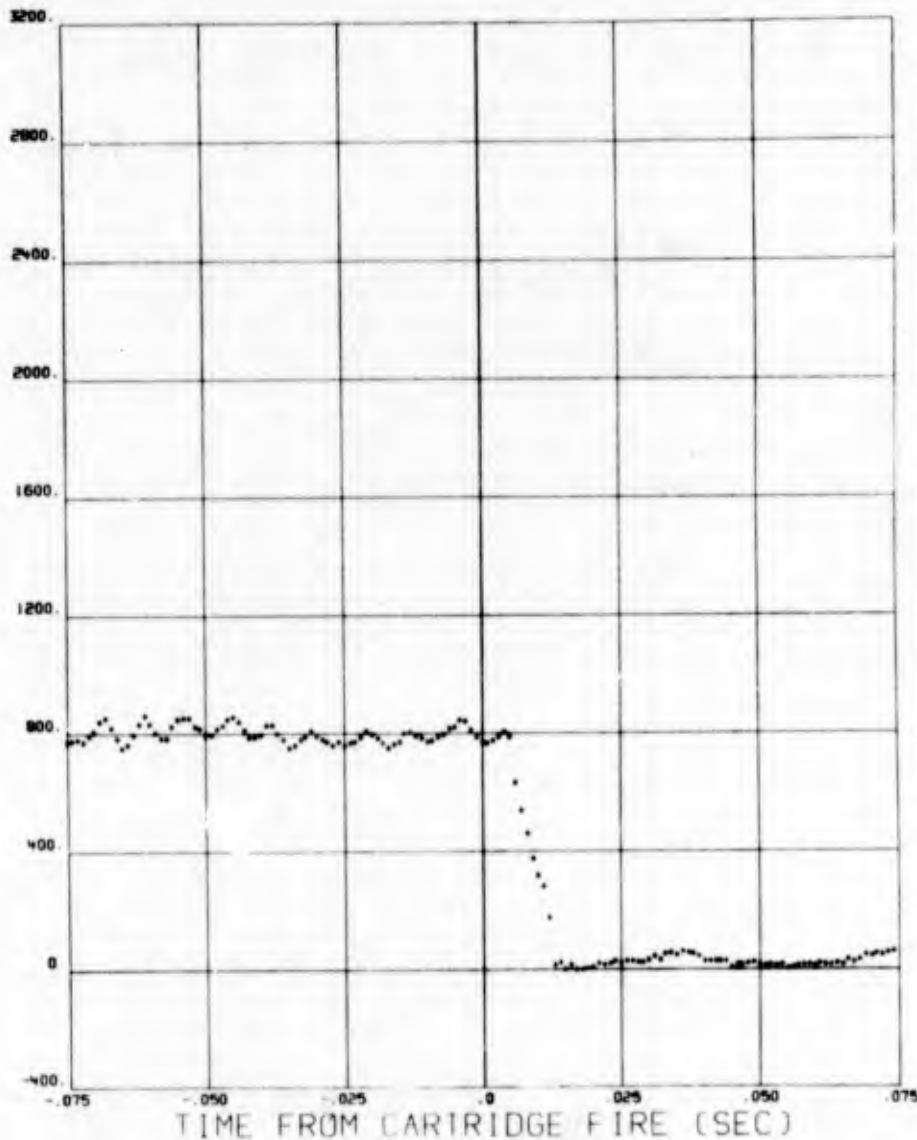
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



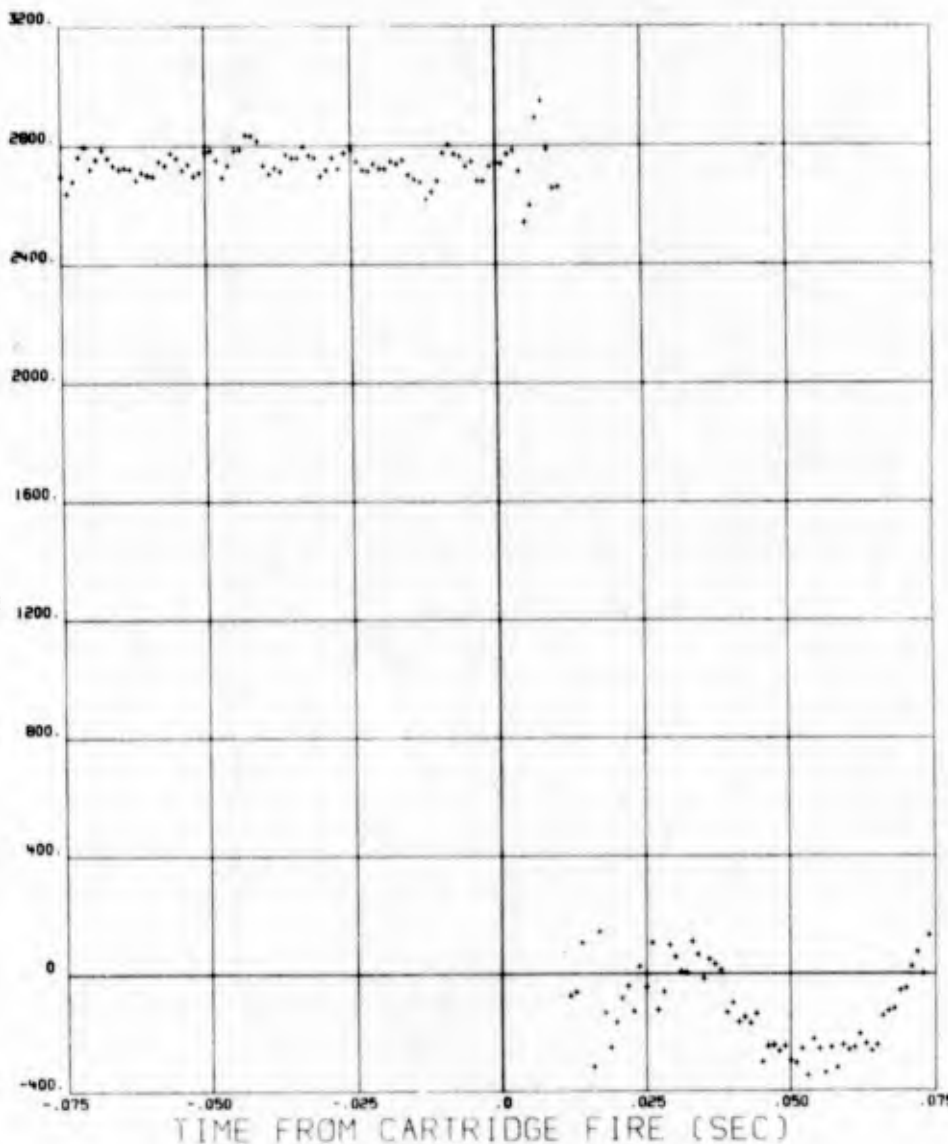
TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY 15x, ADTC

20/04/73 670AG018 28 OCT 71 MSN 57C BOMB

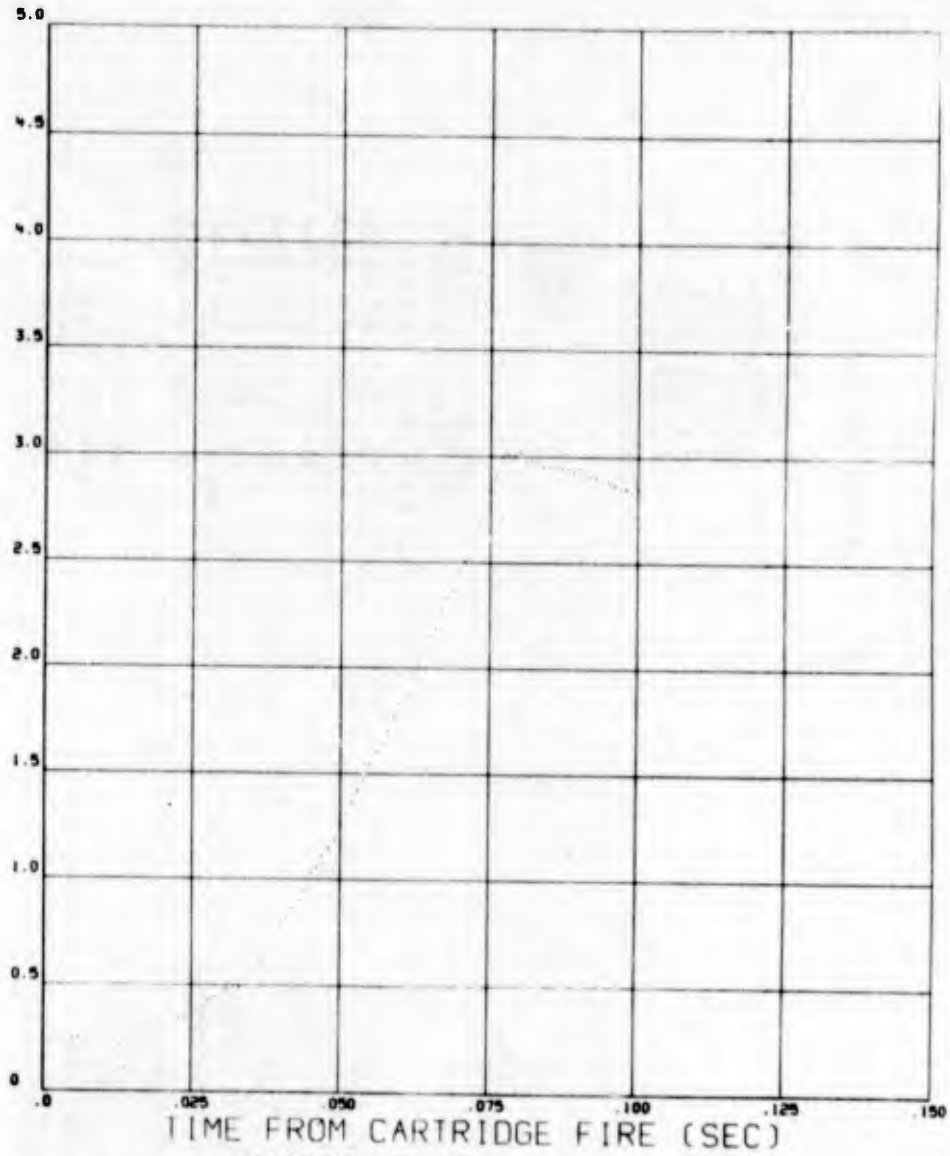
121^{R245}₇₇ 07

RELATIVE
HOOK
REACTION
(LBS)
+ = FORWARD



PLOT PREPARED BY TSX, ADIC

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY 15X, ADTC

DATE 28 OCT 71 MISSION 57S BOMB ID 120 BOMB WEIGHT 508.25 LBS

EJECTOR MOMENT ARM
TIME OF EJECTOR STROKE
A/C ANGLE OF ATTACK AT RELEASE
A/C PITCH ANGLE AT RELEASE
A/C ROLL ANGLE AT RELEASE
RACK EJECTION ANGLE

3.063 INCHES
.072 SEC
2.086 DEG
-1.500 DEG
-.900 DEG
-48.000 DEG

IMPACT RANGE DEFLECTION

FEET
FEET

RELEASE HISTORY

PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

HR MIN SEC
*** *** **
*** *** **
7 16 27.306
7 16 27.310
7 16 27.308
7 16 27.308
7 16 27.382
*** *** **
7 16 27.308

TIME DELAY
MILLISECONDS

0
4
2
2
76

2

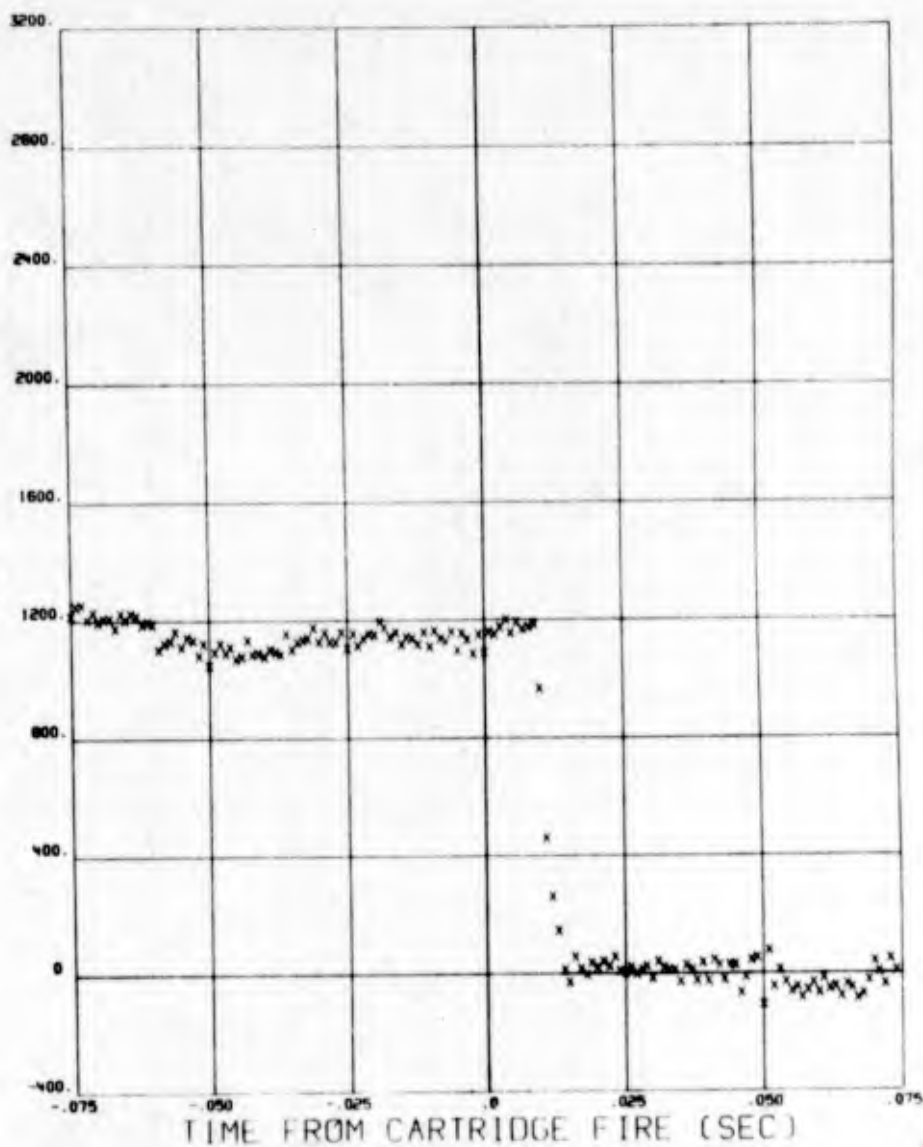
MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE

***** DEG F
***** DEG F
72.86 DEG F

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

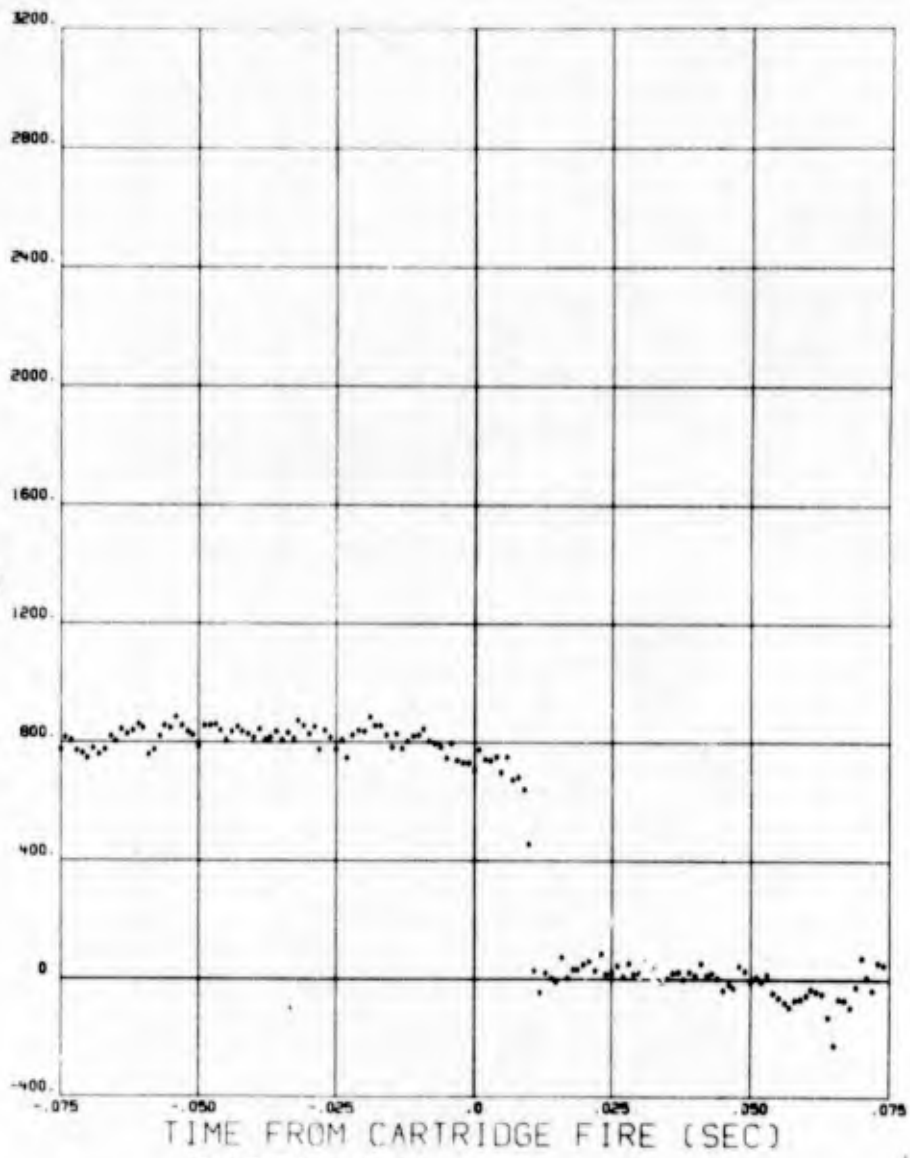
***** FT/SEC
***** FT/SEC
5.8 FT/SEC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



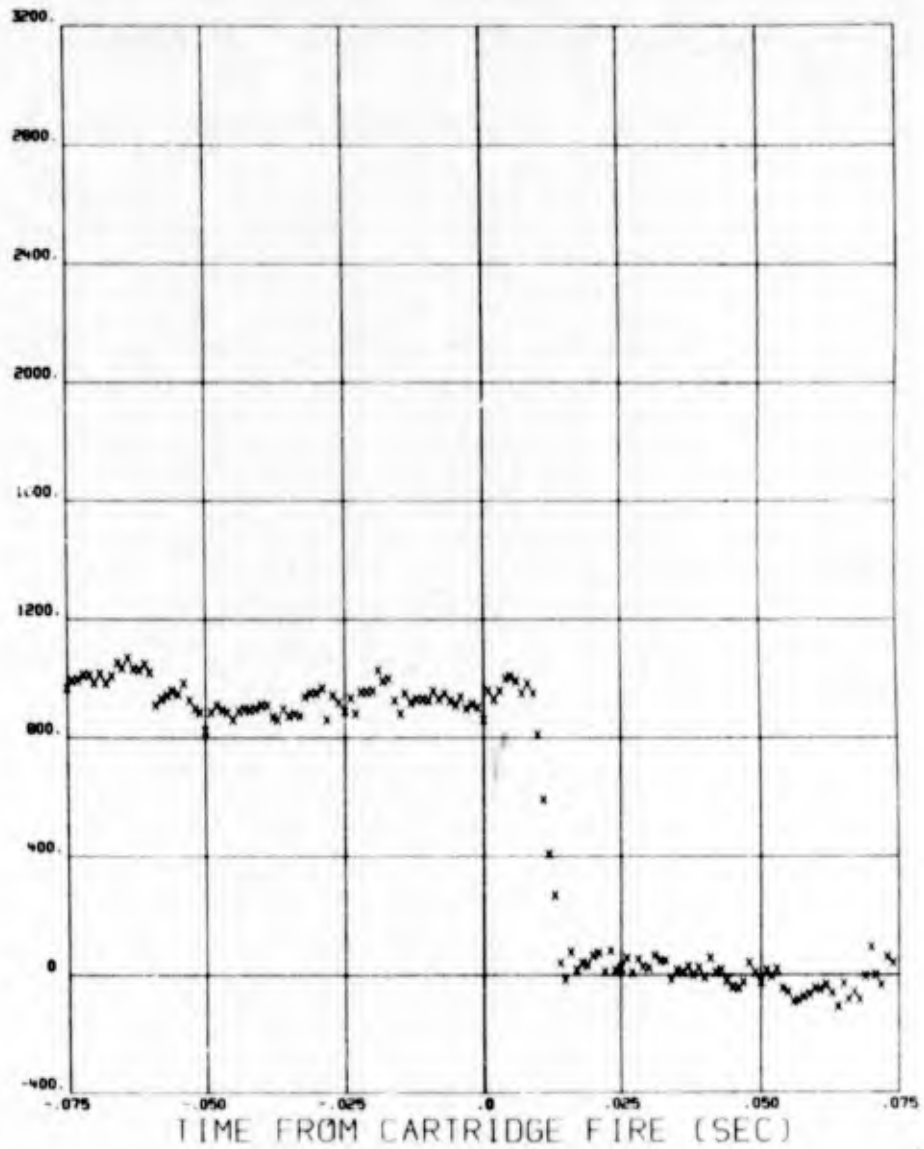
PLOT PREPARED BY TSX, ADIC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



PLOT PREPARED BY TSK, ADIC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT

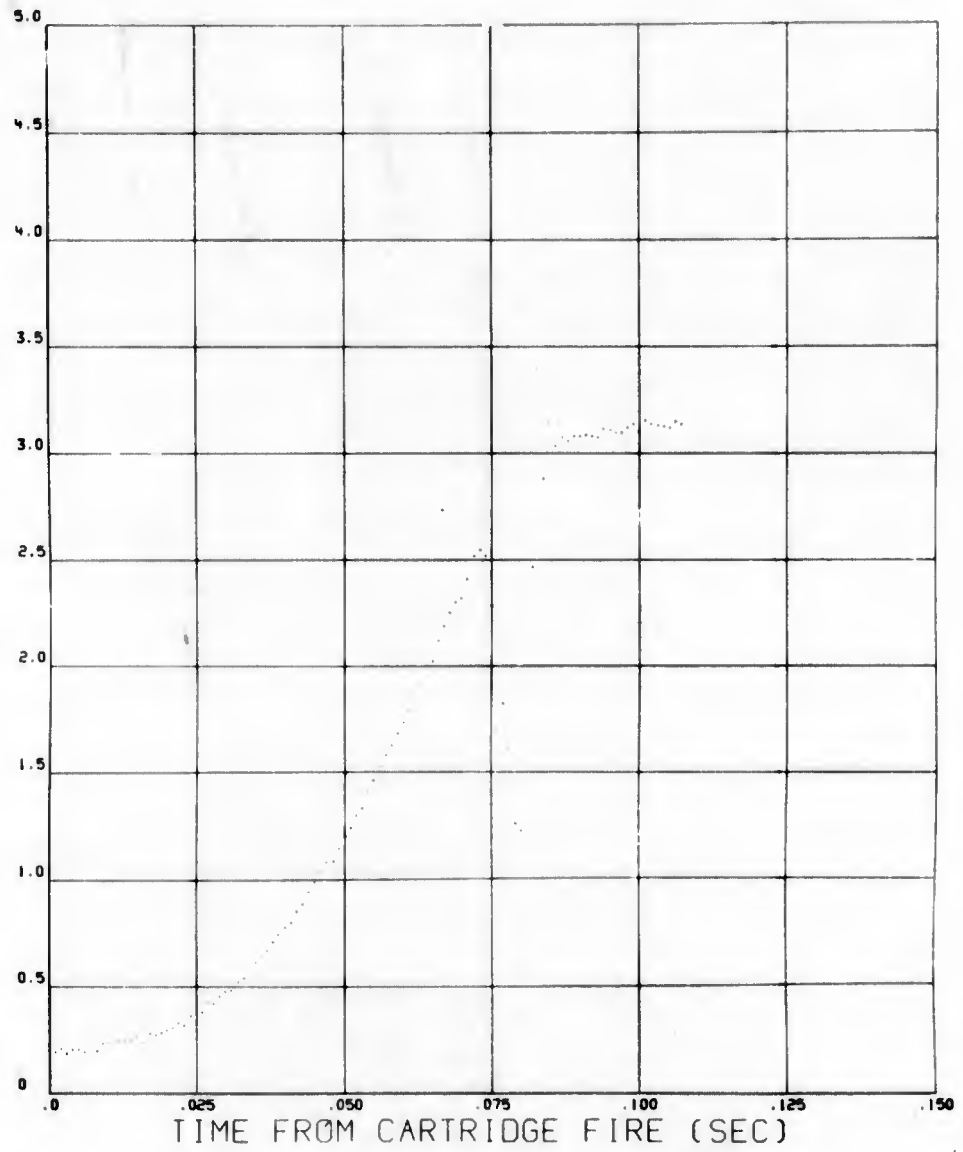


PLOT PREPARED BY TSX, ADTC

1 20/04/73 670AG018 28 OCT 71 MSN 57S BOMB

120^{BB-5} 07

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY TSX, ADTC

DATE 7 JAN 72 MISSION 69C BOMB ID 139 BOMB WEIGHT 507.25 LBS

EJECTOR MOMENT ARM 3.063 INCHES
TIME OF EJECTOR STROKE ***** SEC
A/C ANGLE OF ATTACK AT RELEASE 2.099 DEG
A/C PITCH ANGLE AT RELEASE -.550 DEG
A/C ROLL ANGLE AT RELEASE .588 DEG
RACK EJECTION ANGLE 0.000 DEG

IMPACT RANGE FEET
DEFLECTION FEET

RELEASE HISTORY
PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

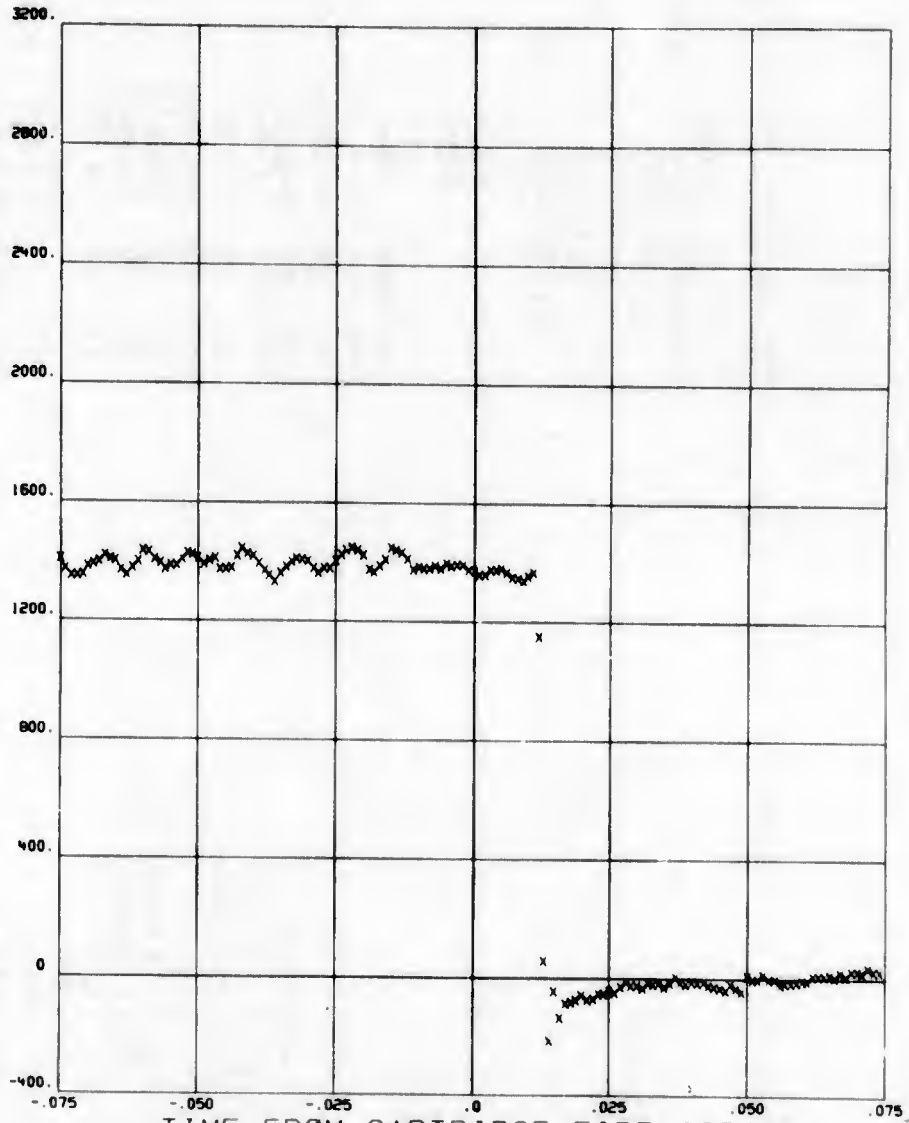
HR MIN SEC
*** *** *****
21 10 54.936
21 10 54.945
*** *** *****
21 10 54.947
21 10 54.947
21 10 55.015
21 10 54.947
21 10 54.947
***** DEG F
***** DEG F
95.00 DEG F

MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREACH AMBIENT TEMPERATURE
SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD
6.9 FT/SEC
***** FT/SEC

TIME DELAY
MILLISECONDS
0
9

11
11
79
11
11

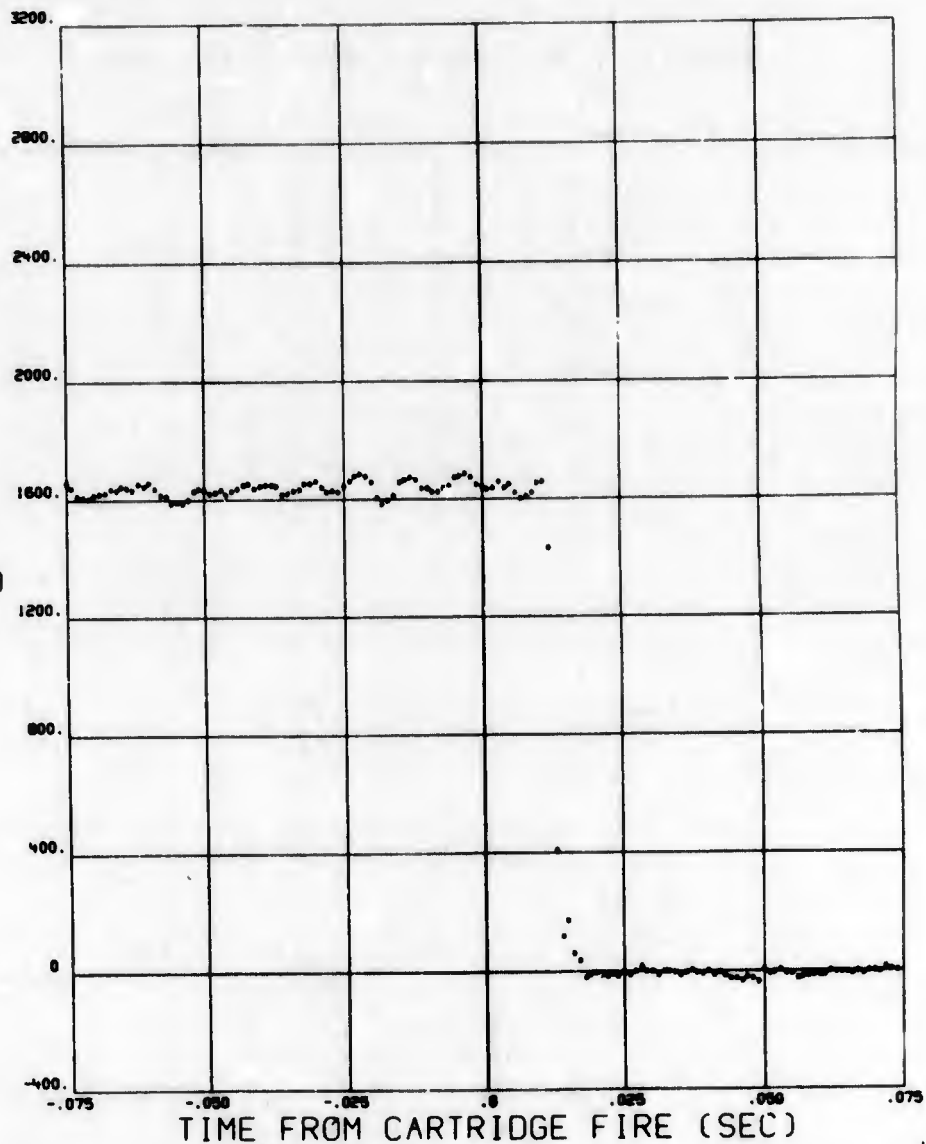
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADIC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



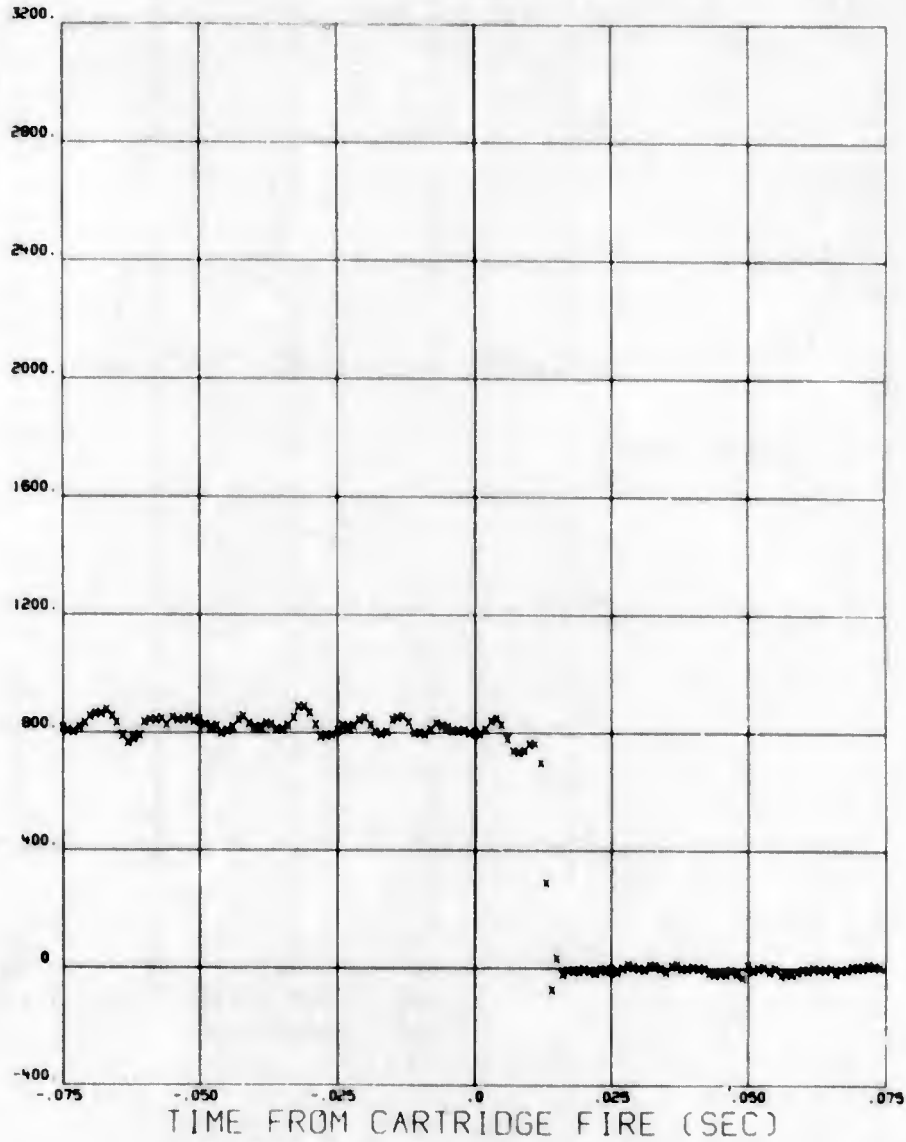
TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

29 05 73 670AG018 7 JAN 72 MSN 69C BOMB

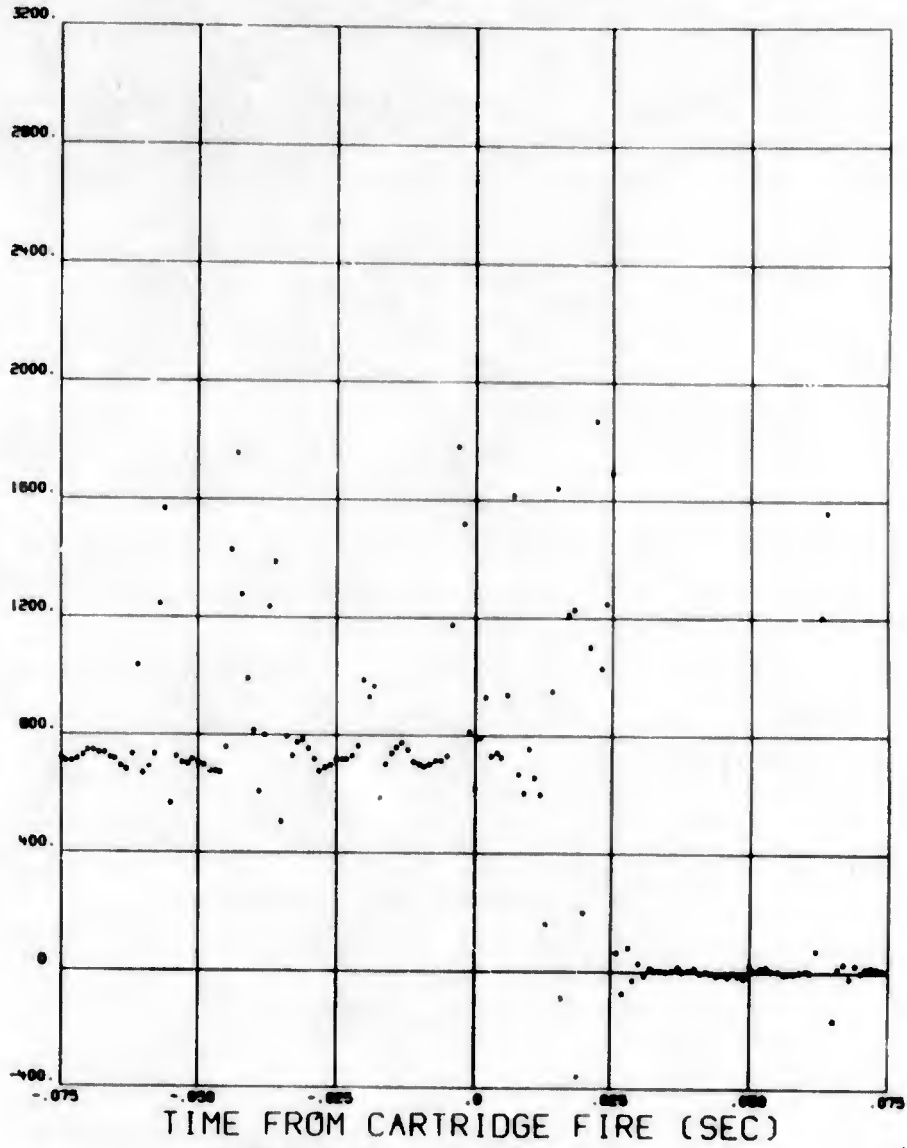
139^{R245}

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



PLOT PREPARED BY TSX, ADIC

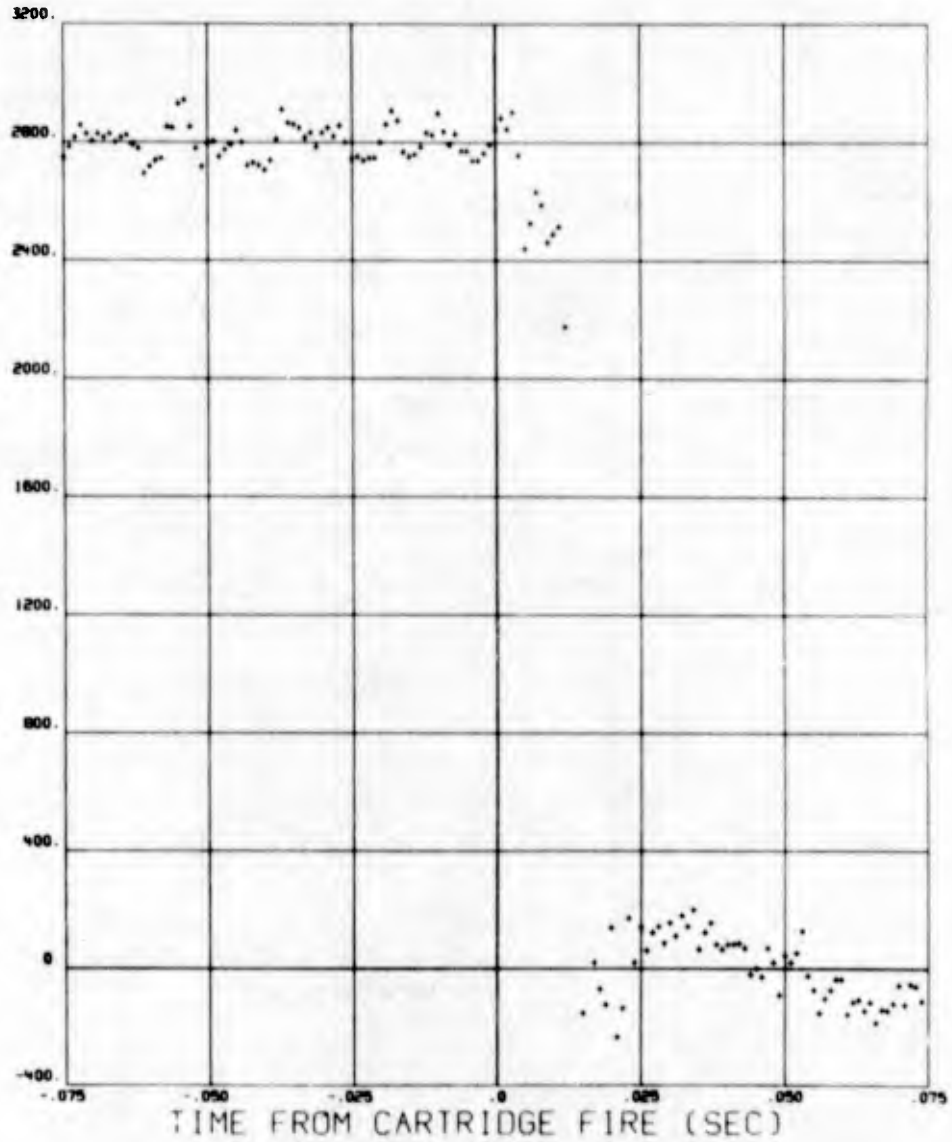
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



29 05/73 670AG018 7 JAN 72 MSN 69C BOMB

139 ^{R245} 5 0

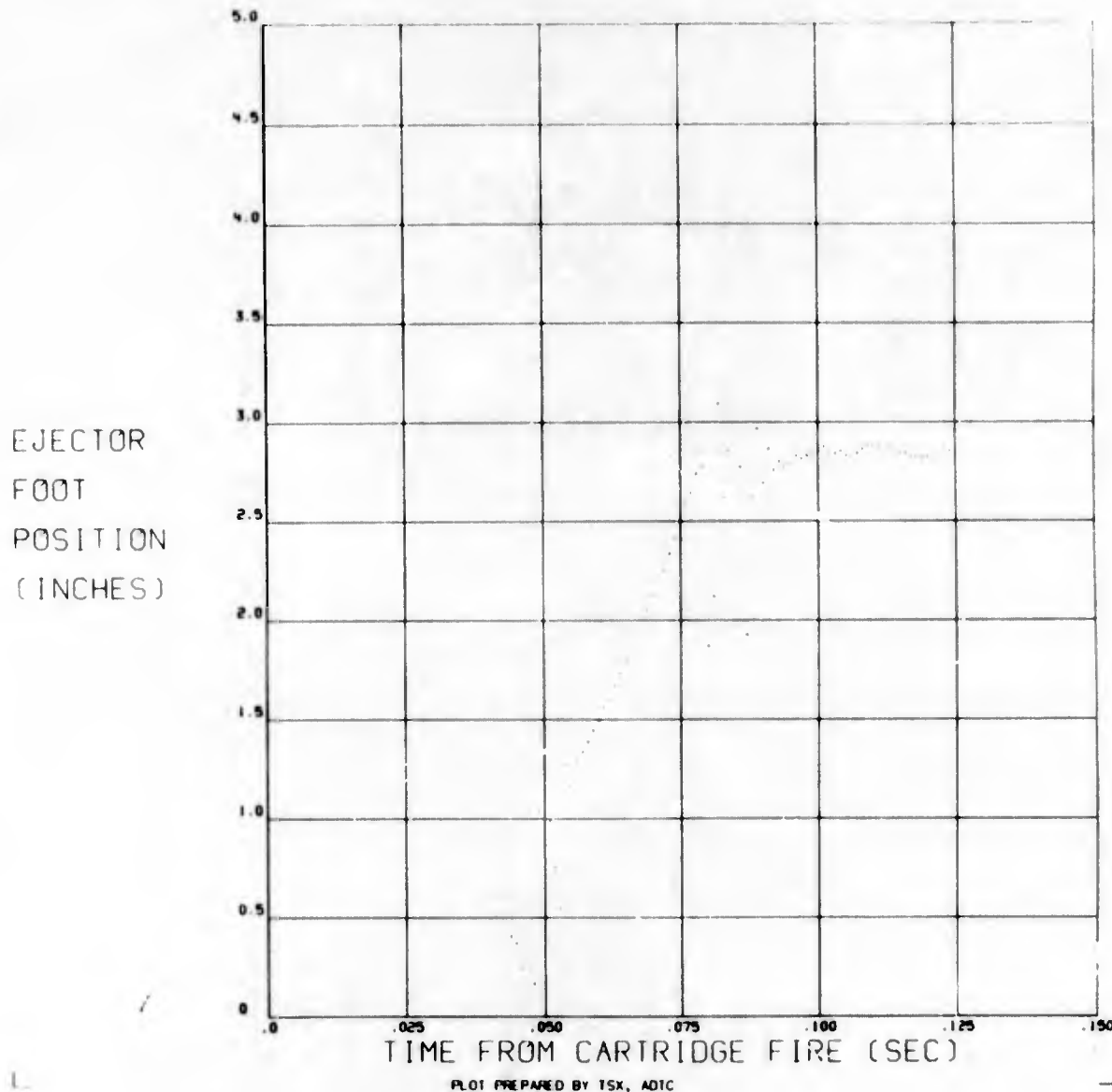
RELATIVE
HOOK
REACTION
(LBS)
+ = FORWARD



PLOT PREPARED BY 15X, ADIC

29/05/72 670AG018 7 JAN 72 MSN 69C BOMB

139^{R/45}, 0



DATE 7 JAN 72 MISSION 69S BOMB ID 153 BOMB WEIGHT 503.00 LBS

EJECTOR MOMENT ARM
 TIME OF EJECTOR STROKE
 A/C ANGLE OF ATTACK AT RELEASE
 A/C PITCH ANGLE AT RELEASE
 A/C ROLL ANGLE AT RELEASE
 BACK EJECTION ANGLE

3.250 INCHES
 .072 SEC
 2.074 DEG
 -.910 DEG
 1.080 DEG
 -48.000 DEG

IMPACT RANGE DEFLECTION

FEET
 FEET

RELEASE HISTORY
 PICKLE TIME
 CARTRIDGE FIRE
 INITIAL LINKAGE MOVEMENT
 EJECTOR FOOT (FIRST MOTION)
 STORE FIRST MOTION (FORWARD)
 STORE FIRST MOTION (AFT)
 EJECTOR FOOT FULL EXTENDED
 HOOK FIRST MOTION (FORWARD)
 HOOK FIRST MOTION (AFT)

TIME DELAY
 MILLISECONDS

0
 2
 1
 1
 74

 1

HR	MIN	SEC
***	***	*****
***	***	*****
21	11	13.373
21	11	13.375
21	11	13.374
21	11	13.374
21	11	13.447
***	***	*****
21	11	13.374

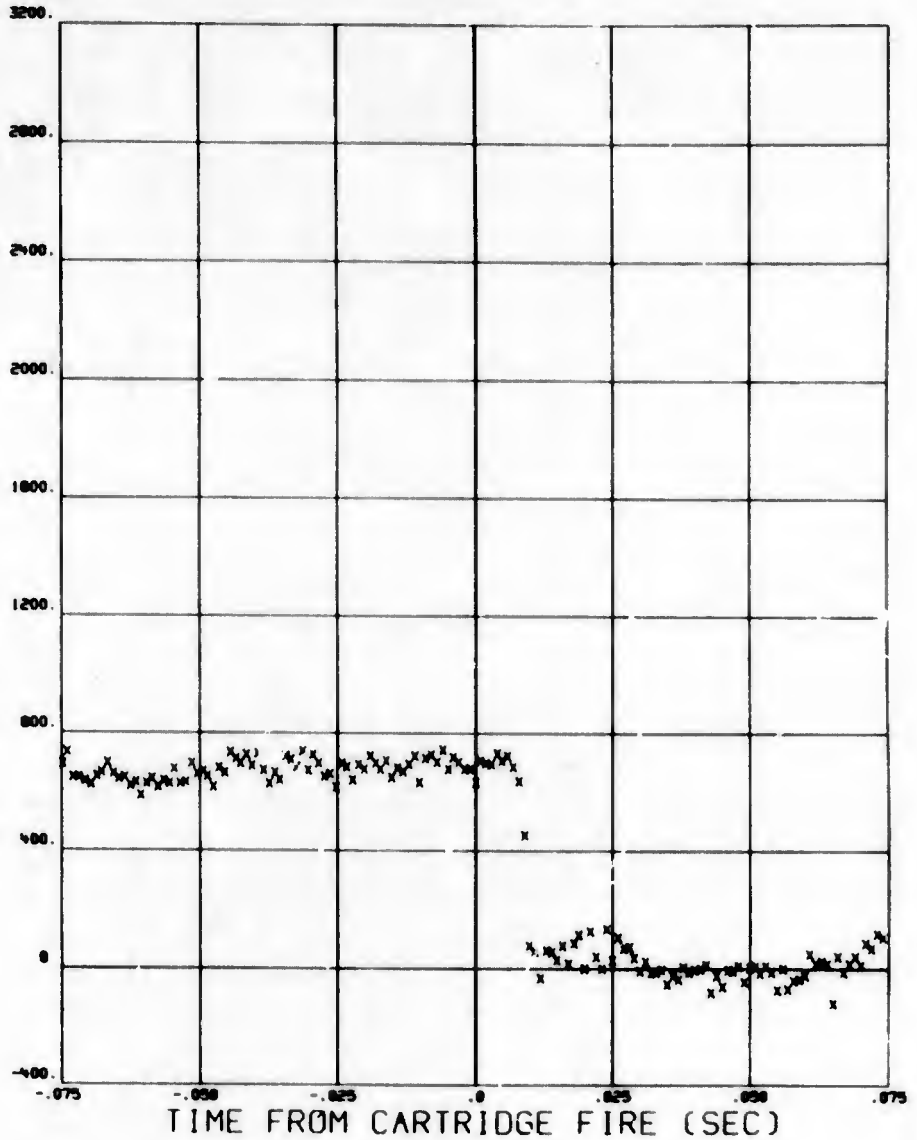
MAXIMUM PRE-FLT GROUND TEMPERATURE
 MAXIMUM POST-FLT GROUND TEMPERATURE
 MAXIMUM BREACH AMBIENT TEMPERATURE

***** DEG F
 ***** DEG F
 96.19 DEG F

SEPARATION VELOCITY
 DISPLACEMENT METHOD
 PRESSURE METHOD

5.9 FT/SEC
 ***** FT/SEC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



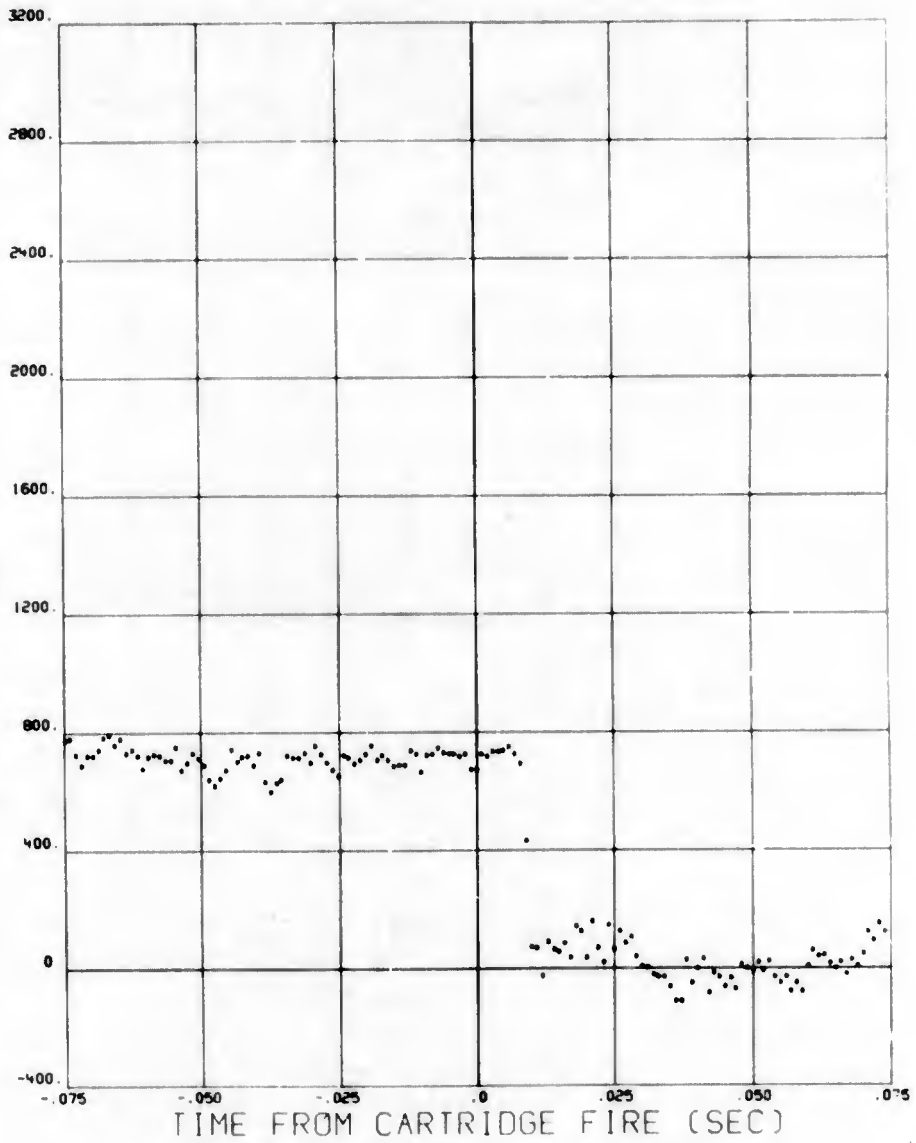
TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY ISX, ADTC

29 05/73 670AG018 7 JAN 72 MSN 69S BOMB

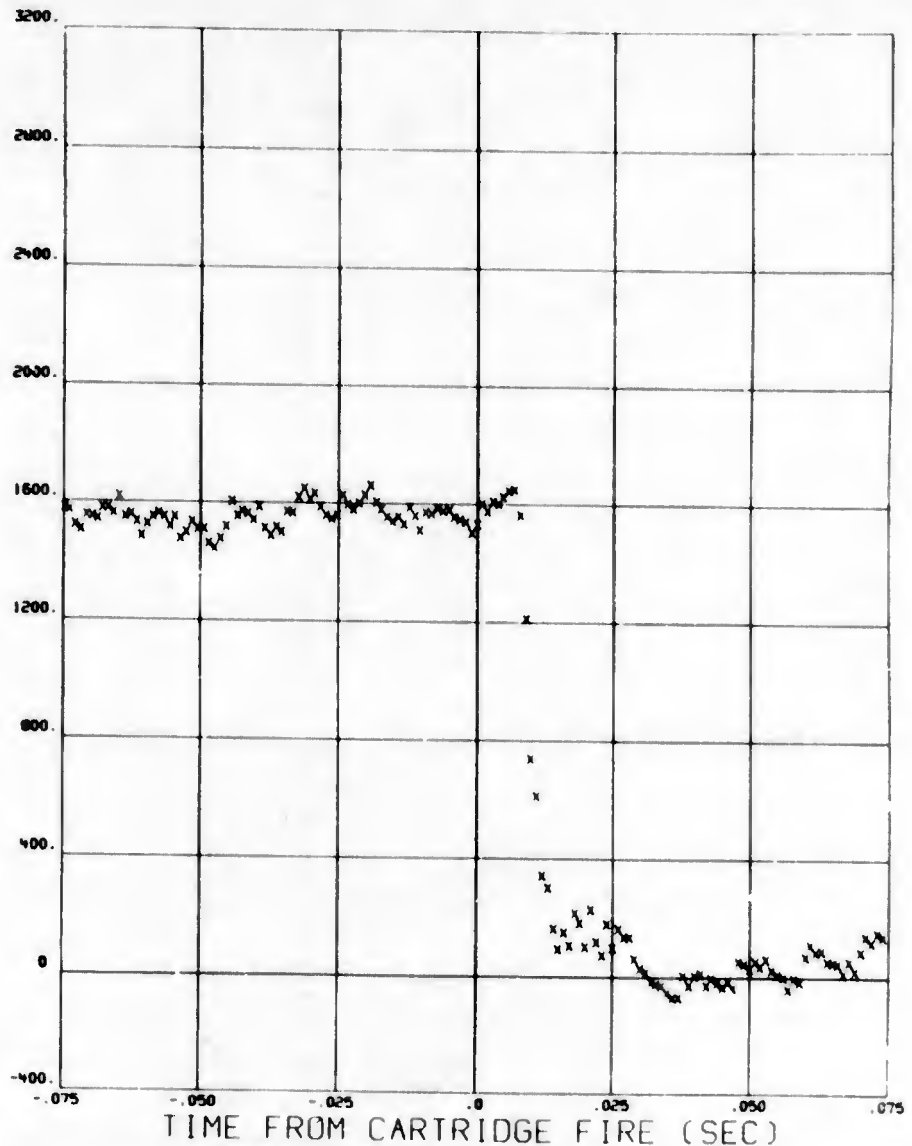
153^{R245}₁₁ 0

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



PLT PREPARED BY TSV, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



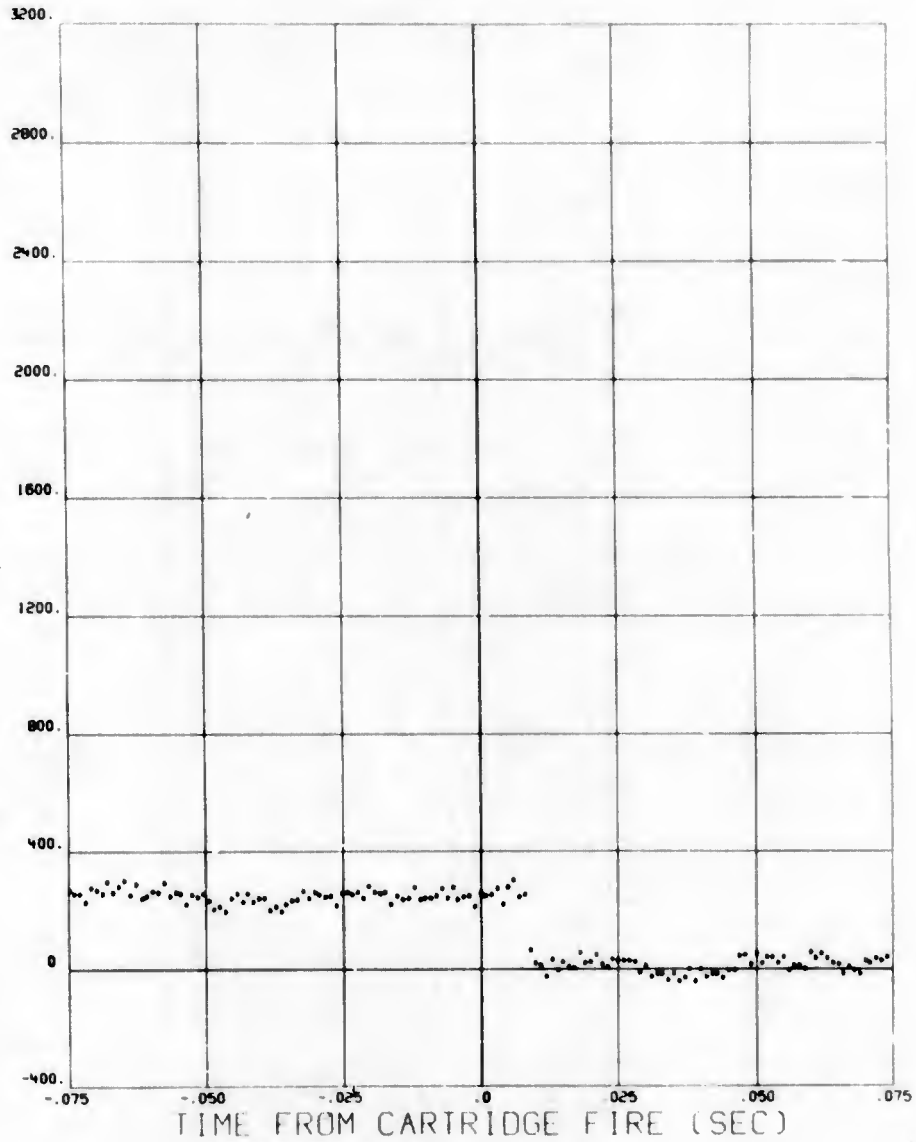
PLOT PREPARED BY ISX, ADIC

810A9018

7 JAN 72 MSN 69S BOMB

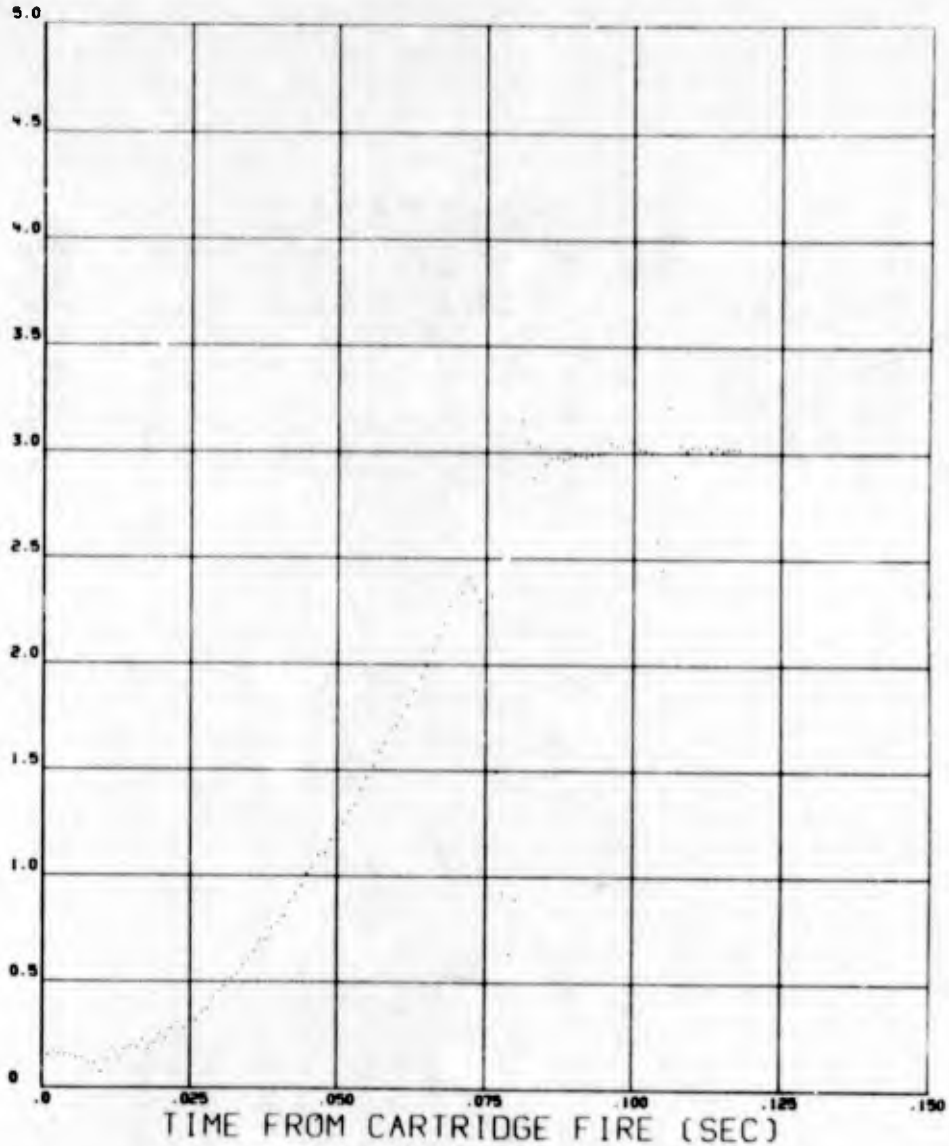
153^{R245} 3 0

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
• = RIGHT AFT



PLOT PREPARED BY 15X, ADTC

EJECTOR
FOOT
POSITION
(INCHES)



PLO1 PREPARED BY 15X, ADTC

DATE 10 JAN 72 MISSION 70C BOMB ID 83 BOMB WEIGHT 511.75 LBS

EJECTOR MOMENT ARM 3.438 INCHES
TIME OF EJECTOR STROKE *** SEC
A/C ANGLE OF ATTACK AT RELEASE 2.068 DEG
A/C PITCH ANGLE AT RELEASE -.580 DEG
A/C ROLL ANGLE AT RELEASE 1.500 DEG
PACK EJECTION ANGLE 0.000 DEG

IMPACT RANGE DEFLECTION
FEET FEET

RELEASE HISTORY
PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

TIME DELAY
MILLISECONDS

0
7

9
8
78
8
8

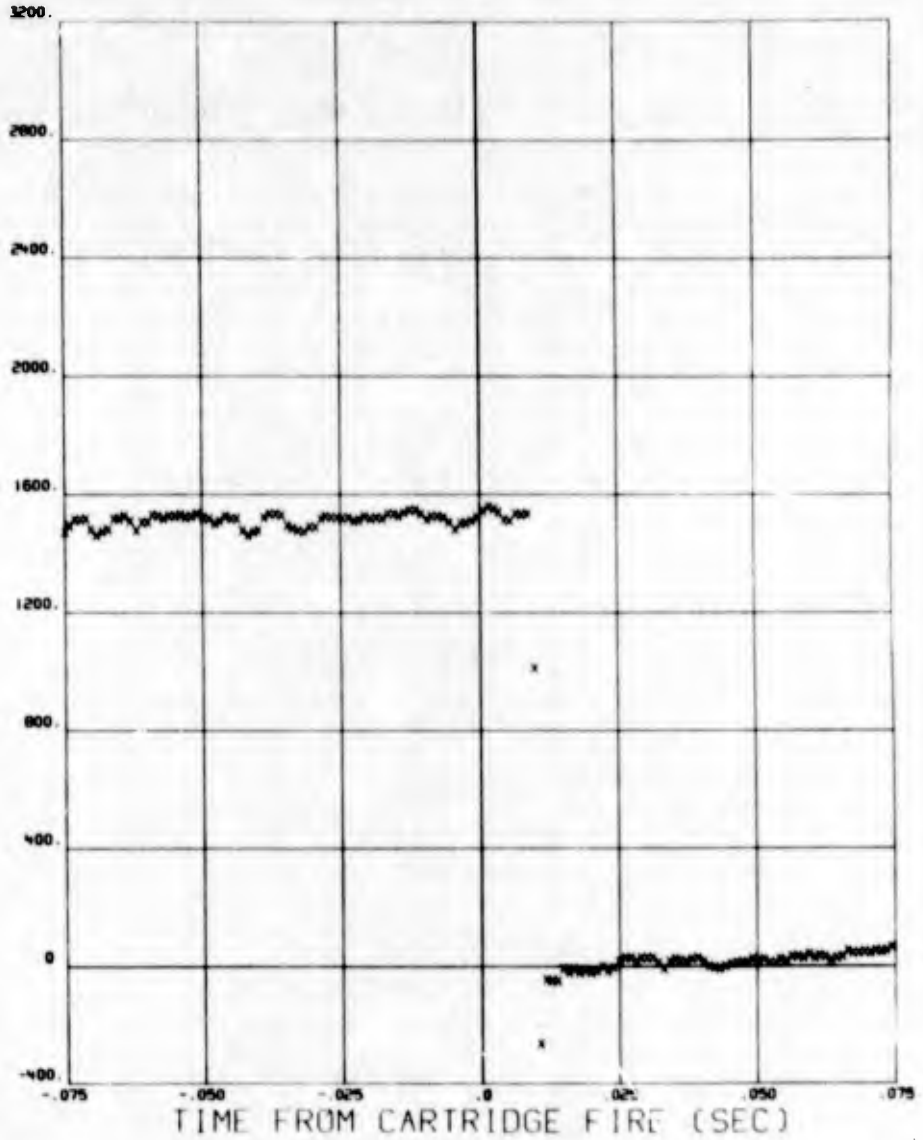
HR MIN SEC
*** *** **
15 4 26.790
15 4 26.797
*** *** **
15 4 26.799
15 4 26.798
15 4 26.868
15 4 26.798
15 4 26.798

MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

***** DEG F
***** DEG F
92.83 DEG F
***** FT/SEC
6.1 FT/SEC
***** FT/SEC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD

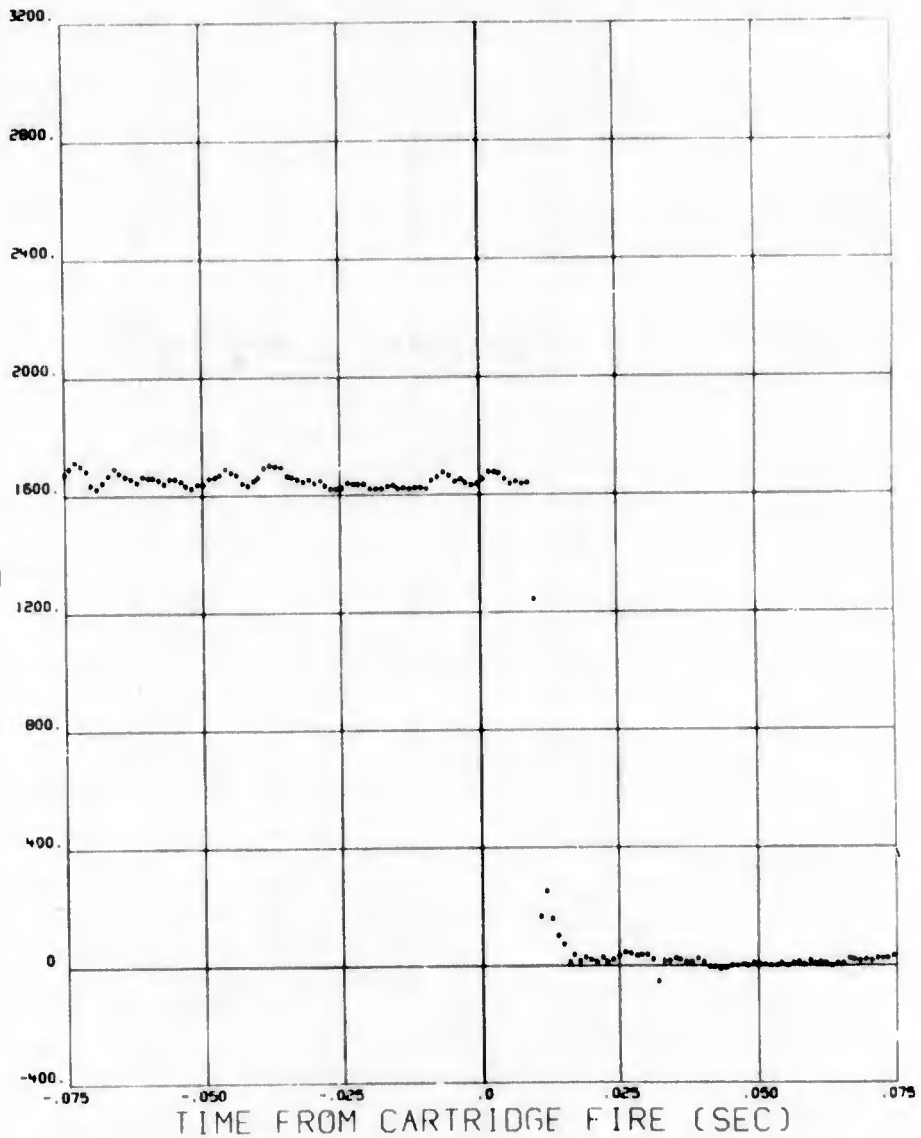


PLOT PREPARED BY TSX, ADTC

29 05 74 670AG018 10 JAN 72 MSN 70C BOMB

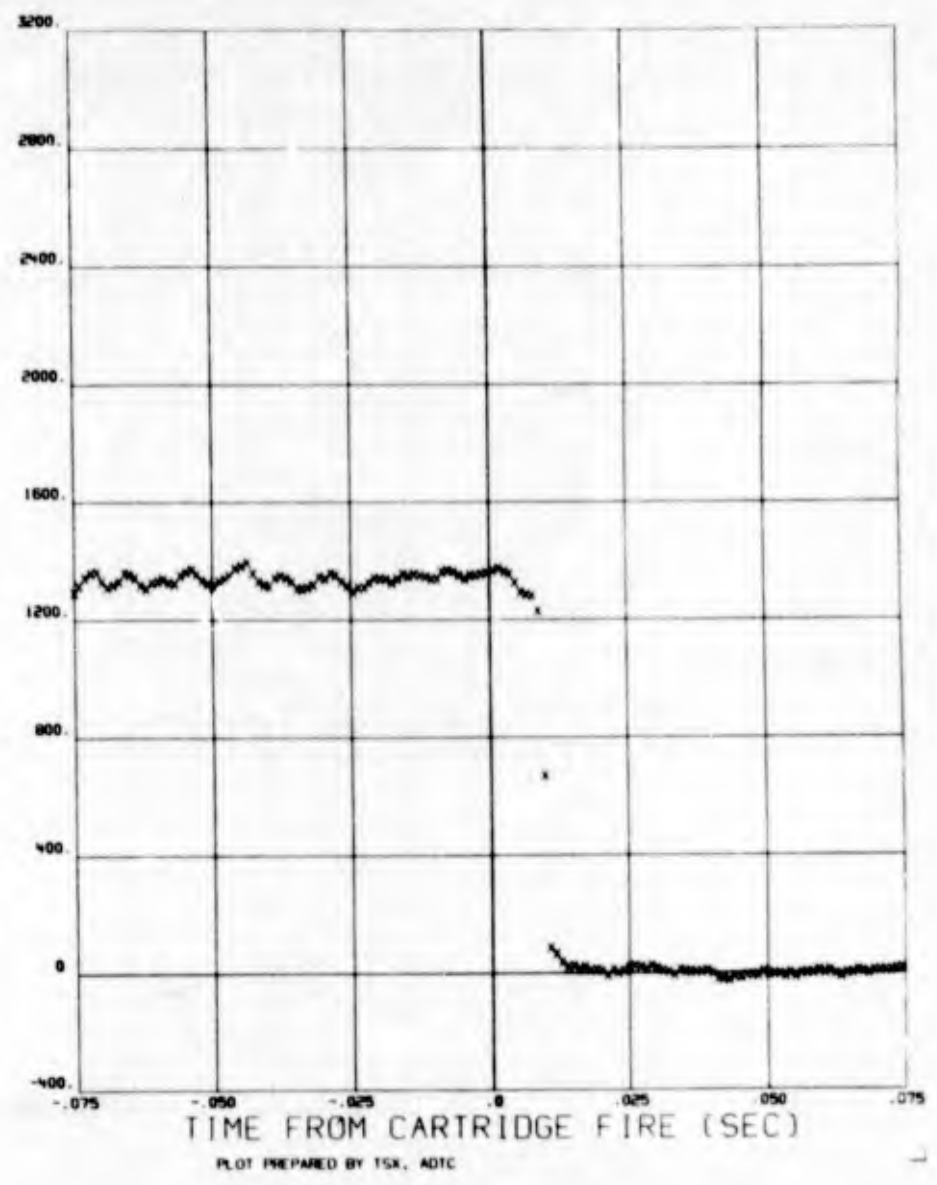
83 ^{PL245} 20 0

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



PLOT PREPARED BY 15X, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT

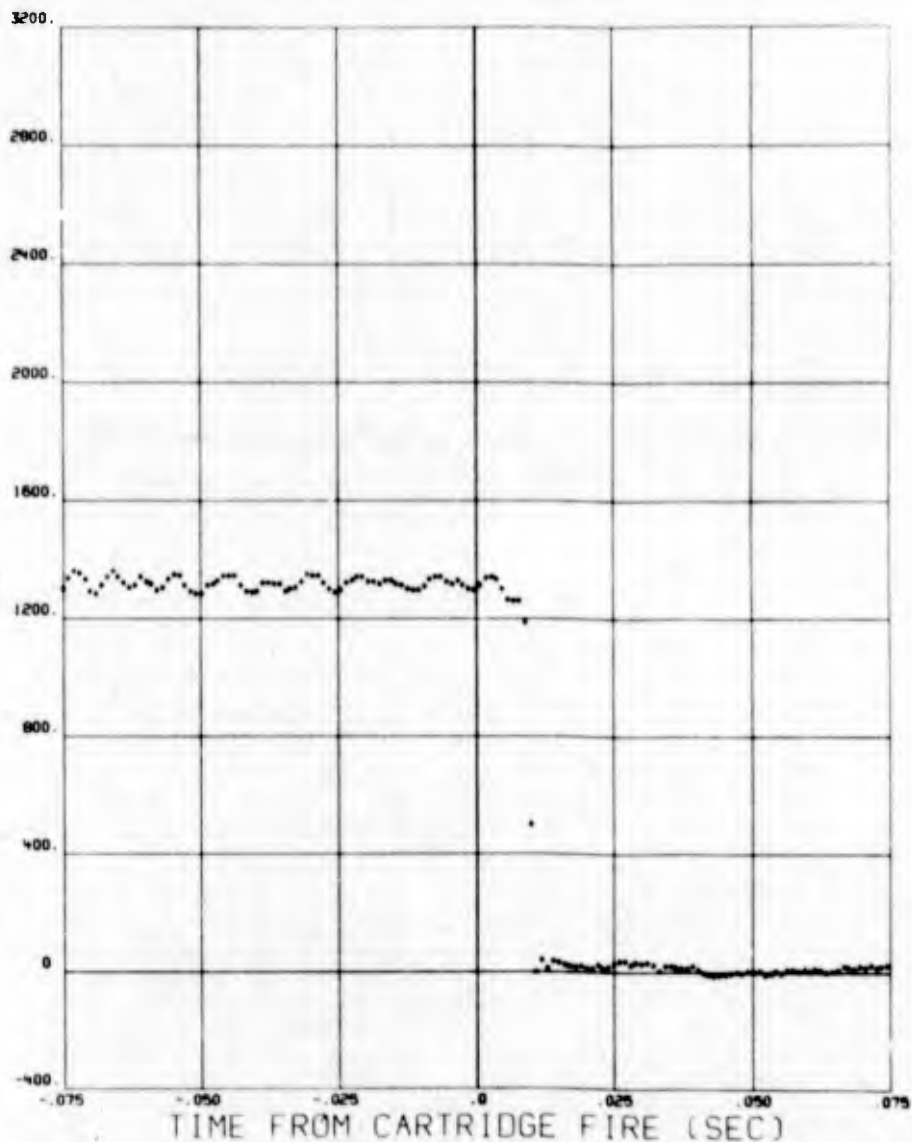


29/05/73 670AG018 10 JAN 72 MSN 70C BOMB

83^{M245} 22 0

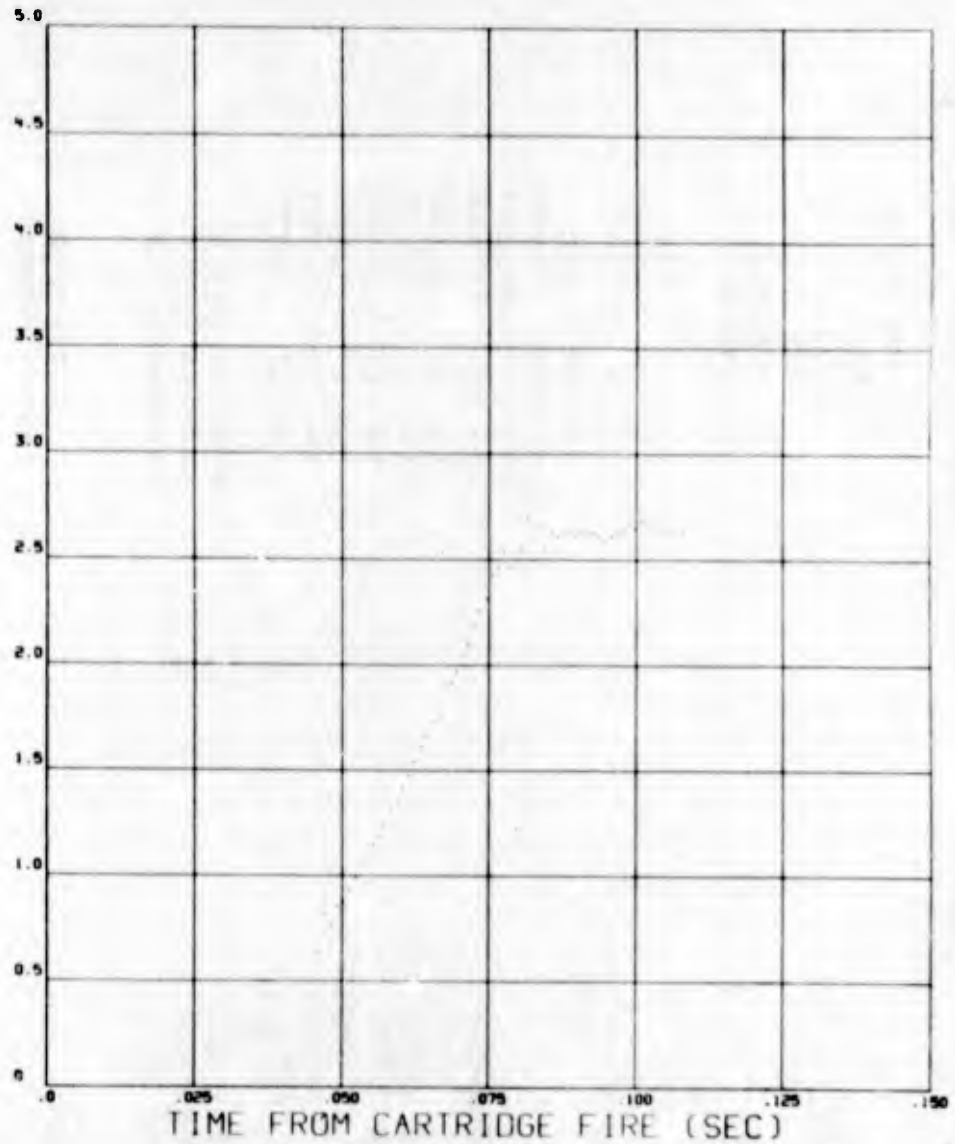
RELATIVE
SWAY
BRACE
STRAIN
(LBS)

* = RIGHT AFT



LOT PREPARED BY TSX, ADTC

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY ISK, ADTC

DATE 22 MAR 72 MISSION 85C 90HB ID 17 SOMB WEIGHT 506.00 LBS

EJECTOR MOMENT ARM
TIME OF EJECTOR STROKE 3.125 INCHES
A/C ANGLE OF ATTACK AT RELEASE .060 SEC
A/C PITCH ANGLE AT RELEASE 2.140 DEG
A/C ROLL ANGLE AT RELEASE .730 DEG
RACK EJECTION ANGLE 1.930 DEG
0.000 DEG

IMPACT RANGE FEET
DEFLECTION FEET

RELEASE HISTORY
PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

TIME DELAY
MILLISECONDS

3
2
2
71
0
1

HR MIN SEC
*** ** *
*** ** *
*** ** *
14 17 9.500
14 17 9.579
14 17 9.579
14 17 9.640
14 17 9.577
14 17 9.578
***** DEG F
***** DEG F
***** DEG F

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD
6.7 FT/SEC
***** FT/SEC

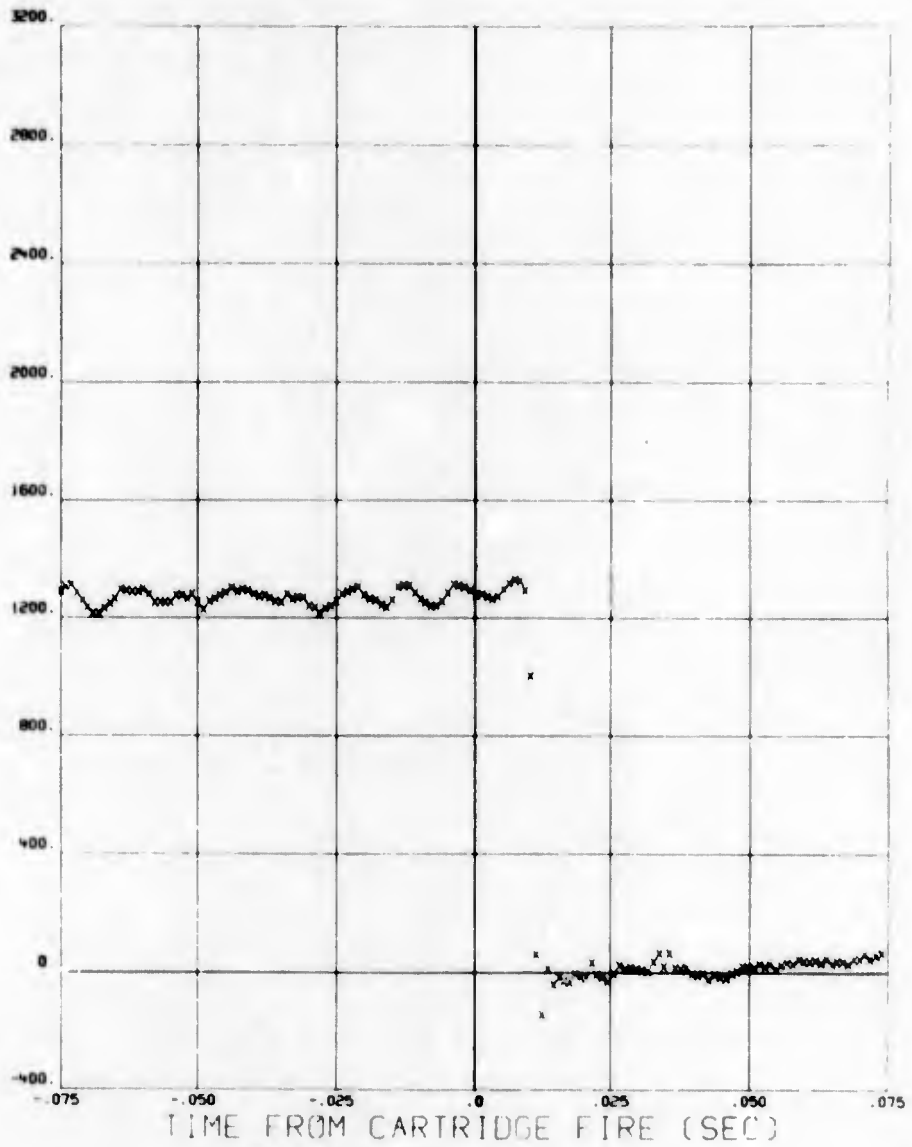
MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

670AG018 22 MAR 72 MSN 85C BOMB

1000

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD

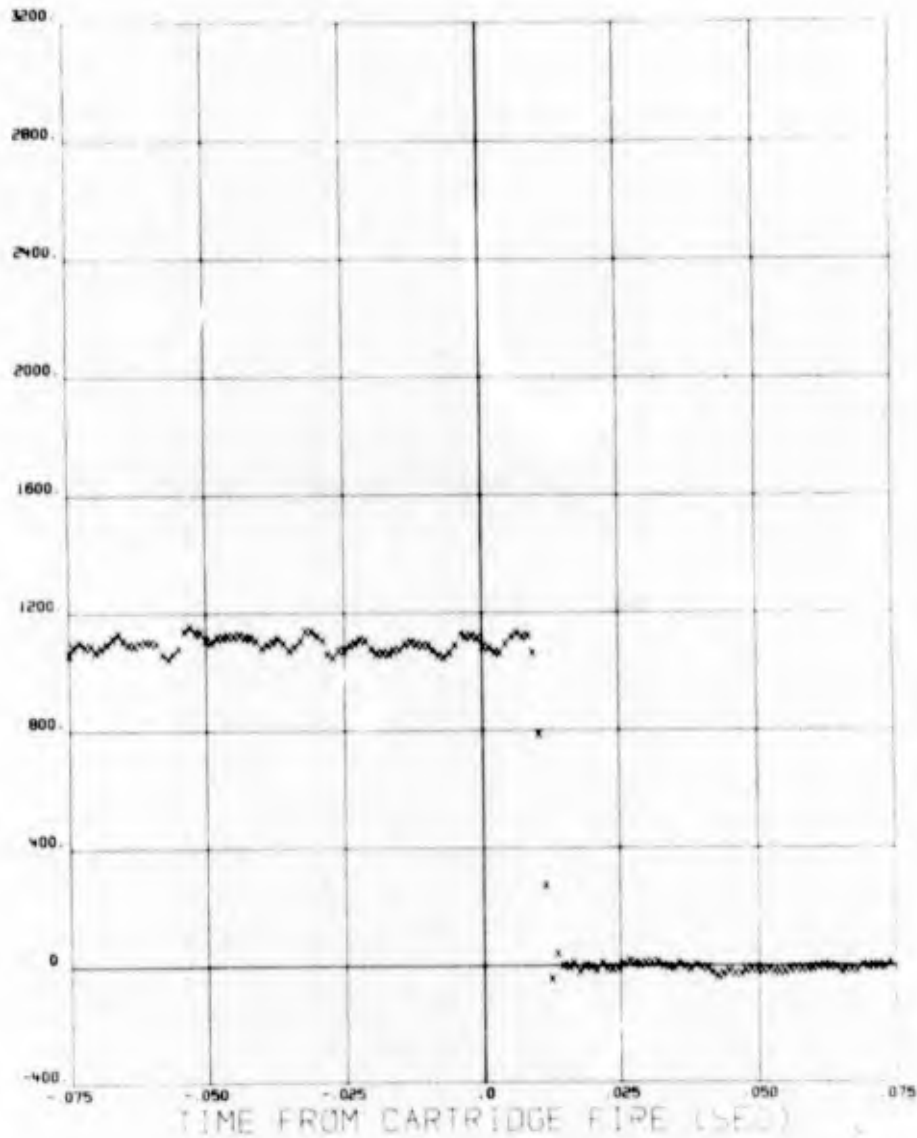


PLOT PREPARED BY ISX, ADTC

AD-100-11 MAW 10 MK, 850 BOMB

1-10-54

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
1/2 INCH DIA

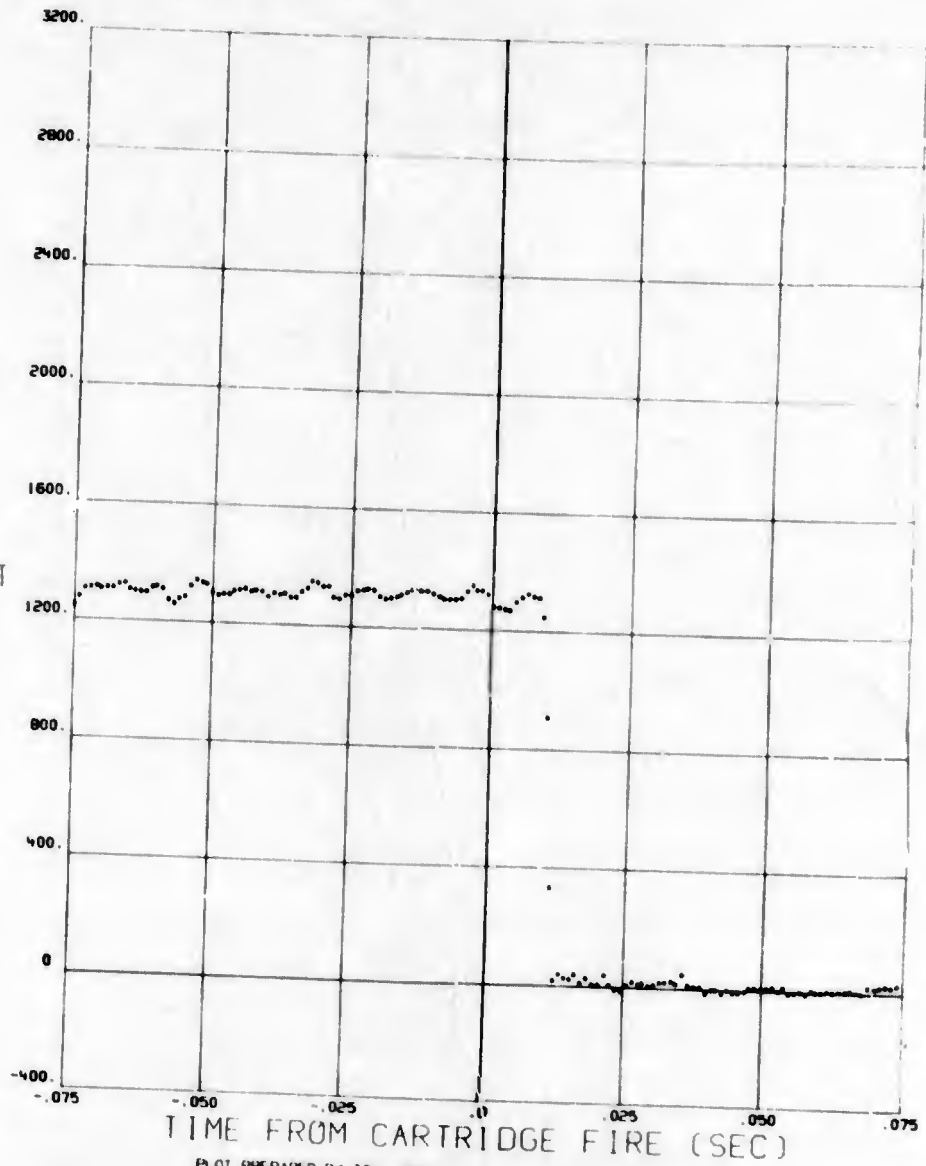


PLOT PREPARED BY TSK, ADIC

67040018 12 MAR 72 MSN 85C BOMB

17 07

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* RIGHT AFT

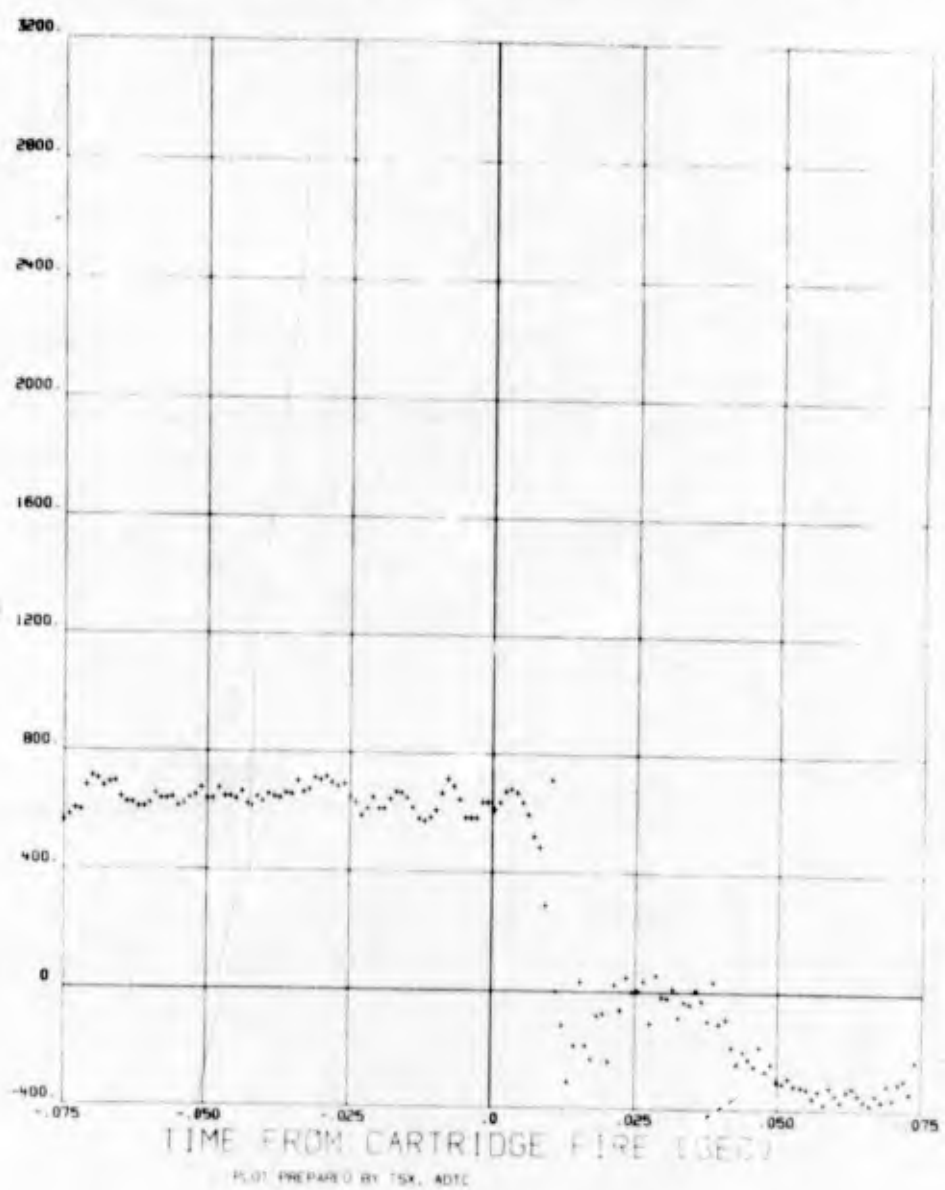


PLOT PREPARED BY TSX, ADIC

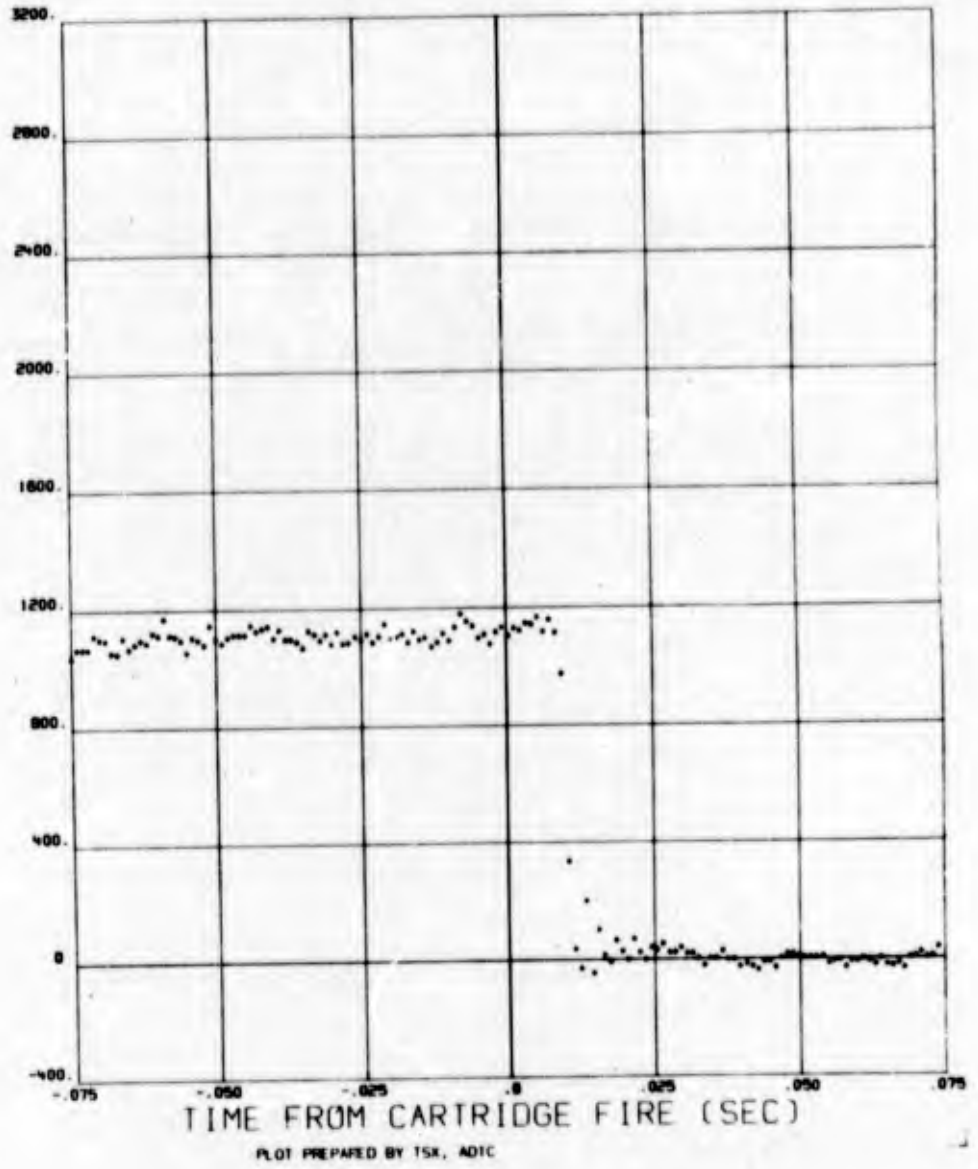
042018 22 MAR 72 MSN 850 BOMB

17^{REV}

RELATIVE
HOOK
REACTION
(G)
FORWARD



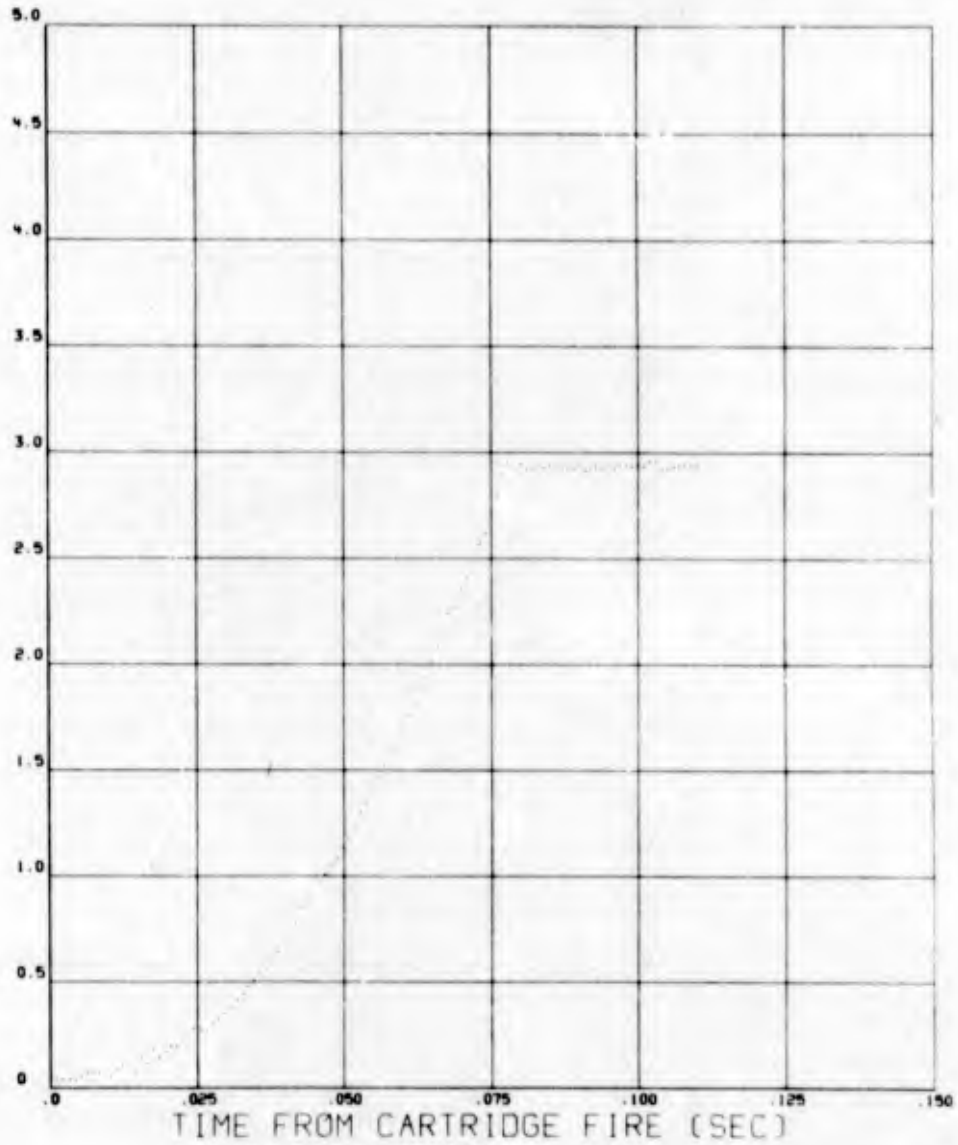
RELATIVE
HOOK
REACTION
(LBS)
* = AFT



19/04/72 670AG018 22 MAR 72 MSN 85C BOMB

17^{RMS} 7 0 7

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY TSK, ADTC

DATE 22 MAR 72 MISSION 855 BOMB ID 1780 BOMB WEIGHT 509.75 LBS

EJECTOR MOMENT ARM 2.771 INCHES
 TIME OF EJECTOR STROKE .074 SEC
 A/C ANGLE OF ATTACK AT RELEASE 2.070 DEG
 A/C PITCH ANGLE AT RELEASE .260 DEG
 A/C ROLL ANGLE AT RELEASE 1.450 DEG
 RACK EJECTION ANGLE -48.000 DEG

IMPACT RANGE DEFLECTION FEET FEET

RELEASE HISTORY
 PICKLE TIME
 CARTRIDGE FIRE
 INITIAL LINKAGE MOVEMENT
 EJECTOR FOOT (FIRST MOTION)
 STORE FIRST MOTION (FORWARD)
 STORE FIRST MOTION (AFT)
 EJECTOR FOOT FULL EXTENDED
 HOOK FIRST MOTION (FORWARD)
 HOOK FIRST MOTION (AFT)

MAXIMUM PRE-FLT GROUND TEMPERATURE
 MAXIMUM POST-FLT GROUND TEMPERATURE
 MAXIMUM BREECH AMBIENT TEMPERATURE

SEPARATION VELOCITY
 DISPLACEMENT METHOD
 PRESSURE METHOD

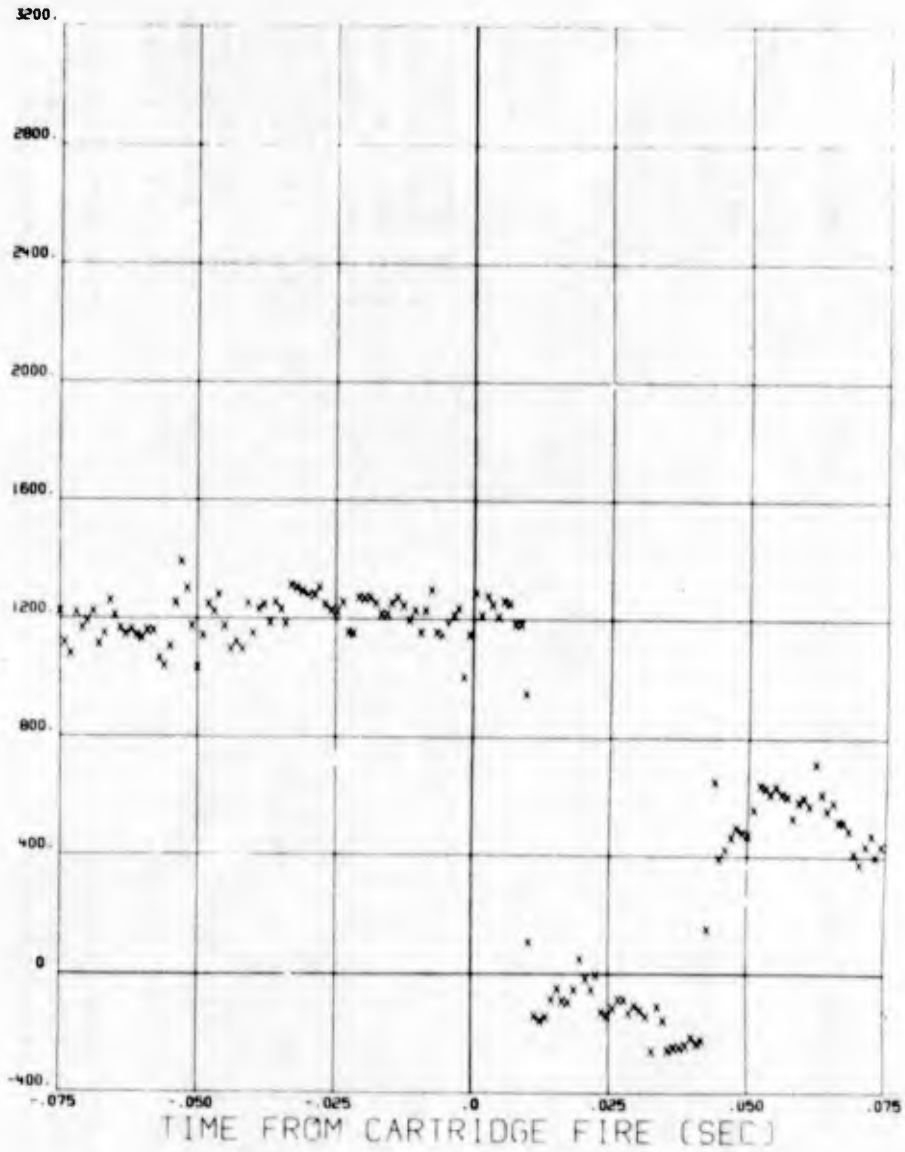
TIME DELAY
 MILLISECOND

 1
 0
 3
 75
 0
 0

670AG018 22 MAR 72 MSN 85S BOMB

1780¹²⁴³₁₀

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD

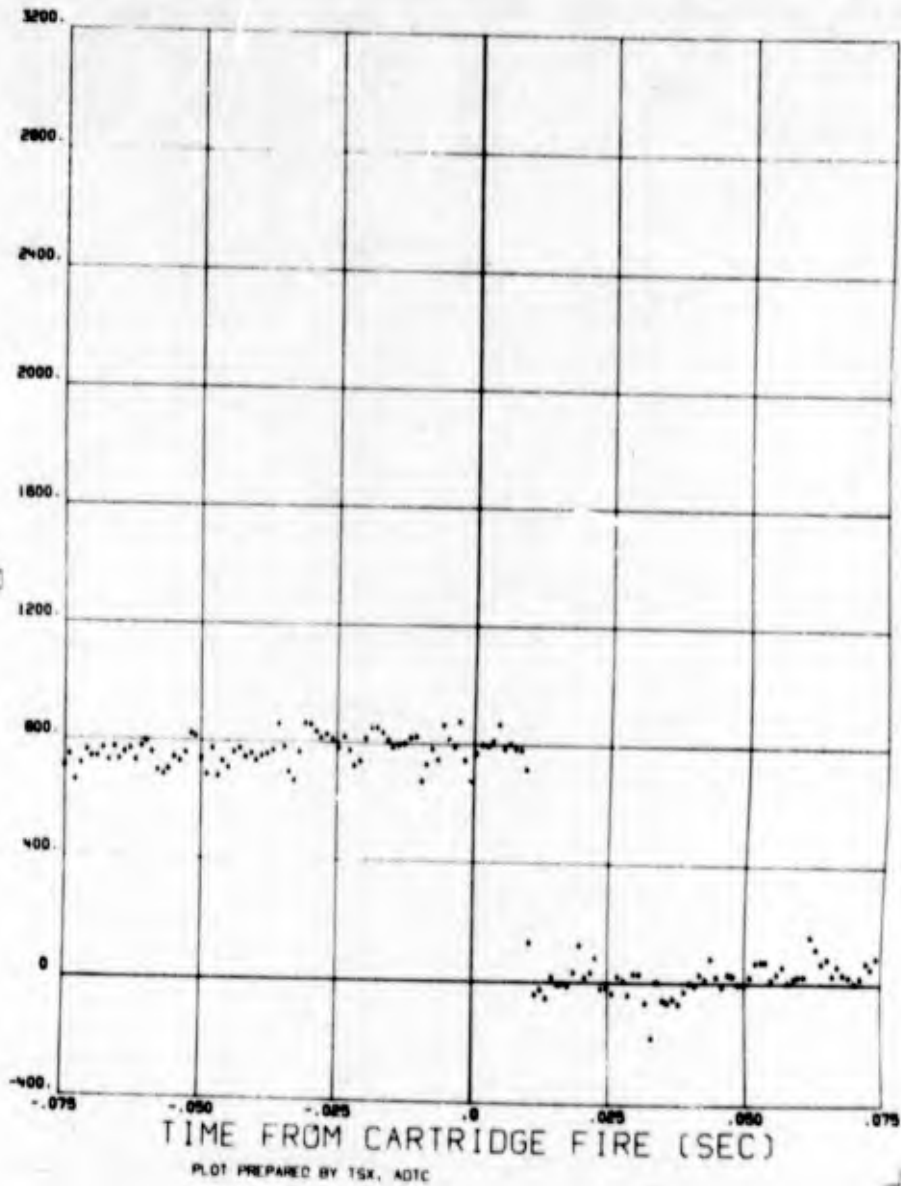


PLOT PREPARED BY 15X, AD1C

070A5018 22 MAR 72 MSN 855 BOMB

178D^{R243} 11 0 1

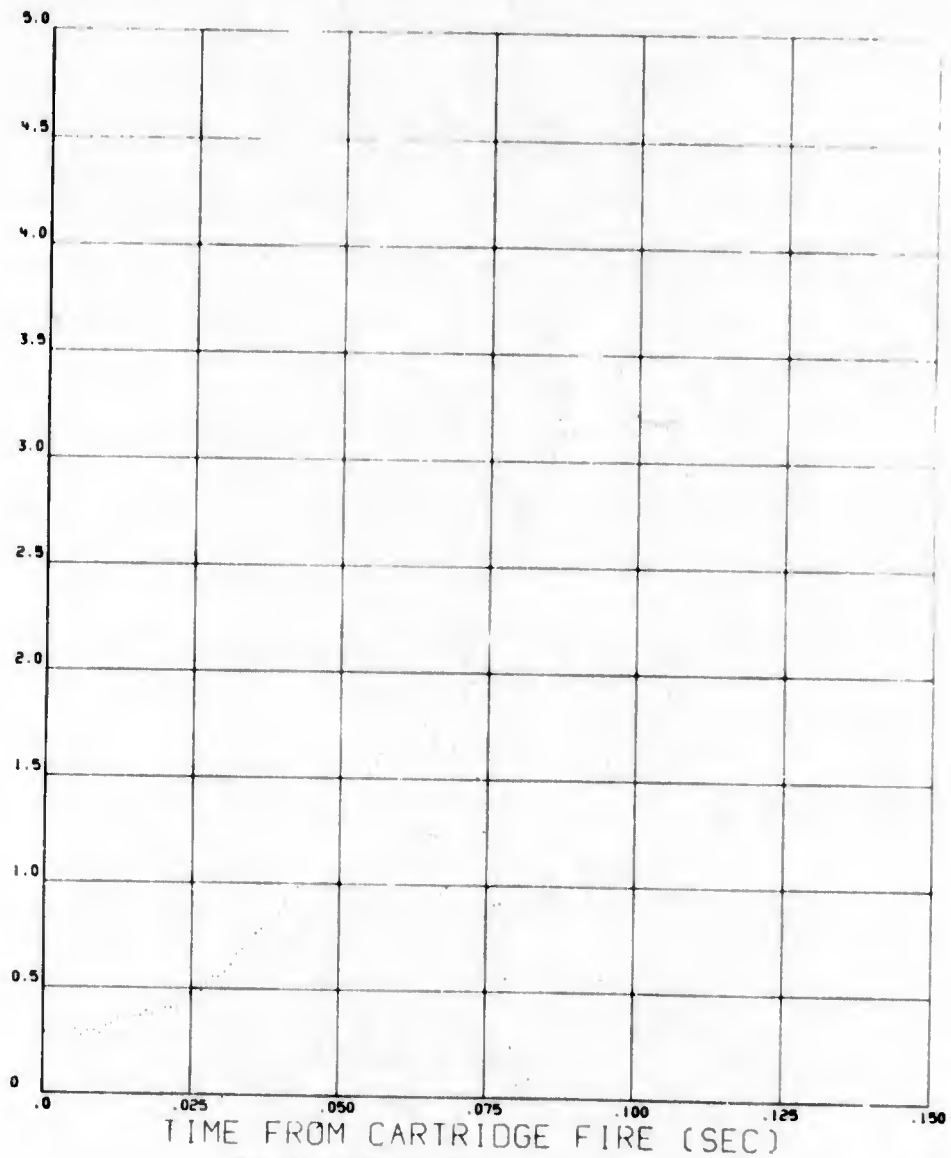
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
• = RIGHT FWD



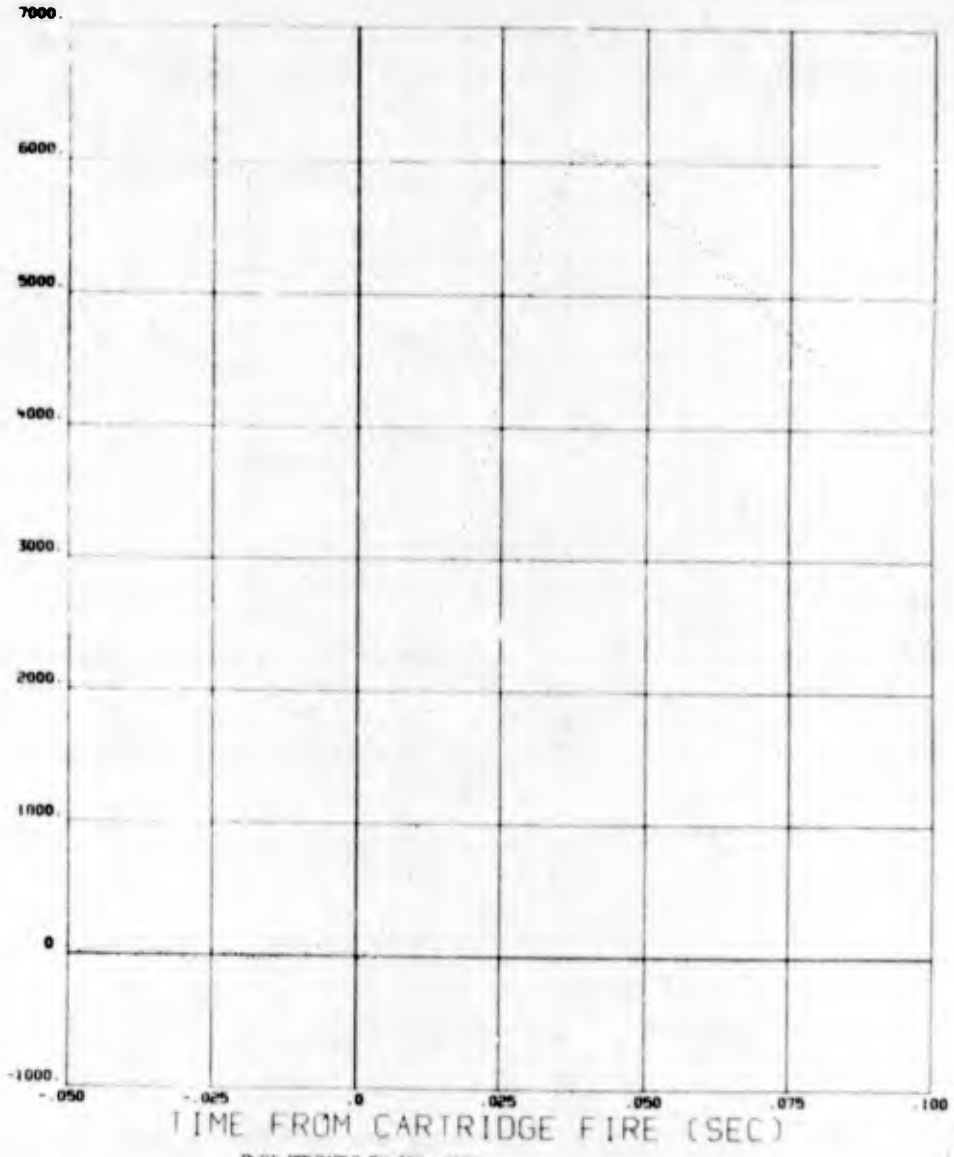
19/04/75 670AG018 22 MAR 72 MSN 85S BOMB

1780^{R243}₁₆

EJECTOR
FOOT
POSITION
(INCHES)



FIRE CHAMBER
PRESSURE
PSI

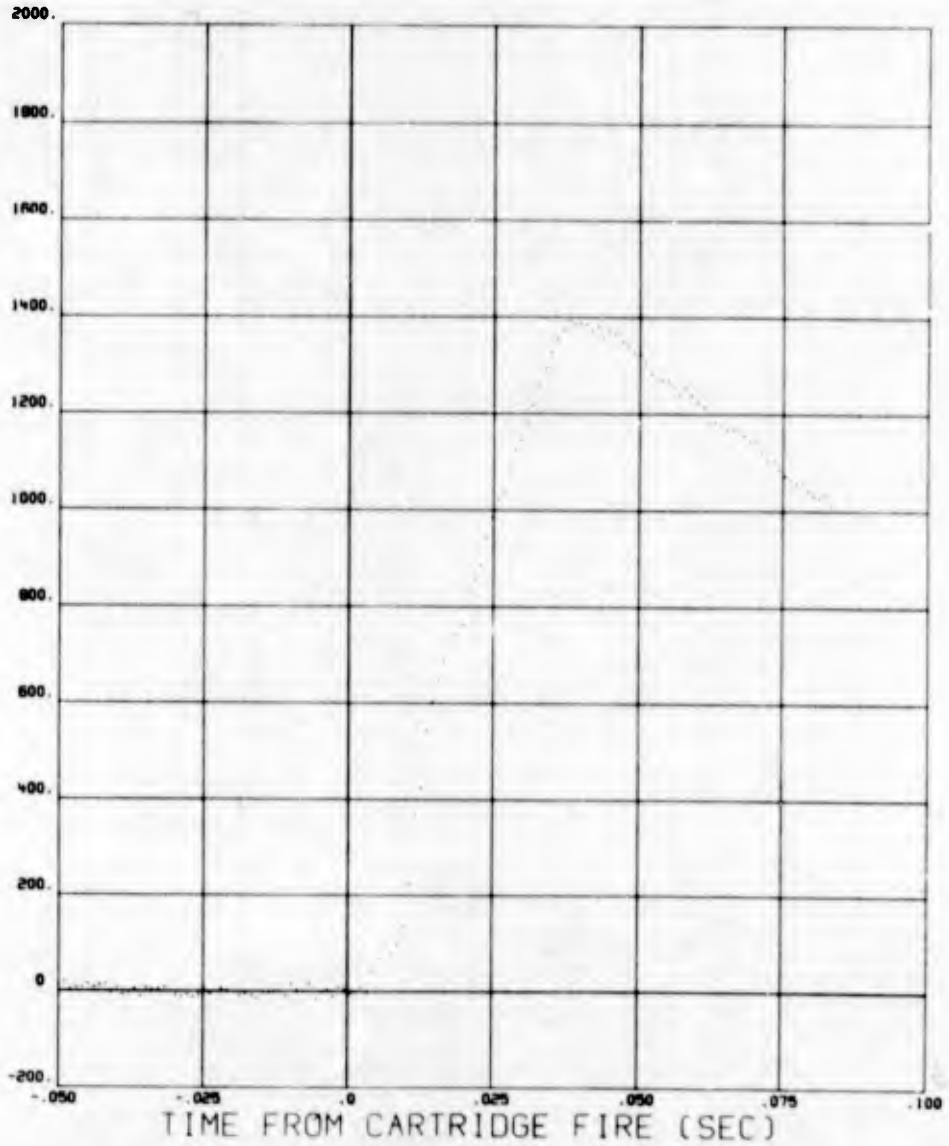


PLOT PREPARED BY TSX, ADTC

19/04/73 670AG018 22 MAR 72 MSN 85S BOMB

178D R243 18 07

EJECTOR
FOOT
FORCE
(LBS)



DATE 15 MAY 72 MISSION 98C BOMB ID 144 BOMB WEIGHT 511.50 LBS

EJECTOR MOMENT ARM
TIME OF EJECTOR STROKE
A/C ANGLE OF ATTACK AT RELEASE
A/C PITCH ANGLE AT RELEASE
A/C ROLL ANGLE AT RELEASE
RACK EJECTION ANGLE

3.188 INCHES
.067 SEC
3.184 DEG
.980 DEG
-.940 DEG
0.000 DEG

IMPACT RANGE DEFLECTION

RELEASE HISTORY

PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

HR MIN *** 22 22 22 22 22 22 22 22
*** 2 2 2 2 2 2 2 2
SEC *****
32.075
32.079
32.088
32.087
32.087
32.155
32.088
32.087

TIME DELAY
MILLISECONDS
0
4
13
12
12
80
13
12

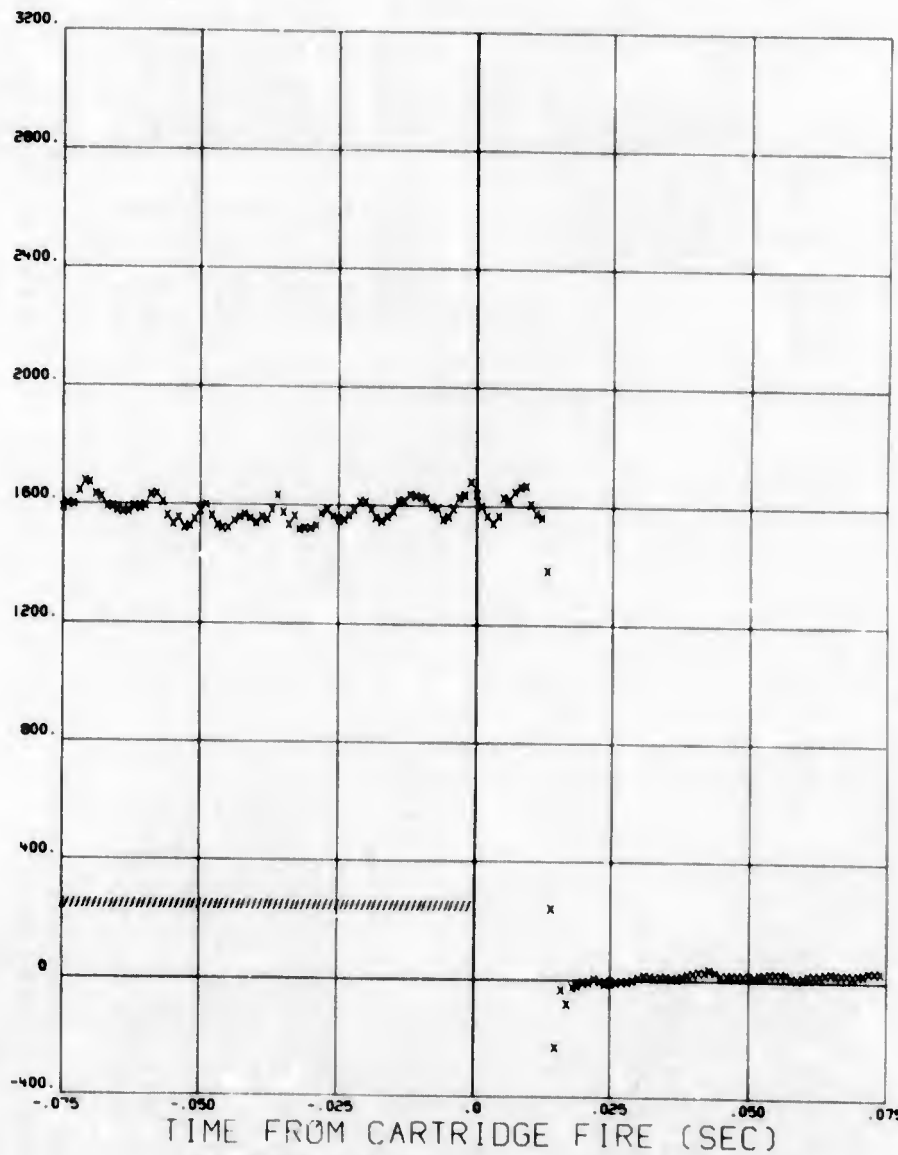
68.47 DEG F
***** DEG F
33.38 DEG F

9.0 FT/SEC
7.5 FT/SEC

19 04/73 670AG018 15 MAY 72 MSN 98C BOMB 144

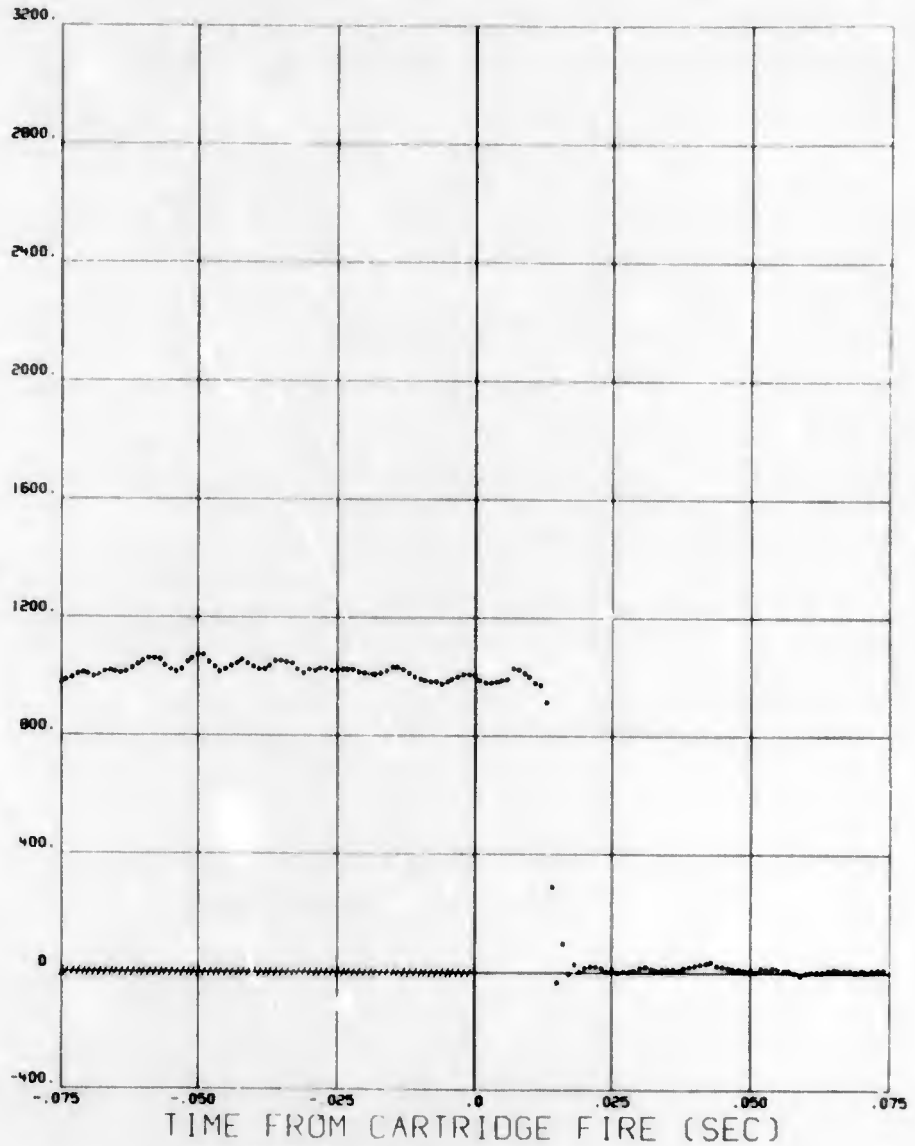
R243
19 0

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



PLOT PREPARED BY ISX, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD

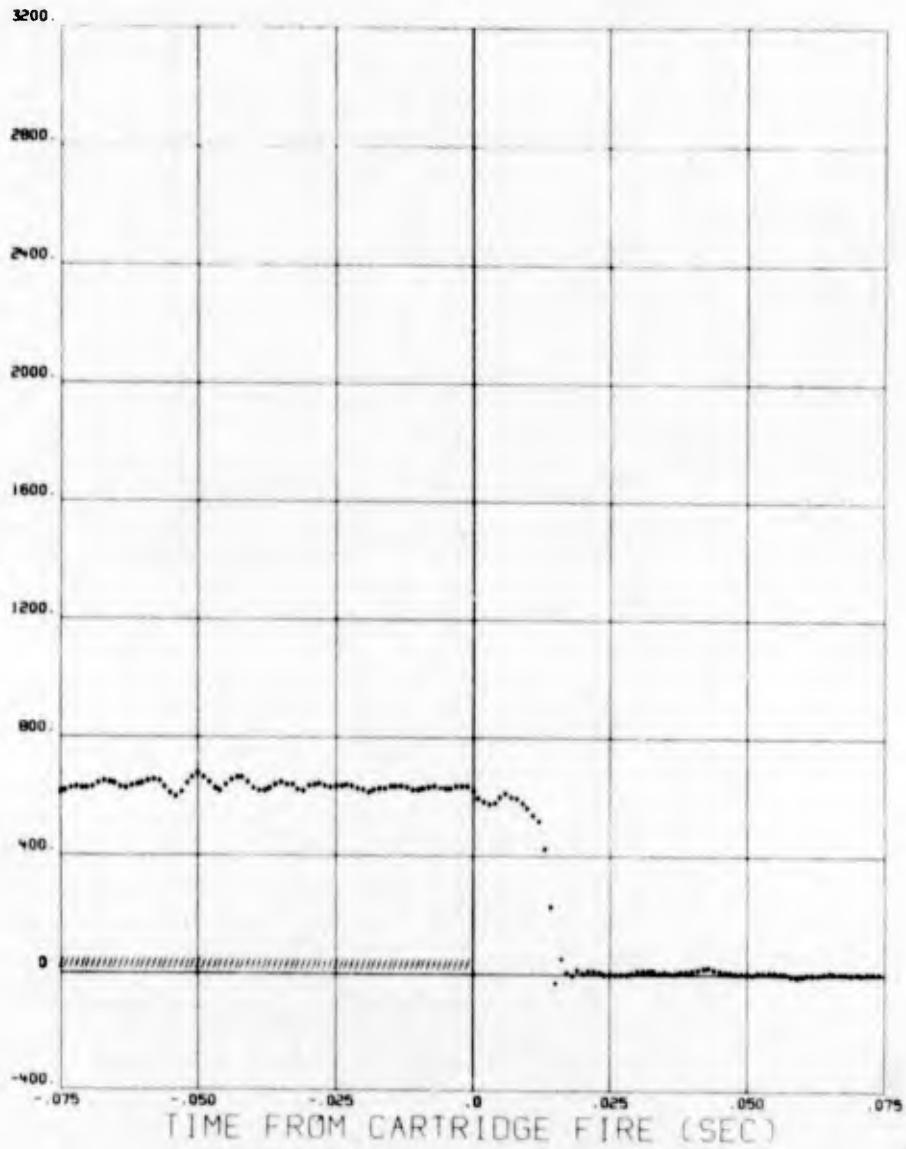


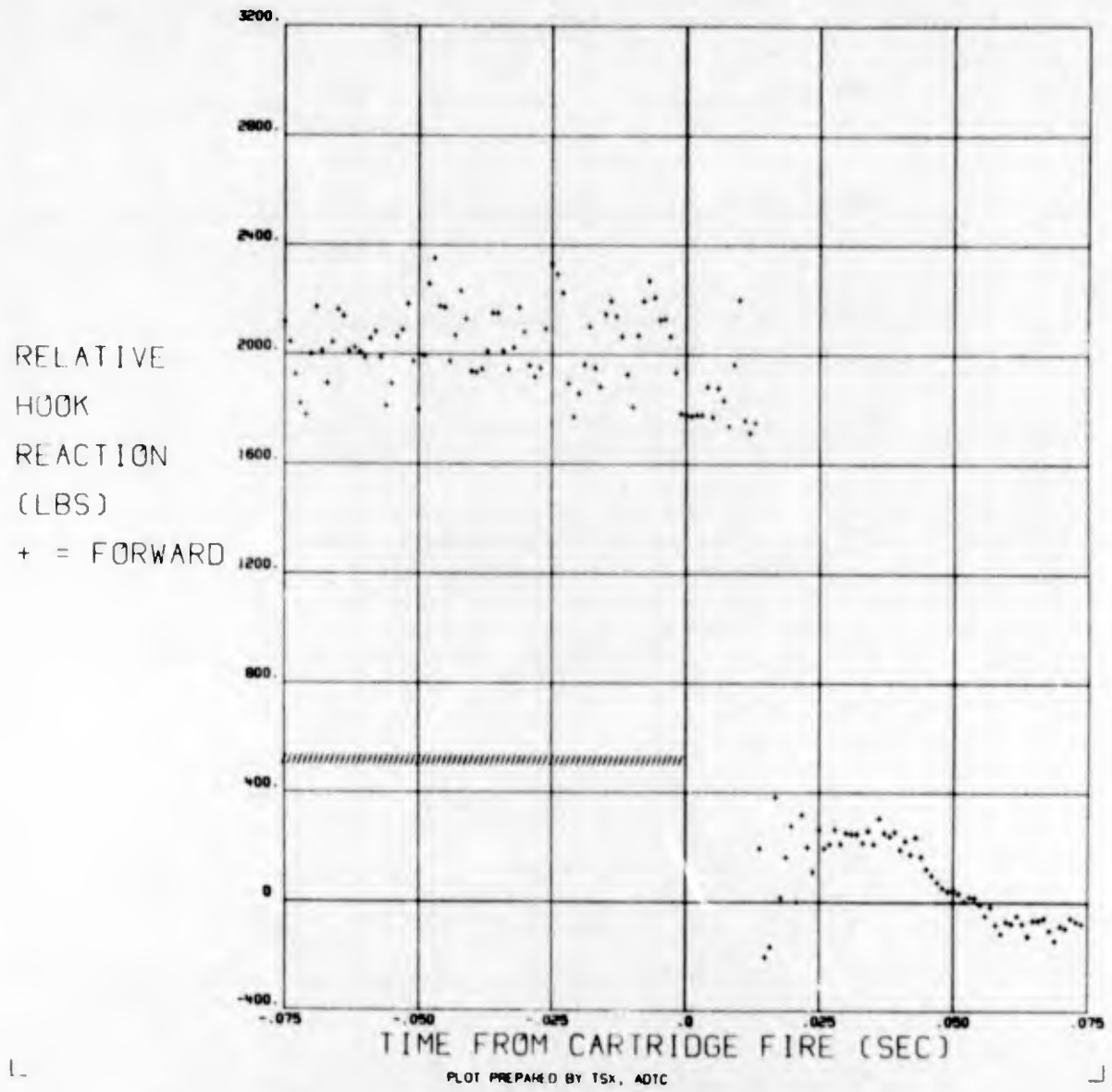
PLOT PREPARED BY TSX, ADTC

070AG018 15 MAY 72 MSN 98C BOMB 144

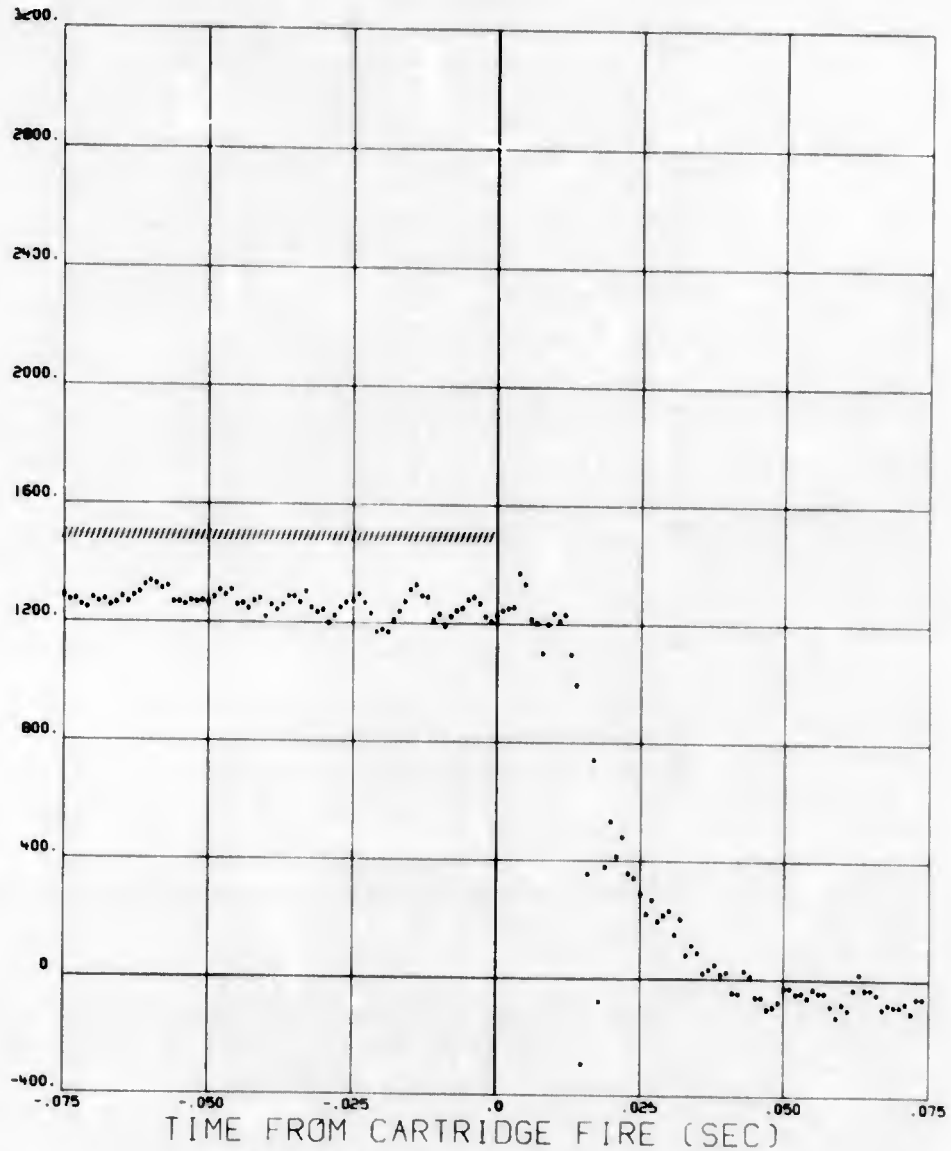
R243
22 0 1

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



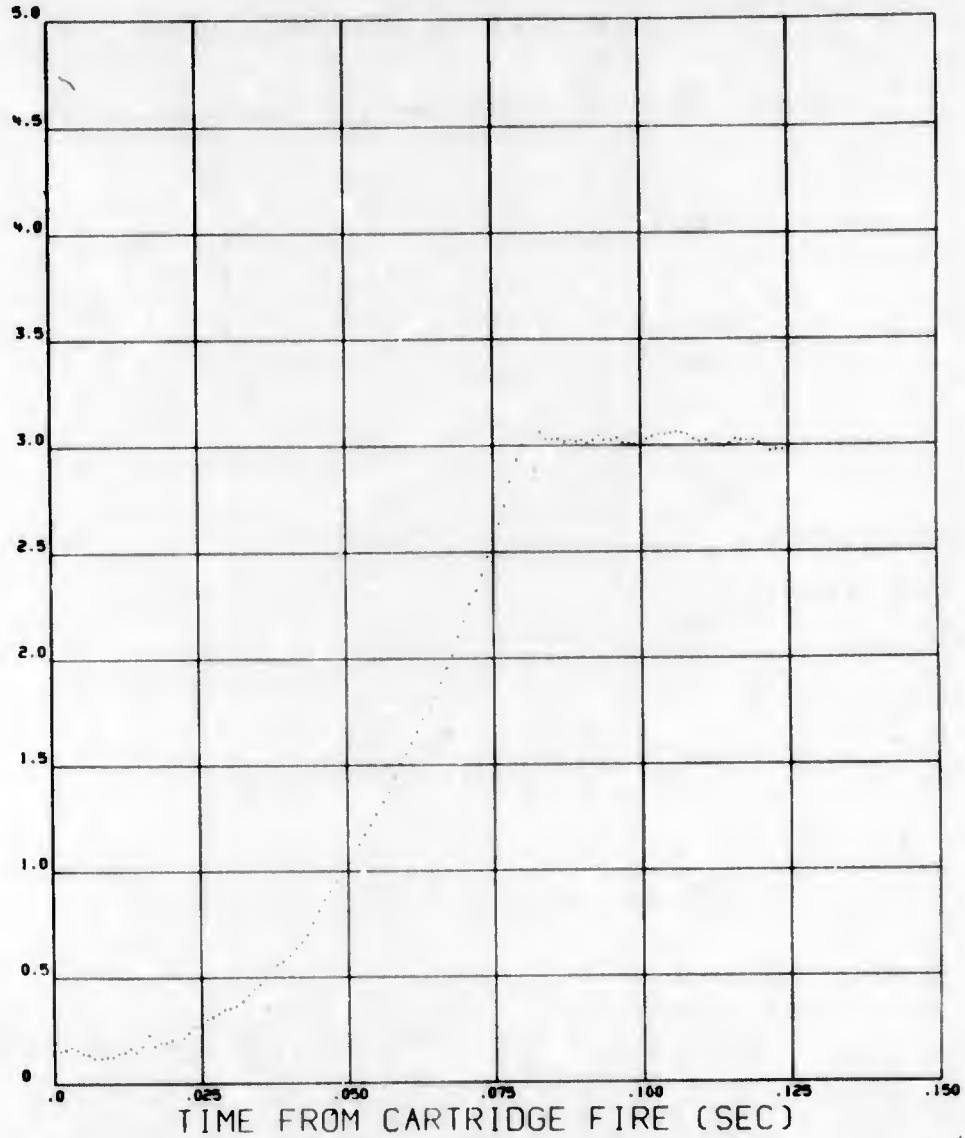


RELATIVE
HOOK
REACTION
(LBS)
* = AFT



PLOT PREPARED BY TSX, ADTC

EJECTOR
FOOT
POSITION
(INCHES)

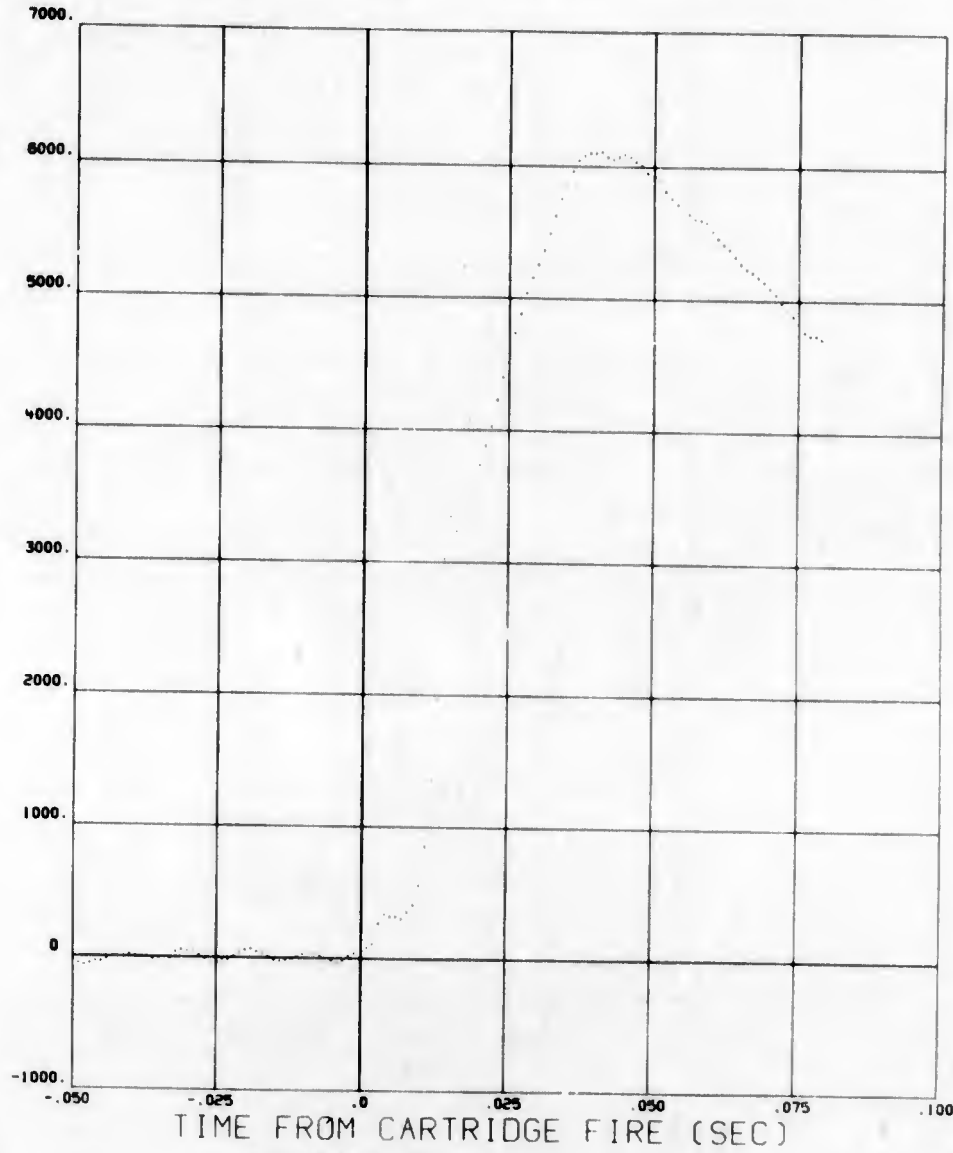


PLOT PREPARED BY TSX, ADTC

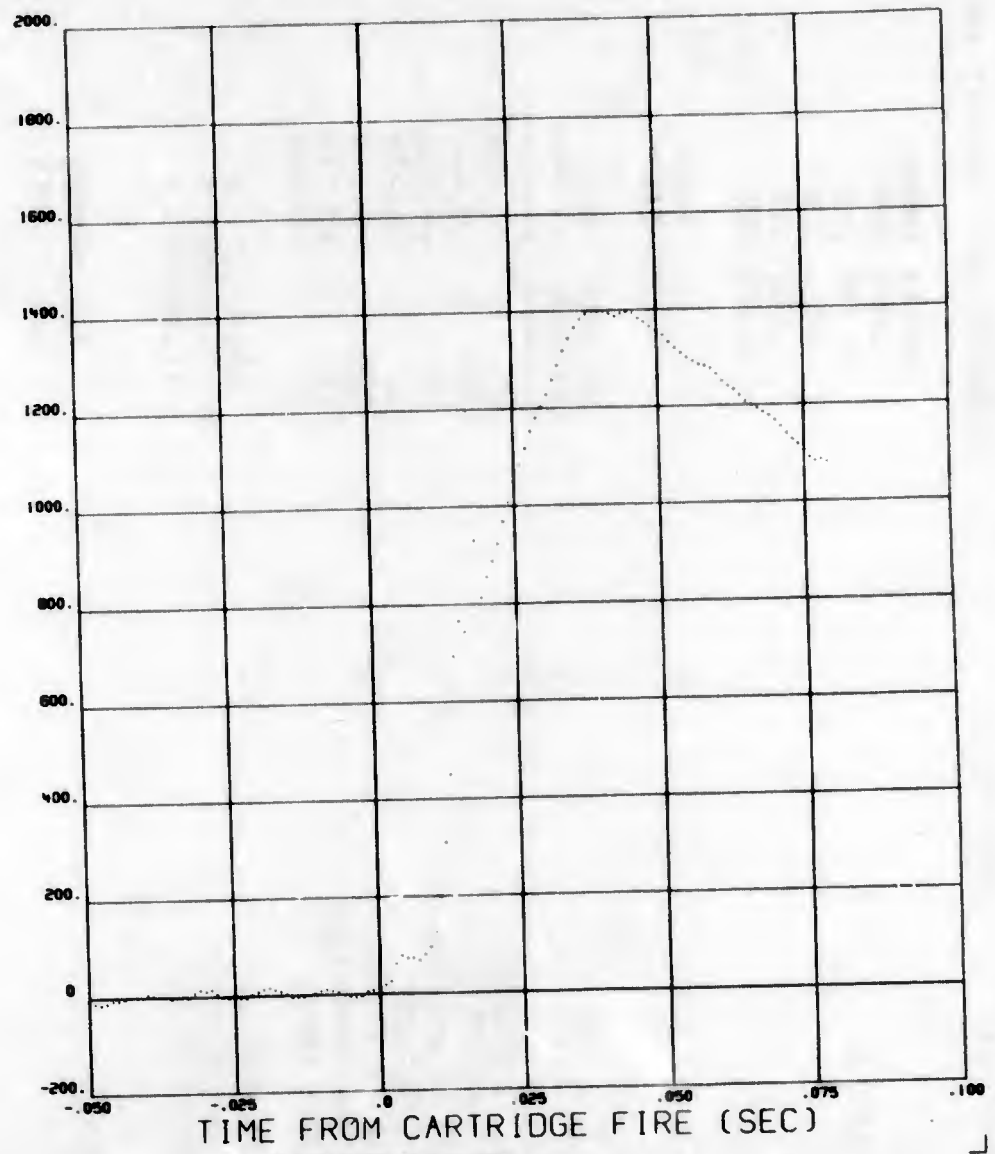
19/04/73 670AG018 15 MAY 72 MSN 98C BOMB 144

R243
26 0

EJECTION
CHAMBER
PRESSURE
(PSI)



EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY TSK, ADTC

DATE 15 MAY 72 MISSION 98S BOMB ID 16 BOMB WEIGHT 506.00 LBS

EJECTOR MOMENT ARM
TIME OF EJECTOR STROKE
A/C ANGLE OF ATTACK AT RELEASE
A/C PITCH ANGLE AT RELEASE
A/C ROLL ANGLE AT RELEASE
RACK EJECTION ANGLE

3.188 INCHES
.075 SEC
3.785 DEG
.910 DEG
.180 DEG
-48.000 DEG

IMPACT RANGE DEFLECTION

FEET FEET

RELEASE HISTORY
PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

TIME DELAY
MILLISECOND:

1 2 1 1 77 0 1

HR MIN SEC
*** ** *
*** ** *
22 2 49.964
22 2 49.965
22 2 49.964
22 2 49.964
22 2 50.040
22 2 49.963
22 2 49.964

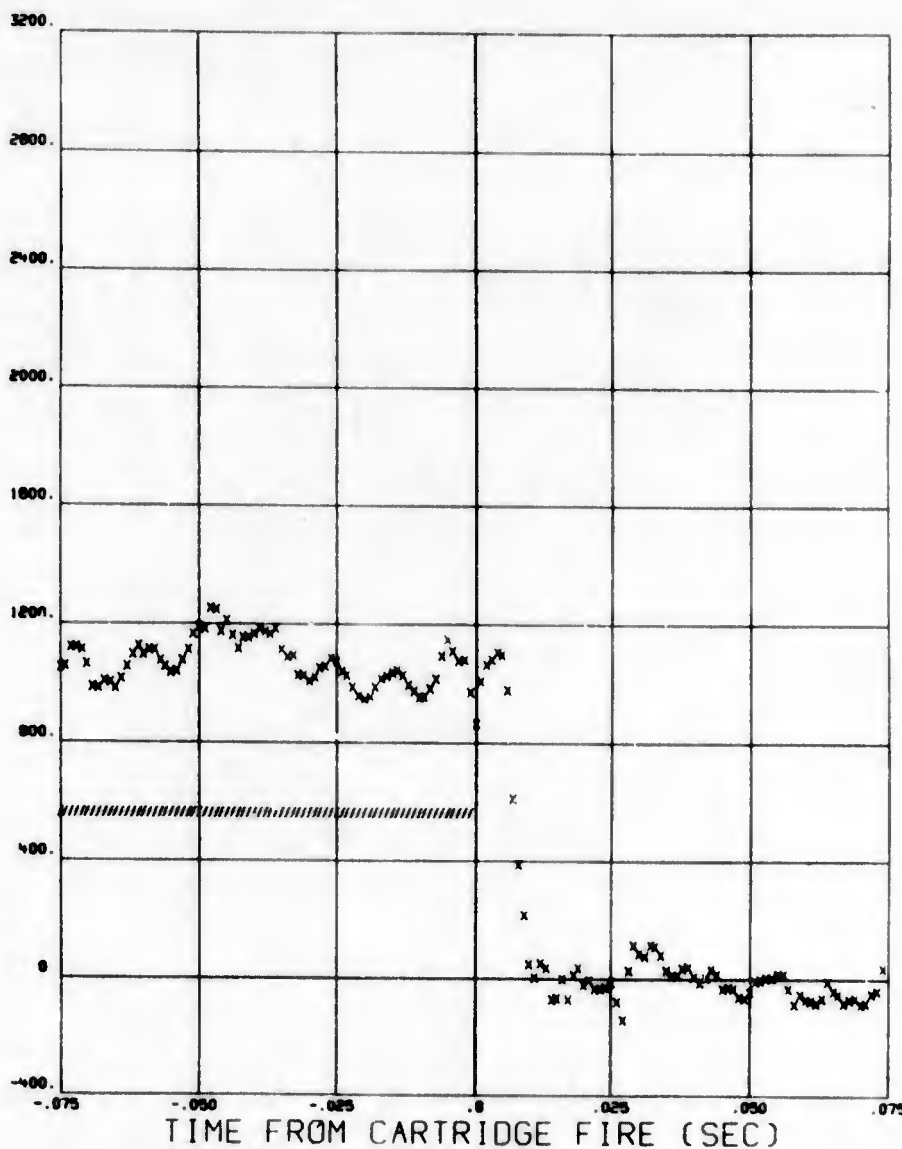
MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE

68.47 DEG F
***** DEG F
31.32 DEG F

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

3.2 FT/SEC
5.8 FT/SEC

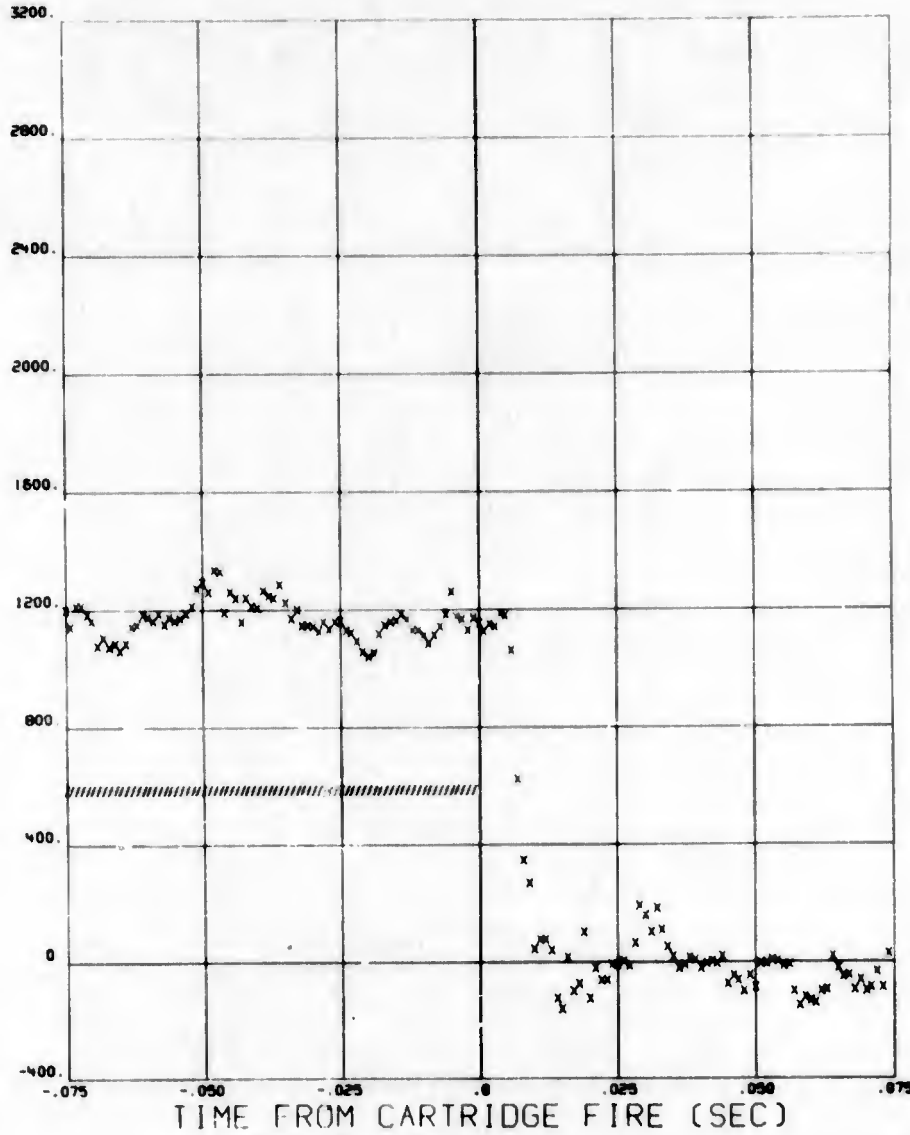
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT

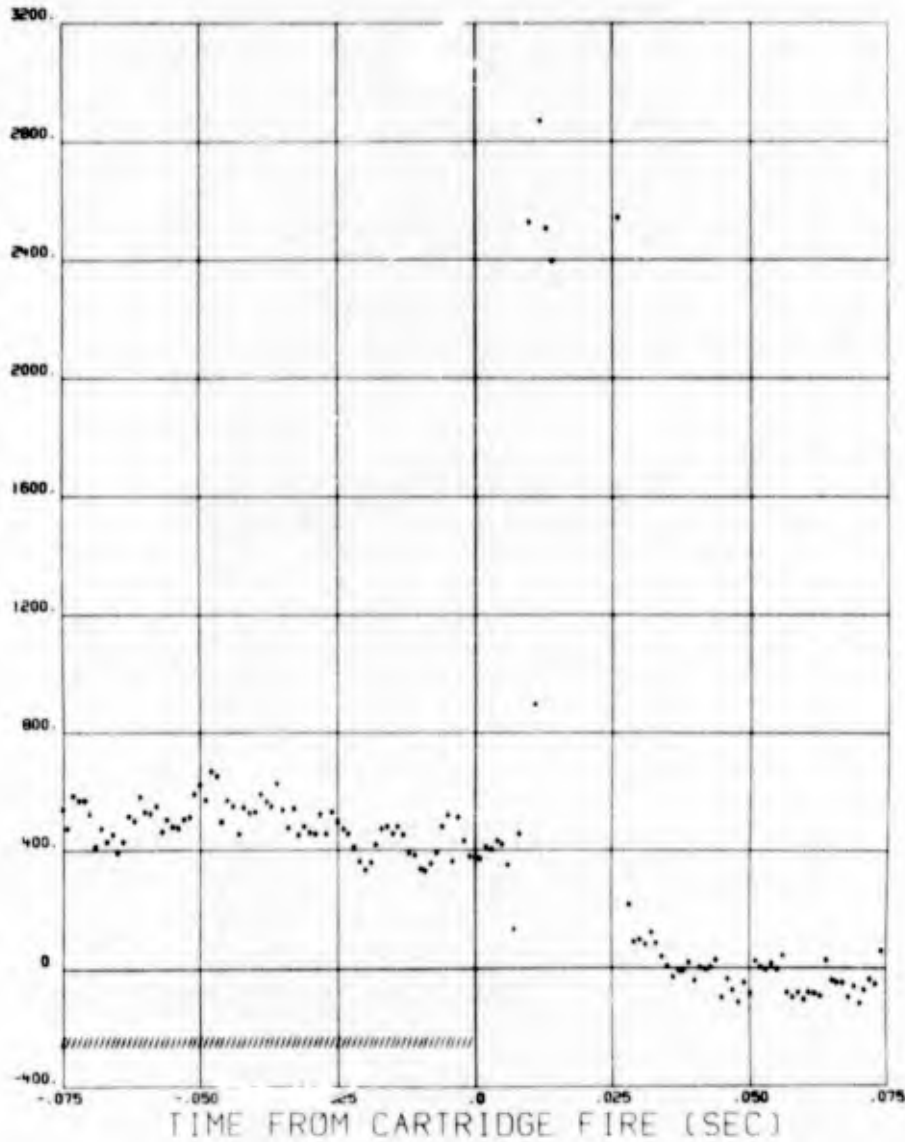


PLOT PREPARED BY TSX, ADIC

19/04/73 670AG018 15 MAY 72 MSN 98S BOMB 16

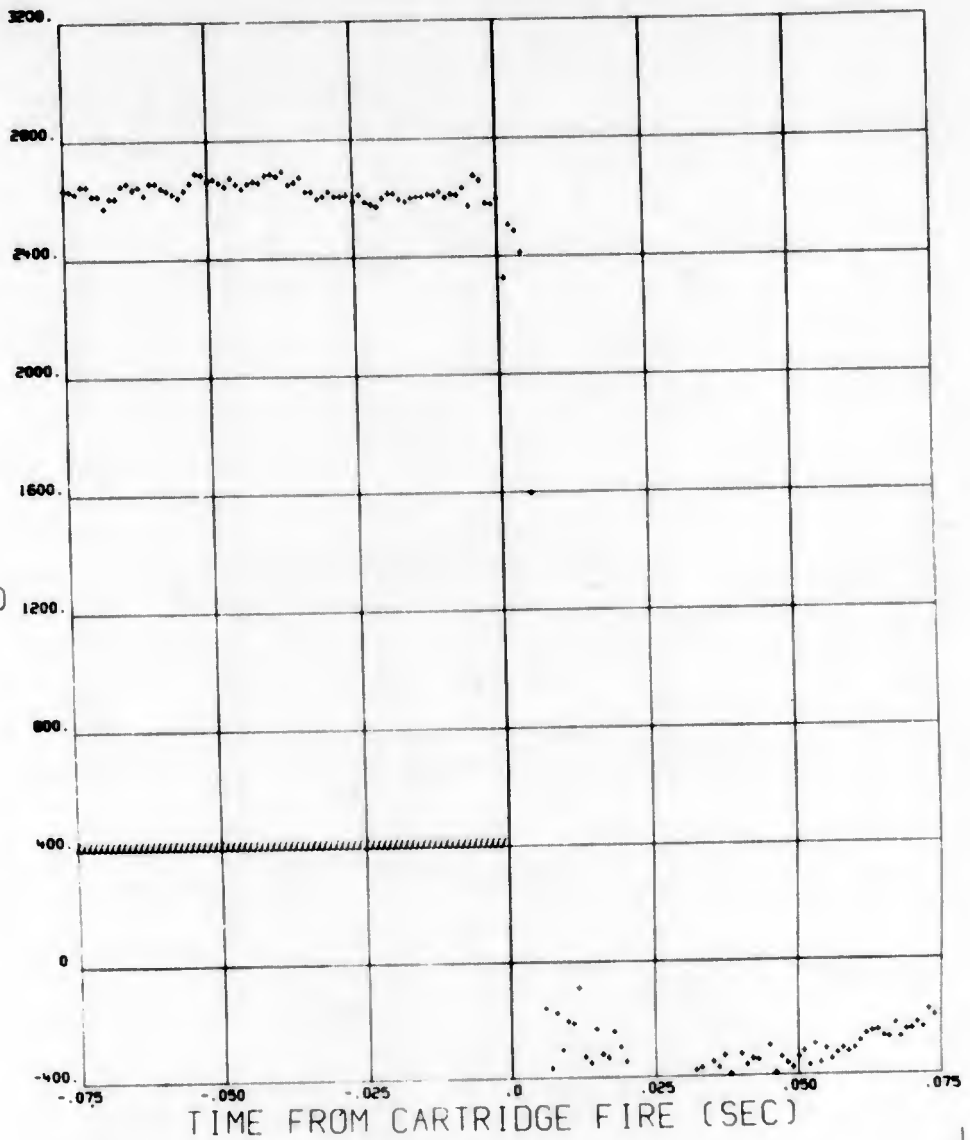
R243 31 0

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



PLOT PREPARED BY TSX, AOTC

RELATIVE
HOOK
REACTION
(LBS)
- = FORWARD

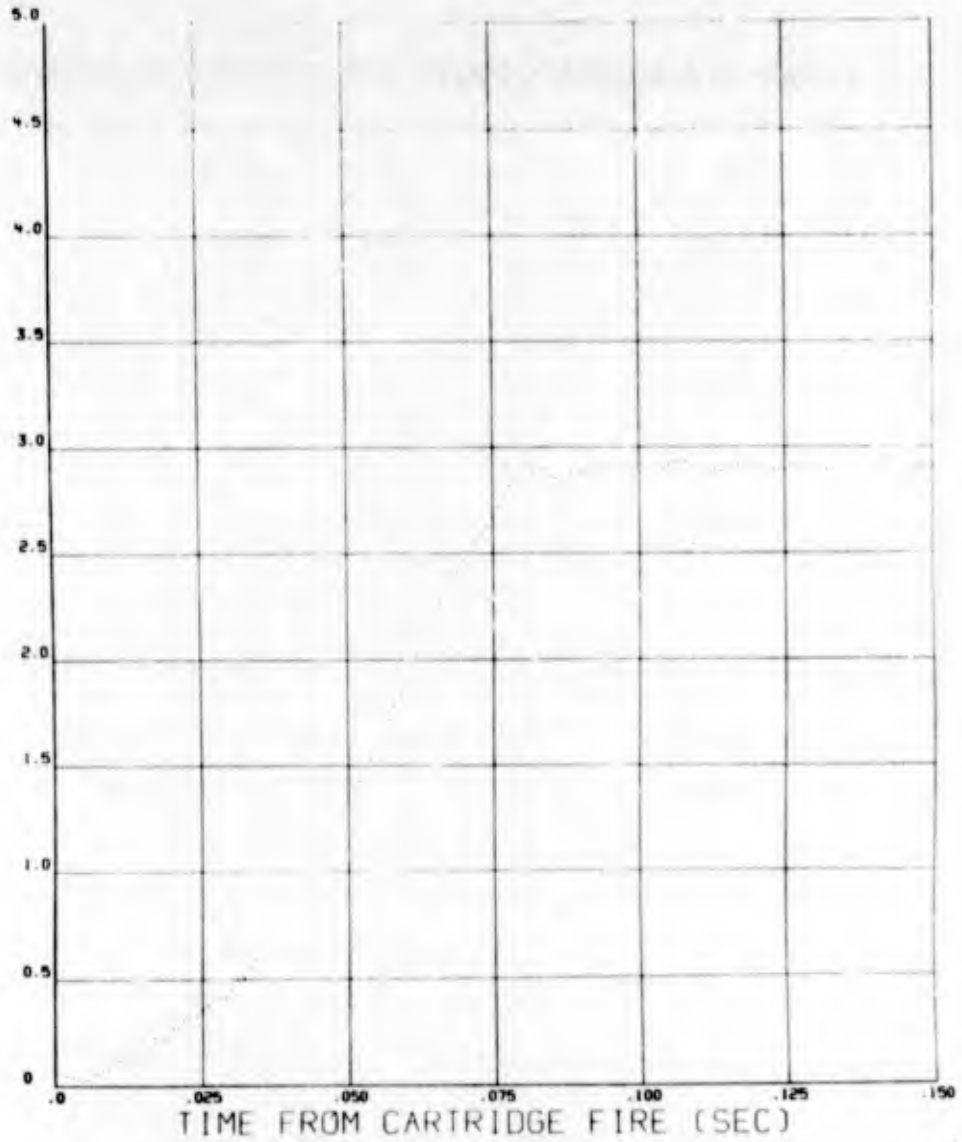


PLOT PREPARED BY TSX, ADTC

10
BOMB 16

RD 4
34 0

1.77118
1.201
1.50110N
(INCHES)

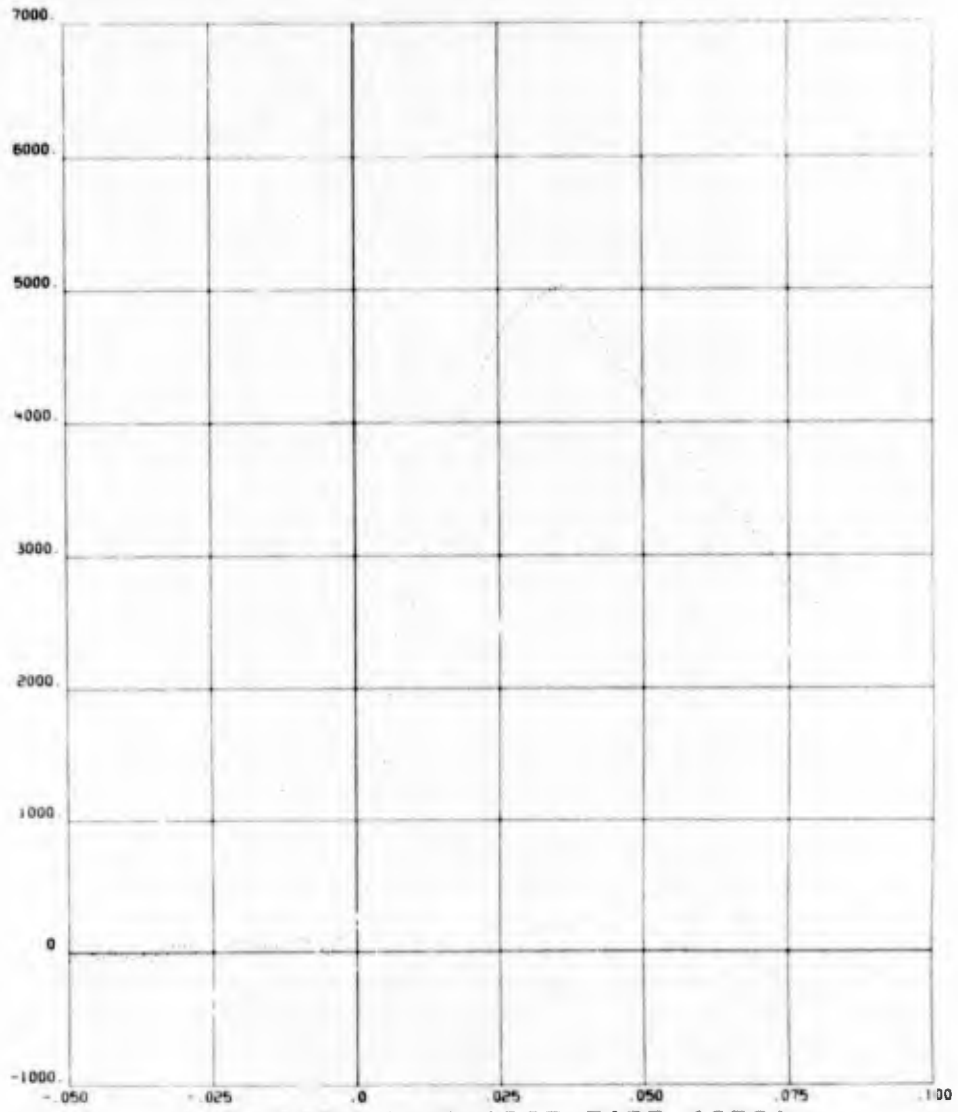


PLOT PREPARED BY T5X. ADTC

19 04 72 670AG018 15 MAY 72 MSN 985 BOMB 16

4245
35

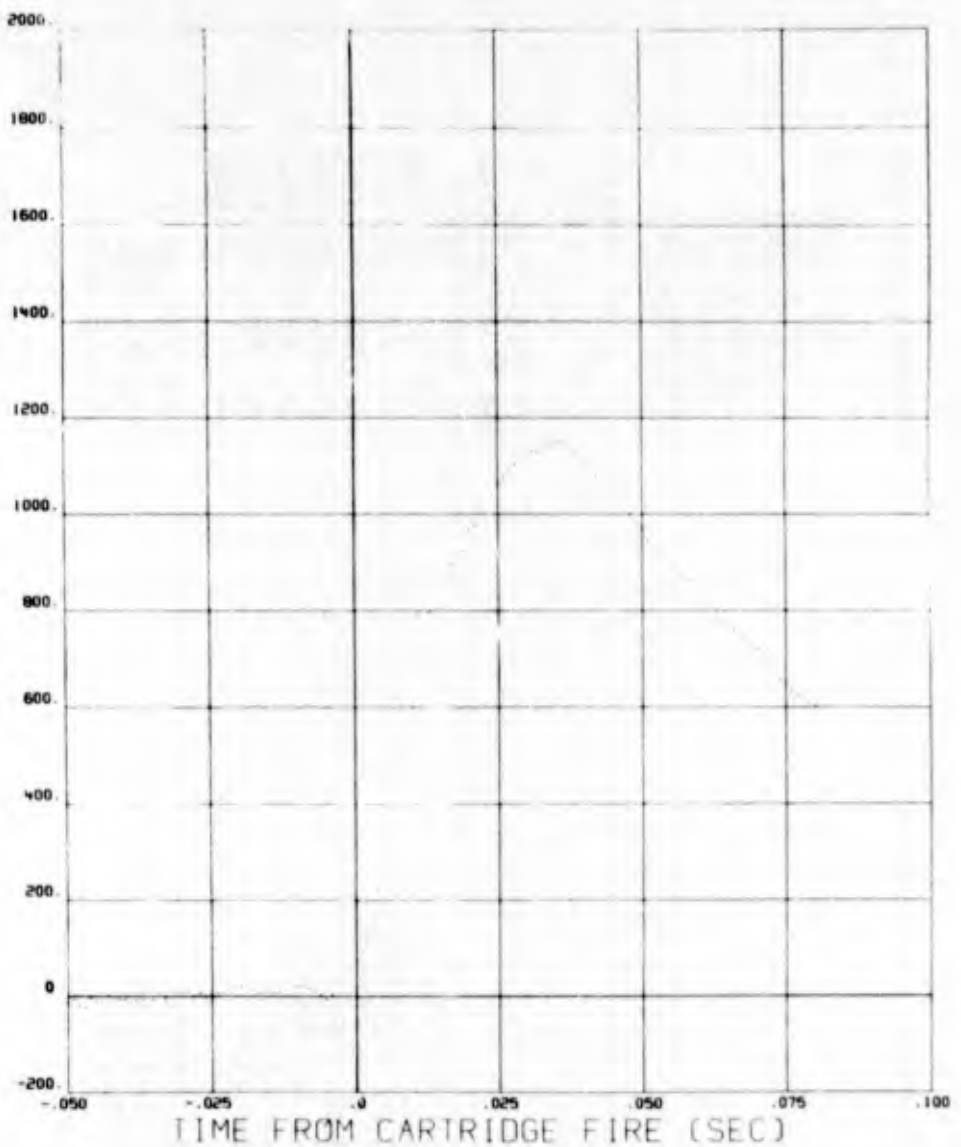
EJECTION
CHAMBER
PRESSURE
(PSI)



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

EJECTOR
(101
(ORCL
(BS)



PLOT PREPARED BY TSK, ADTC

DATE 18 MAY 72 MISSION 101S BOMB ID 175 BOMB WEIGHT 500.25 LBS

EJECTOR MOMENT ARM
TIME OF EJECTOR STROKE
A/C ANGLE OF ATTACK AT RELEASE
A/C PITCH ANGLE AT RELEASE
A/C ROLL ANGLE AT RELEASE
RACK EJECTION ANGLE

3.188 INCHES
.074 SEC
3.338 DEG
1.310 DEG
-3.600 DEG
-48.000 DEG

IMPACT RANGE DEFLECTION

FEET FEET

RELEASE HISTORY

PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

TIME DELAY
MILLISECONDS

HR MIN SEC
*** ** *
*** ** *
3 42 27.108
3 42 27.108
3 42 27.111
3 42 27.110
3 42 27.182
3 42 27.111
3 42 27.108

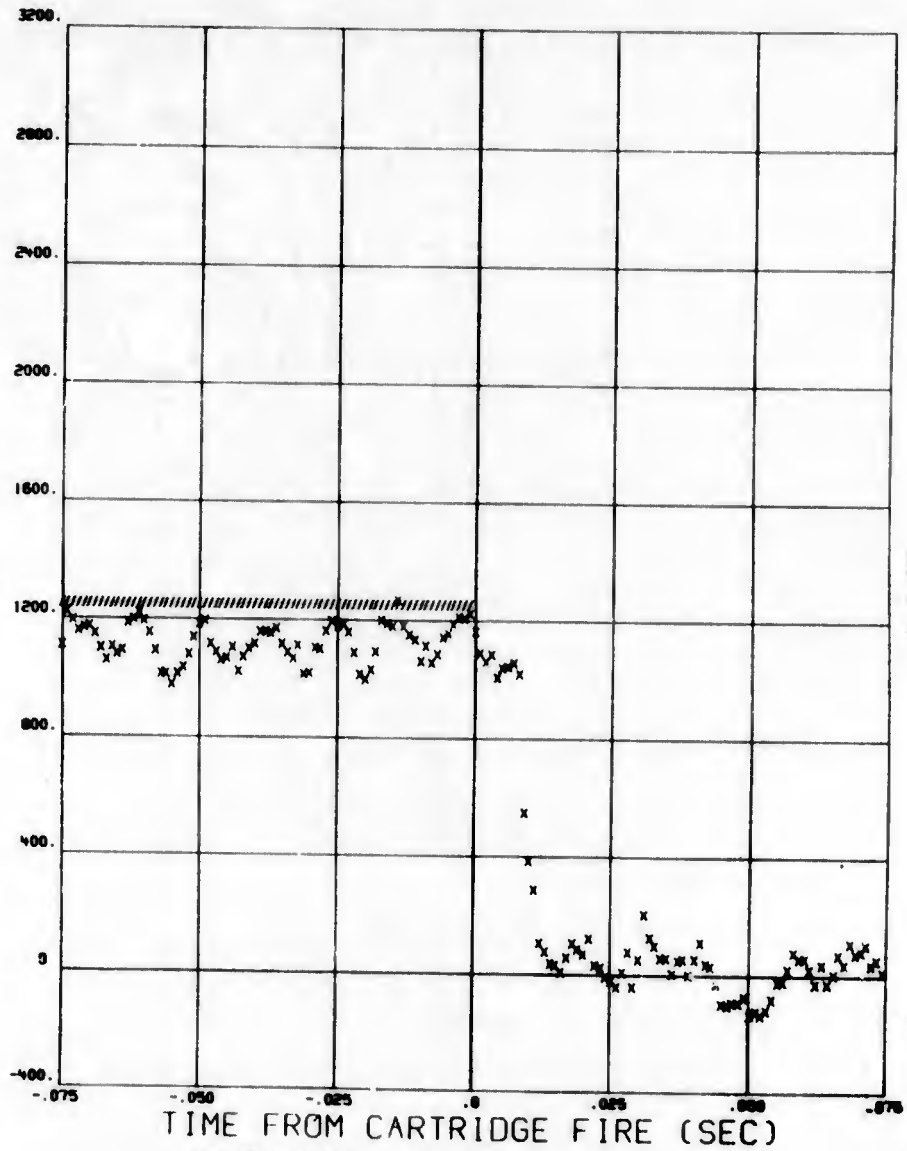
MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREACH AMBIENT TEMPERATURE

45.22 DEG F
***** DEG F
44.17 DEG F

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

3.7 FT/SEC
6.4 FT/SEC

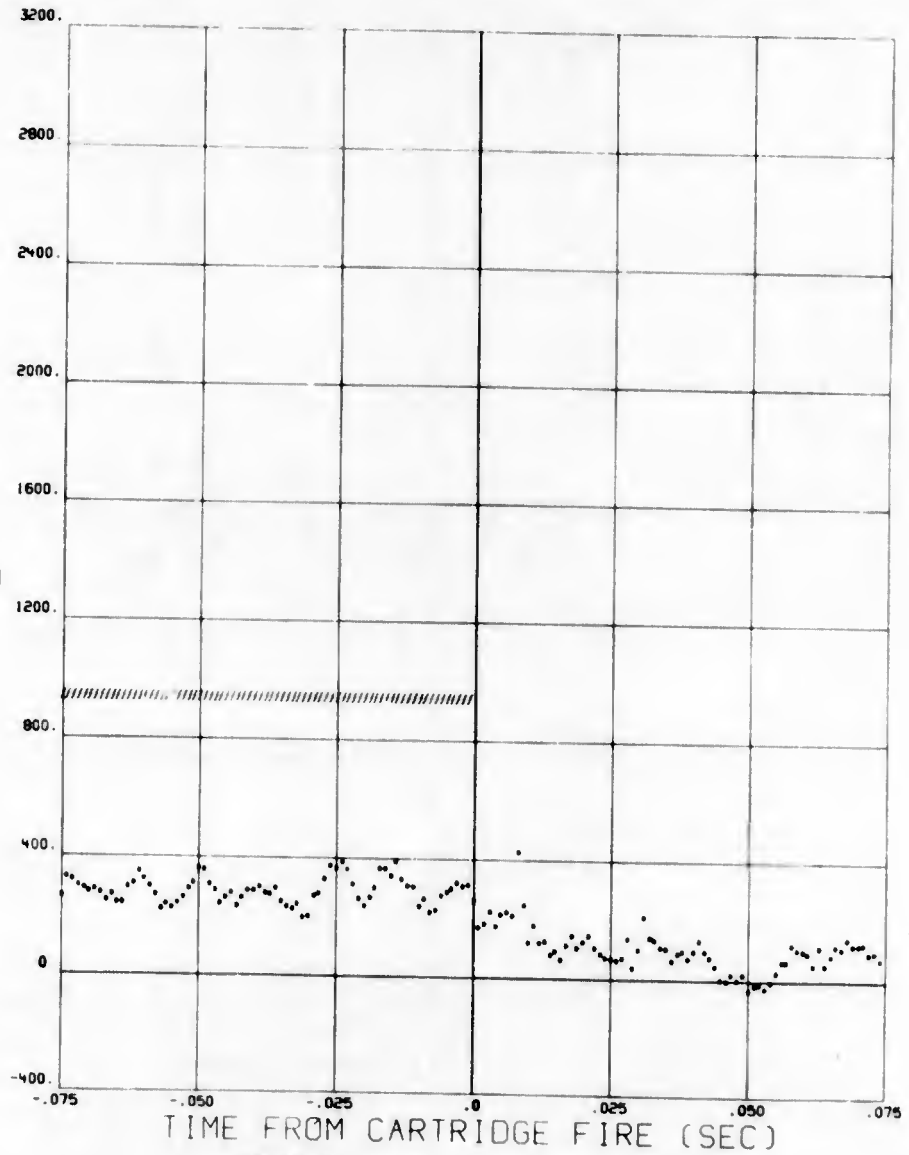
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



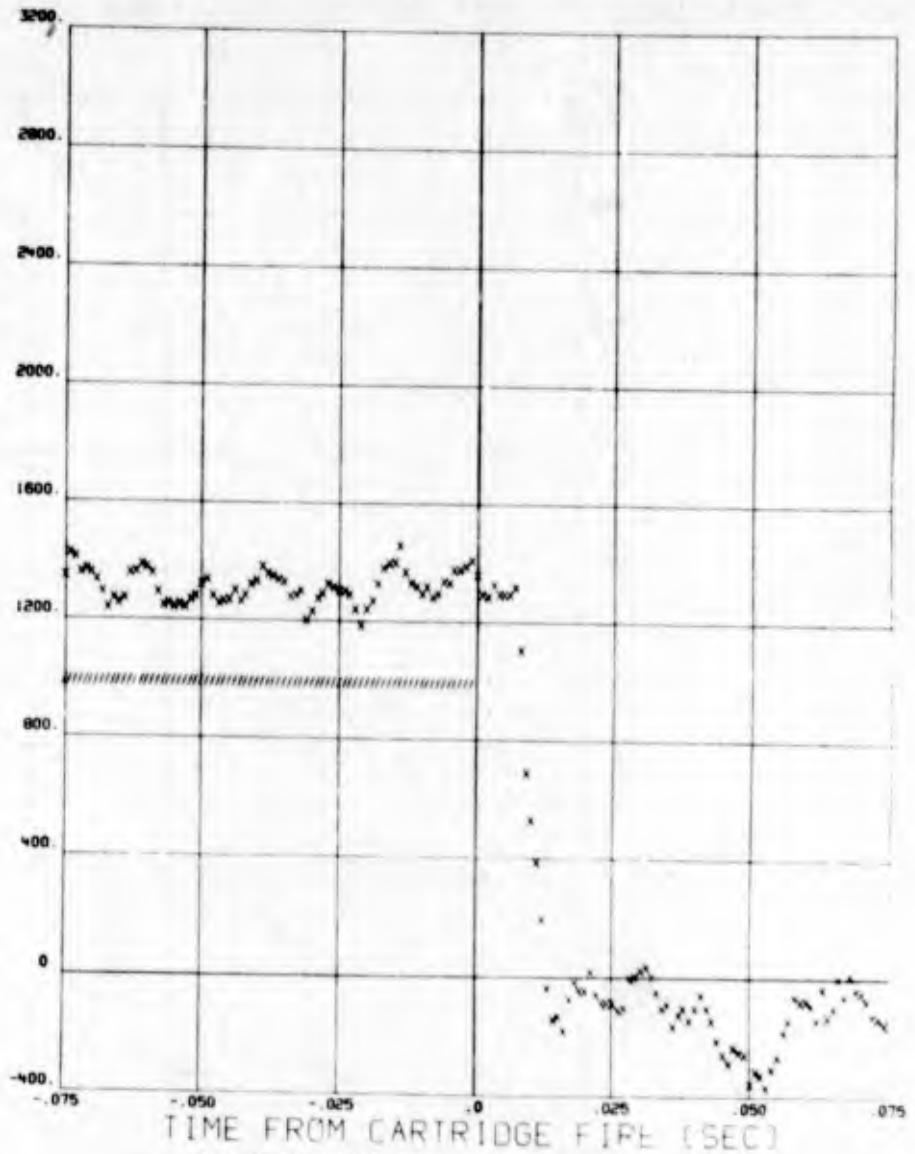
19 04 73 670AG018 18 MAY 72 MSN 101S BOMB 175

R244 2 0 7

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = LEFT AFT

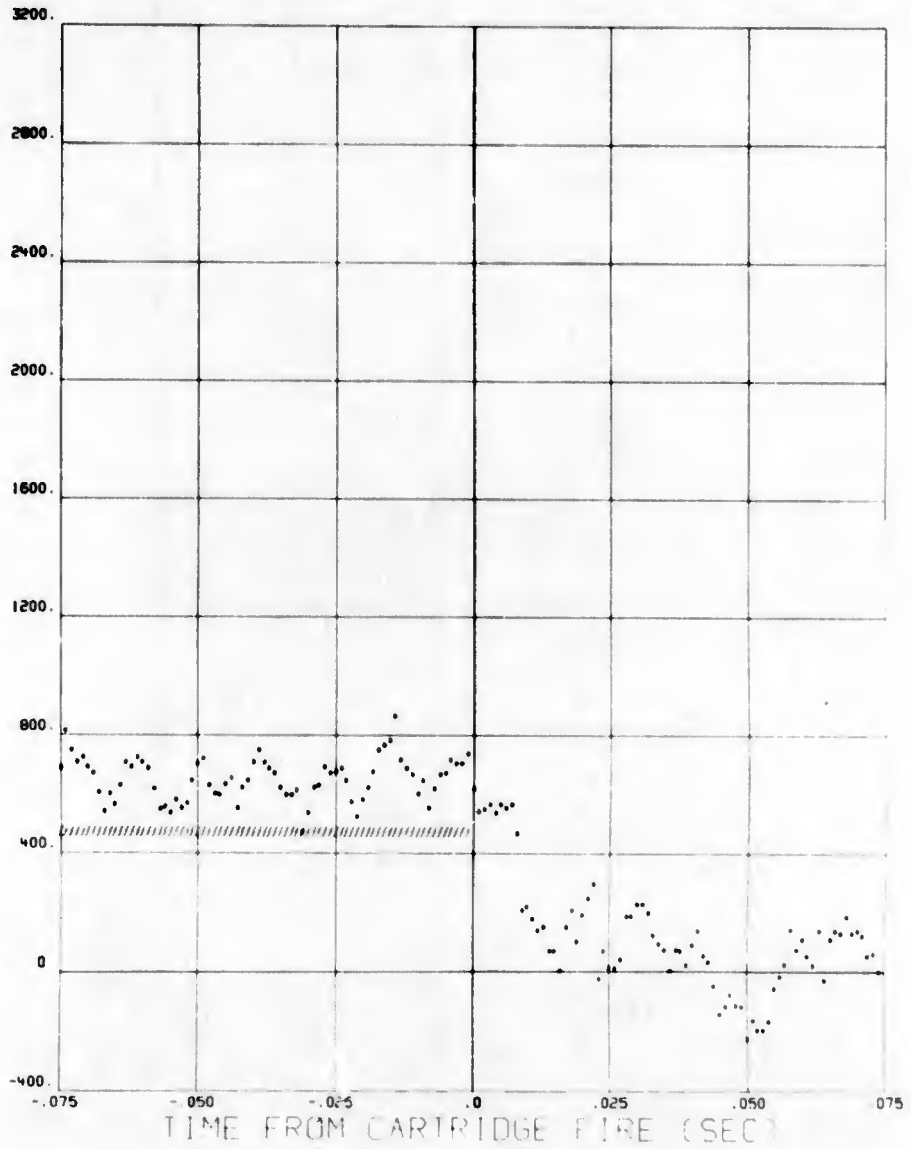


PLOT PREPARED BY TSX, ADTC

19/04/73 670AG018 18 MAY 72 MSN 101S BOMB 175

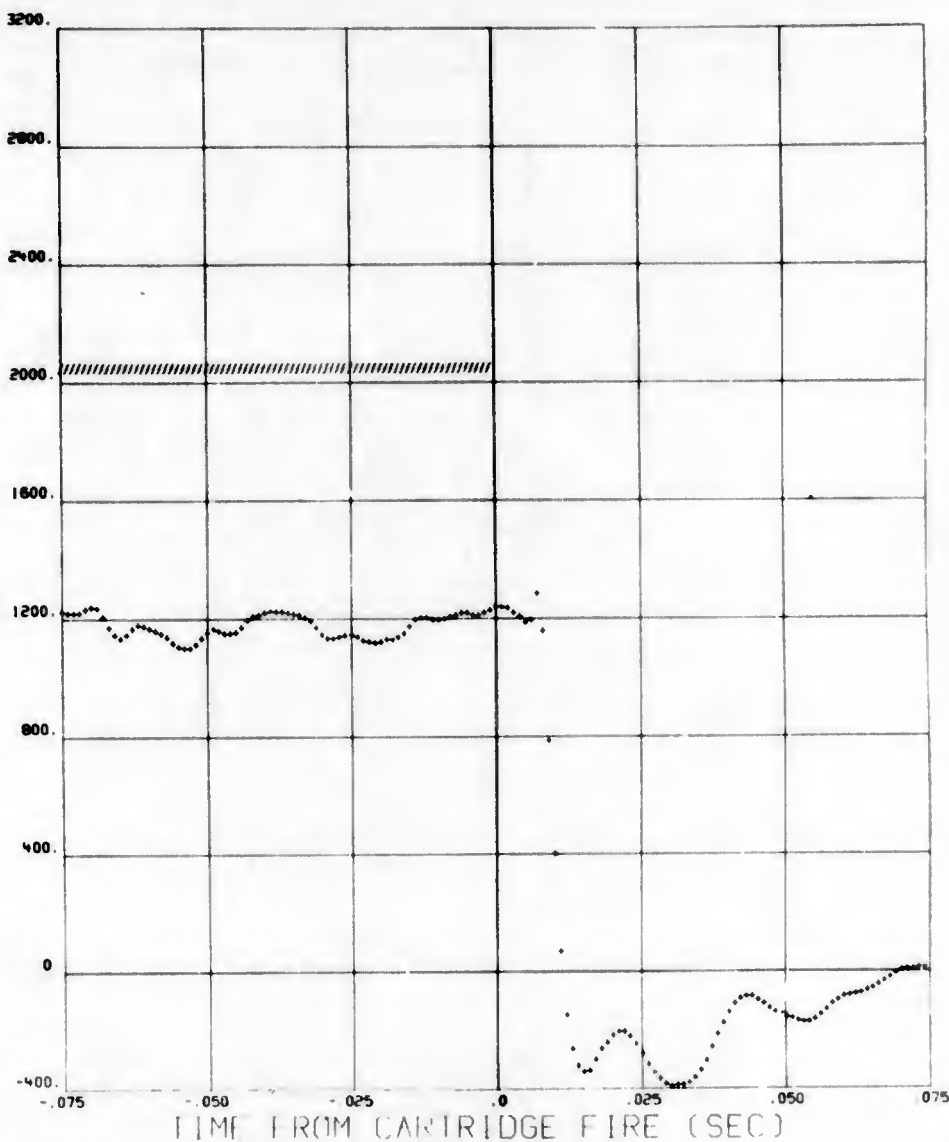
P244 07

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



PLOT PREPARED BY 15X, ADTC

RELATIVE
HOOK
REACTION
(LBS)
+ = FORWARD

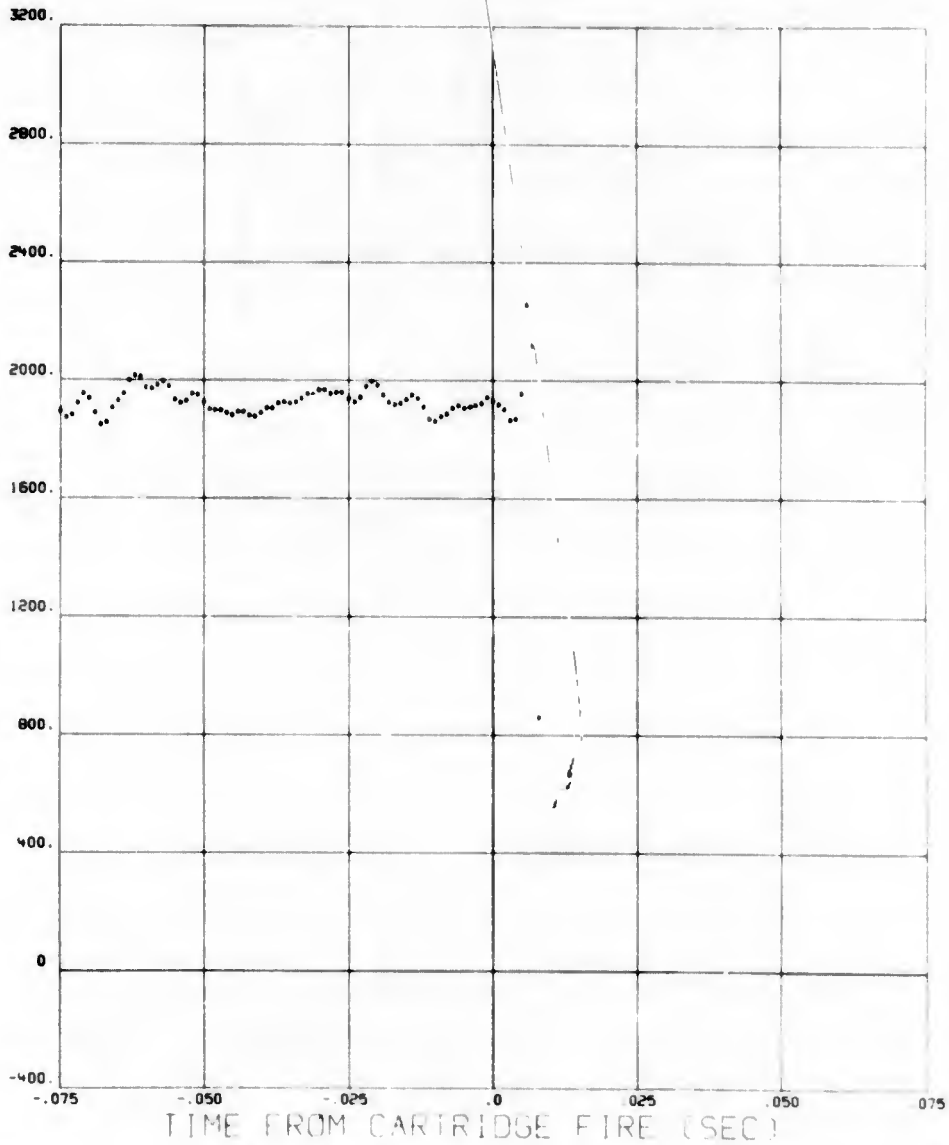


PLOT PREPARED BY 15X, ADIC

19/04/73 670AG018 18 MAY 72 MSN 1015 BOMB 175

R244 6 0

RELATIVE
HOOK
REACTION
(LBS)
* = AFT

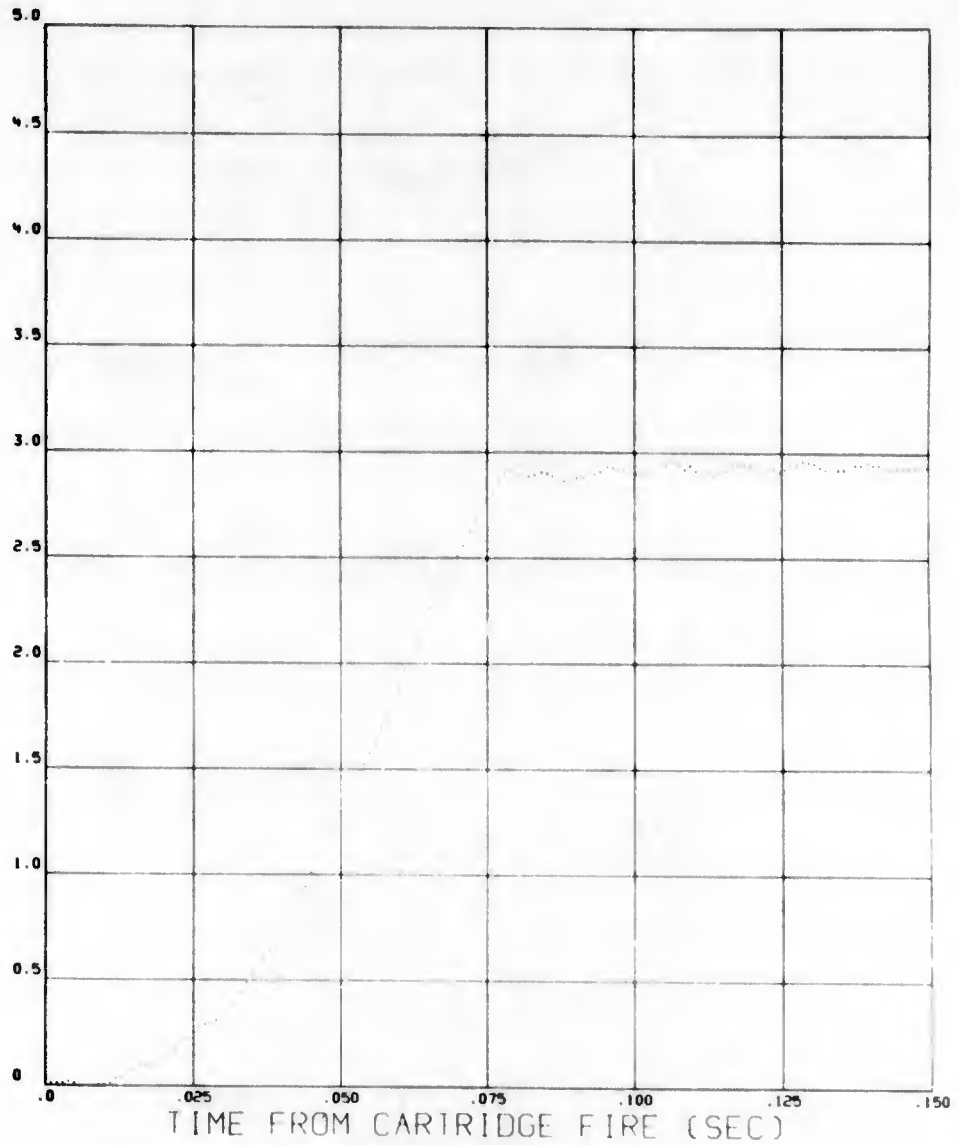


PLOT PREPARED BY 156, ADTC

19/04/73 670AG018 18 MAY 72 MSN 101S BOMB 175

R244 7 0 7

EJECTOR
FOOT
POSITION
(INCHES)

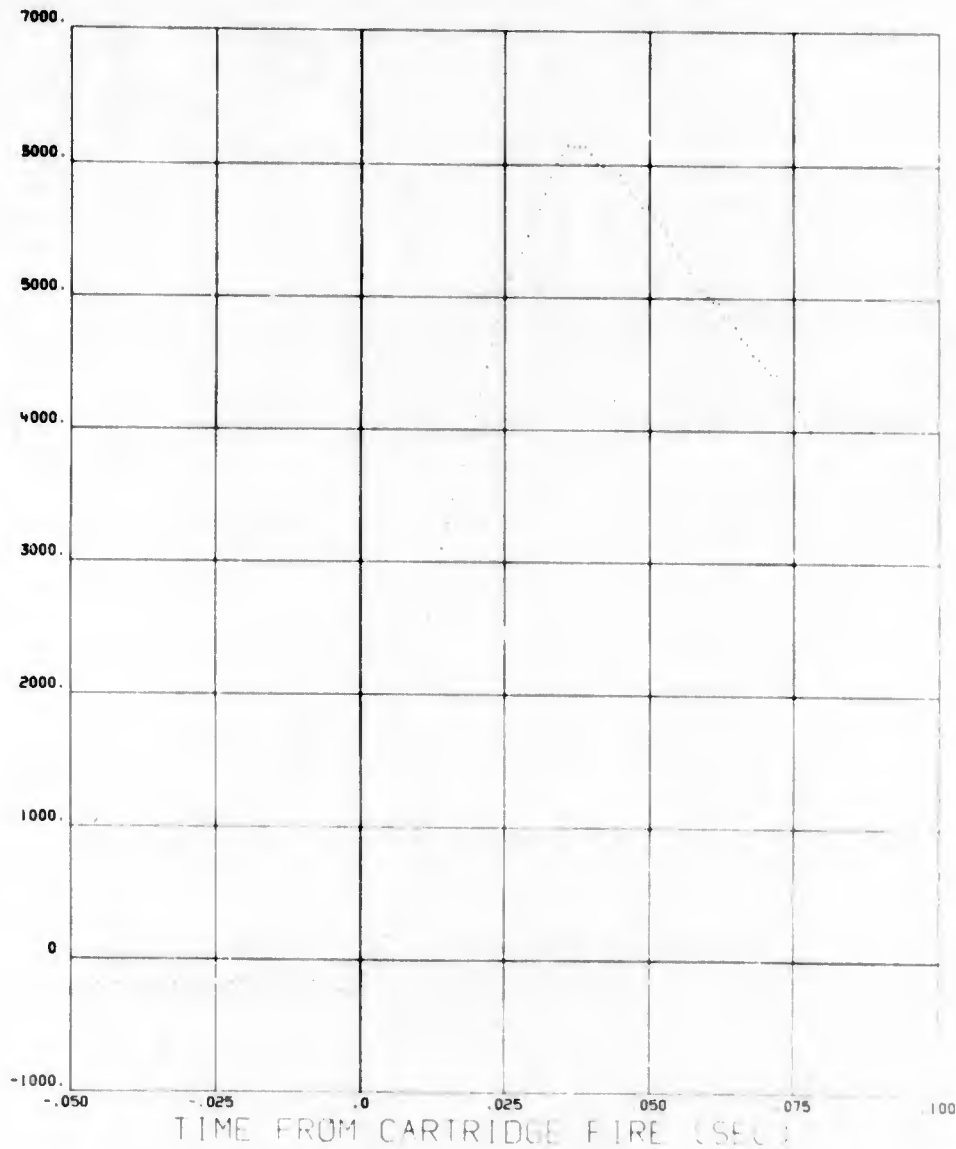


PLOT PREPARED BY ISX, ADIC

19/04/73 670AG018 18 MAY 72 MSN 101S BOMB 175

R244 8 0 7

EJECTION
CHAMBER
PRESSURE
(PSI)

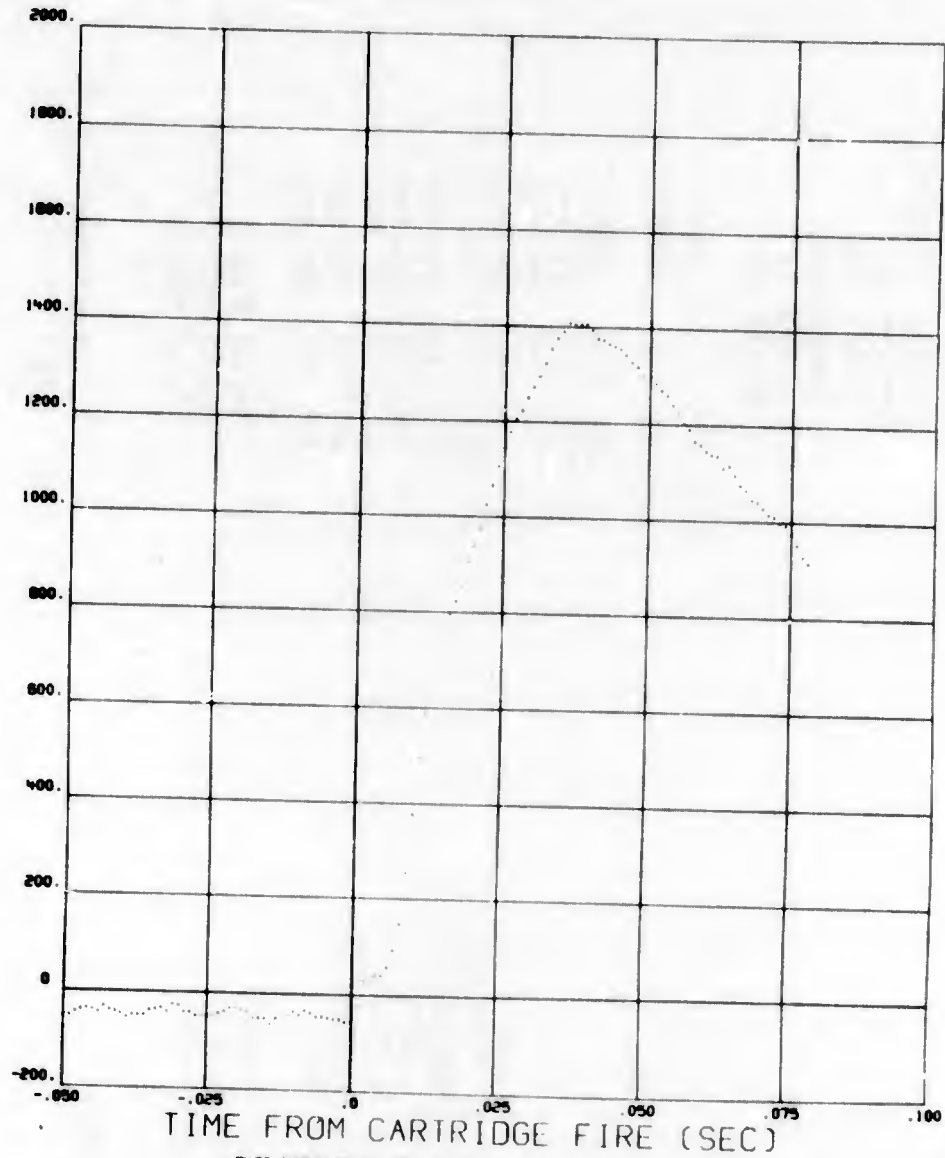


PLOT PREPARED BY TSK, ADIC

19/0-173 670AG018 18 MAY 72 MSN 101S BOMB 175

R244 9 0 7

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY TSX, ADTC

DAYE 19 MAY 72 MISSION 102C BOMB ID 142 BOMB WEIGHT 509.25 LBS

EJECTOR MOMENT ARM
TIME OF EJECTOR STROKE
A/C ANGLE OF ATTACK AT RELEASE
A/C PITCH ANGLE AT RELEASE
A/C ROLL ANGLE AT RELEASE
RACK EJECTION ANGLE

3.063 INCHES
***** SEC
3.604 DEG
1.600 DEG
.990 DEG
0.000 DEG

FEET
FEET

TIME DELAY
MILLISECONDS

HR MIN SEC
*** **
22 13 22.350
22 13 22.356
*** **
22 13 22.358
22 13 22.357
22 13 22.429
22 13 22.354
22 13 22.358

RELEASE HISTORY
PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

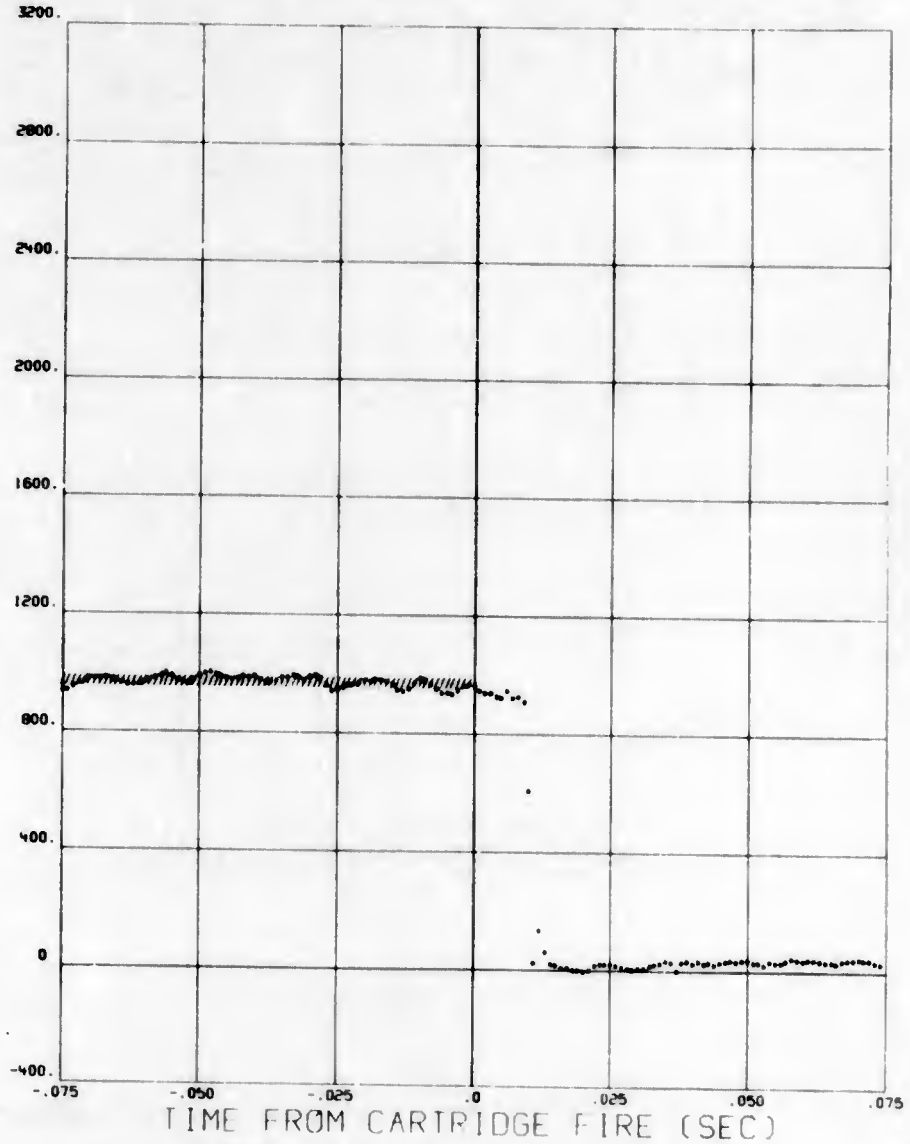
MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

74.17 DEG F
86.50 DEG F
38.48 DEG F

7.6 FT/SEC
7.2 FT/SEC

SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD
~

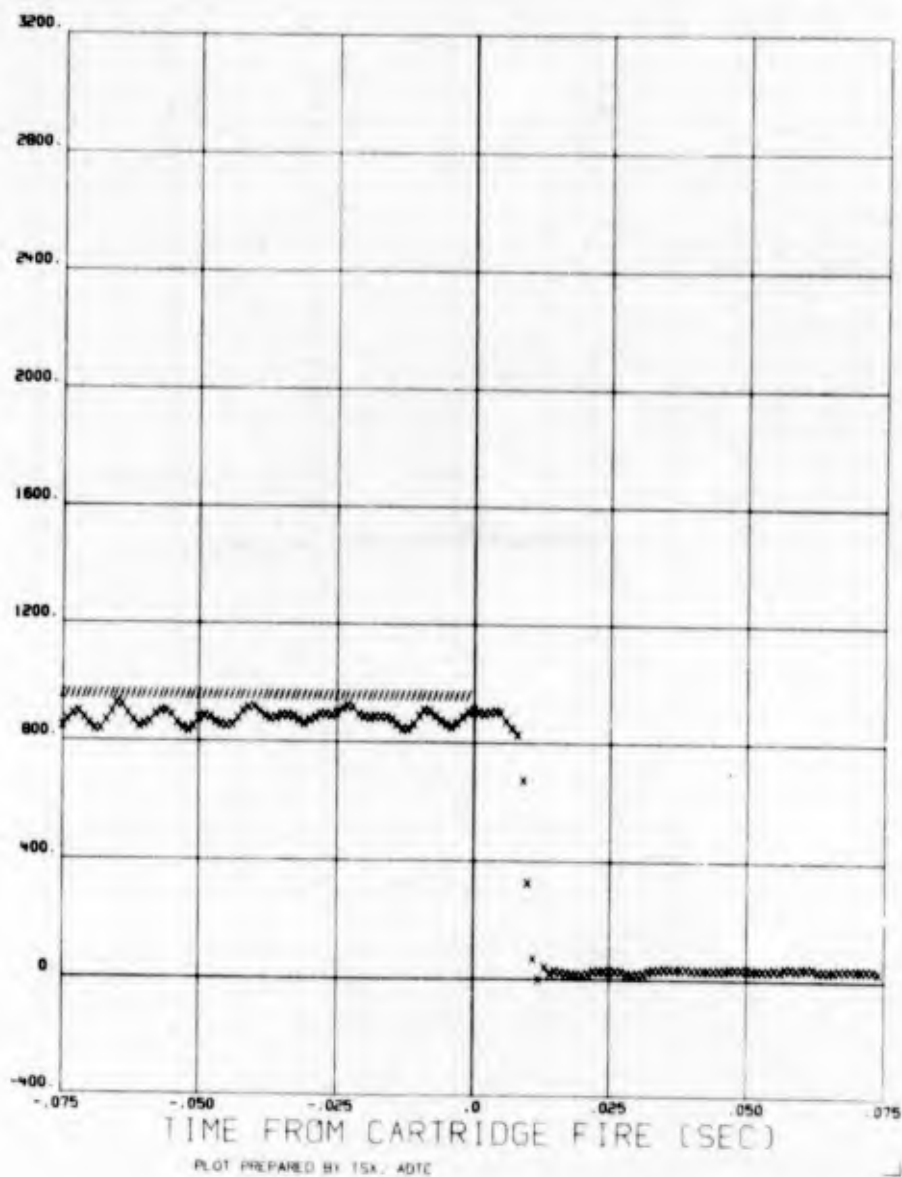


PLOT PREPARED BY 15X, ADIC

19/04/73 670AG018 19 MAY 72 MSN 102C BOMB

142^{RP-1} 48 07

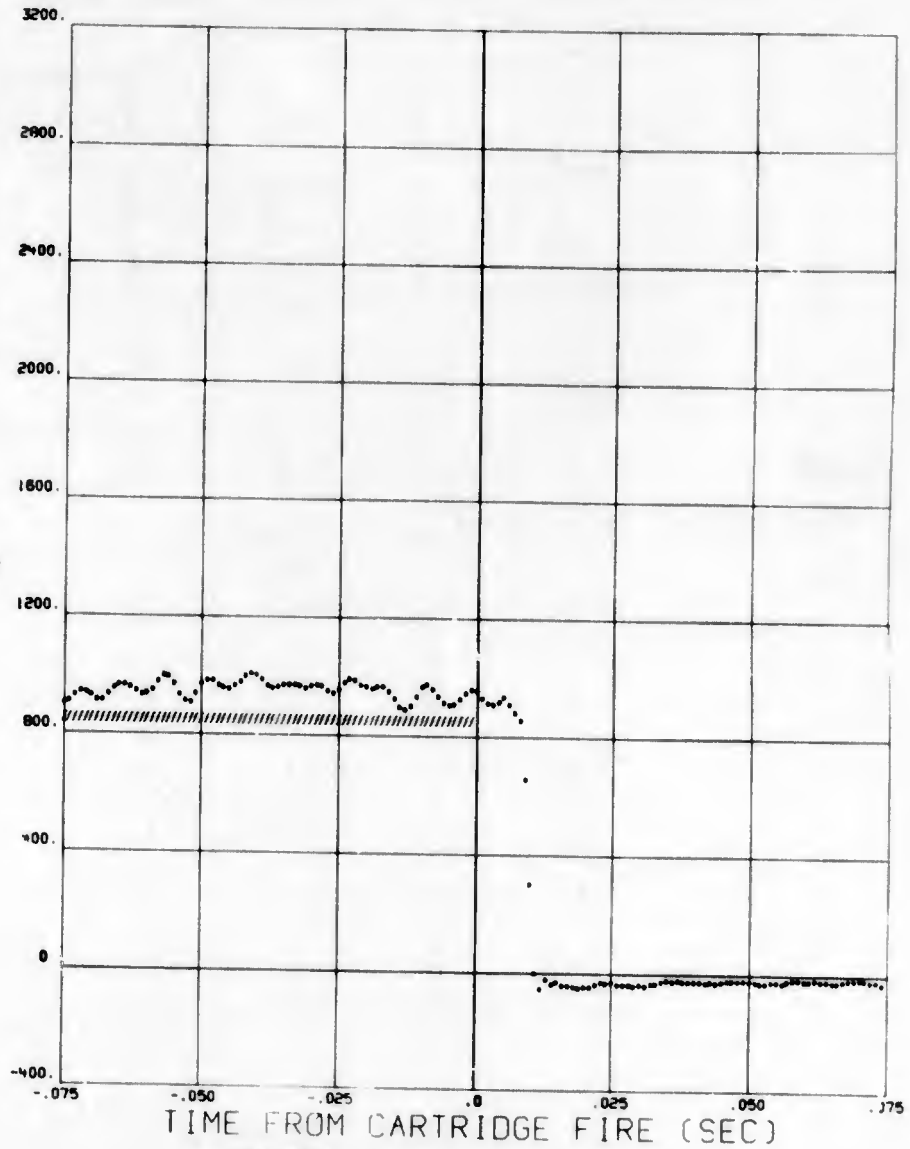
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



19/04/73 670AG018 19 MAY 72 MSN 102C BOMB

142^{R243}₄₉ 07

SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT

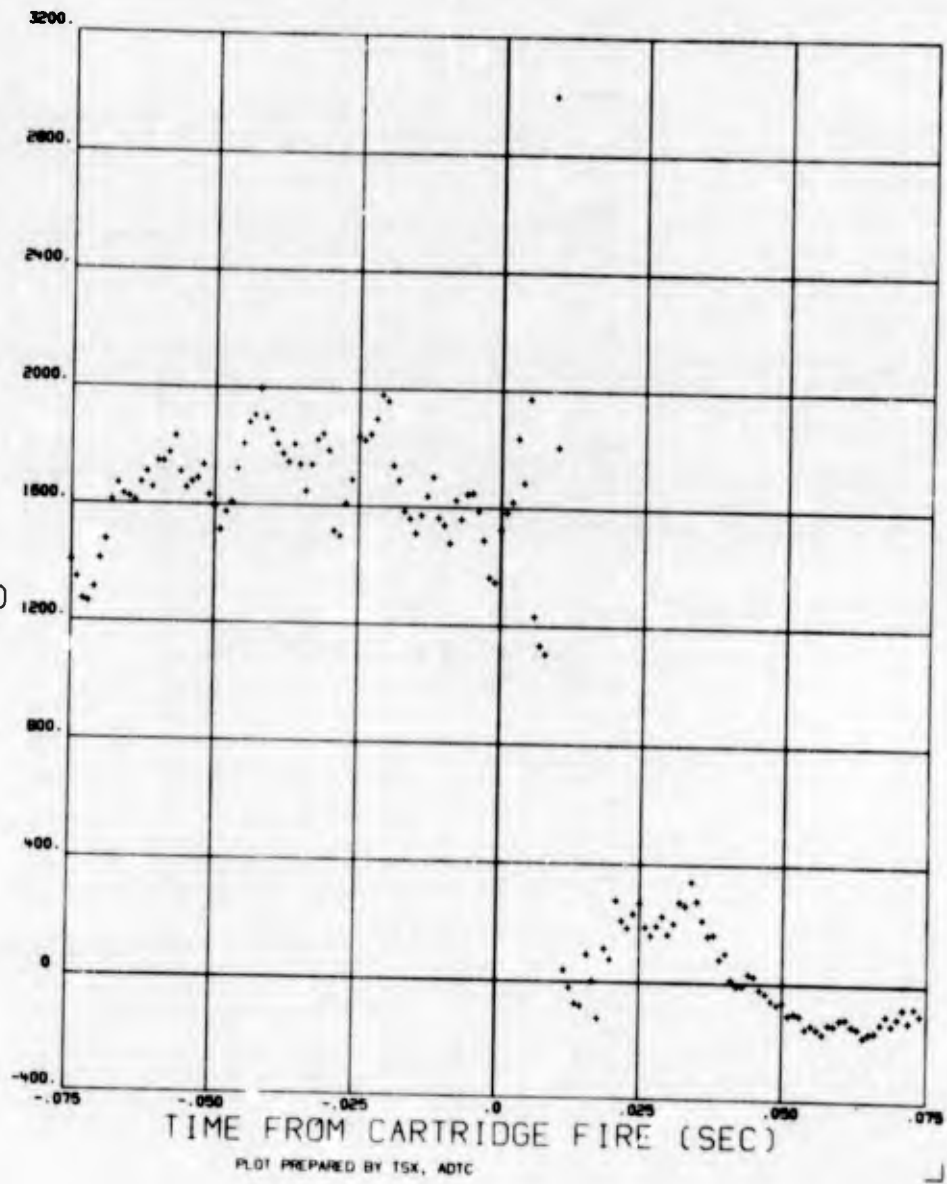


PLOT PREPARED BY TSK, ADTC

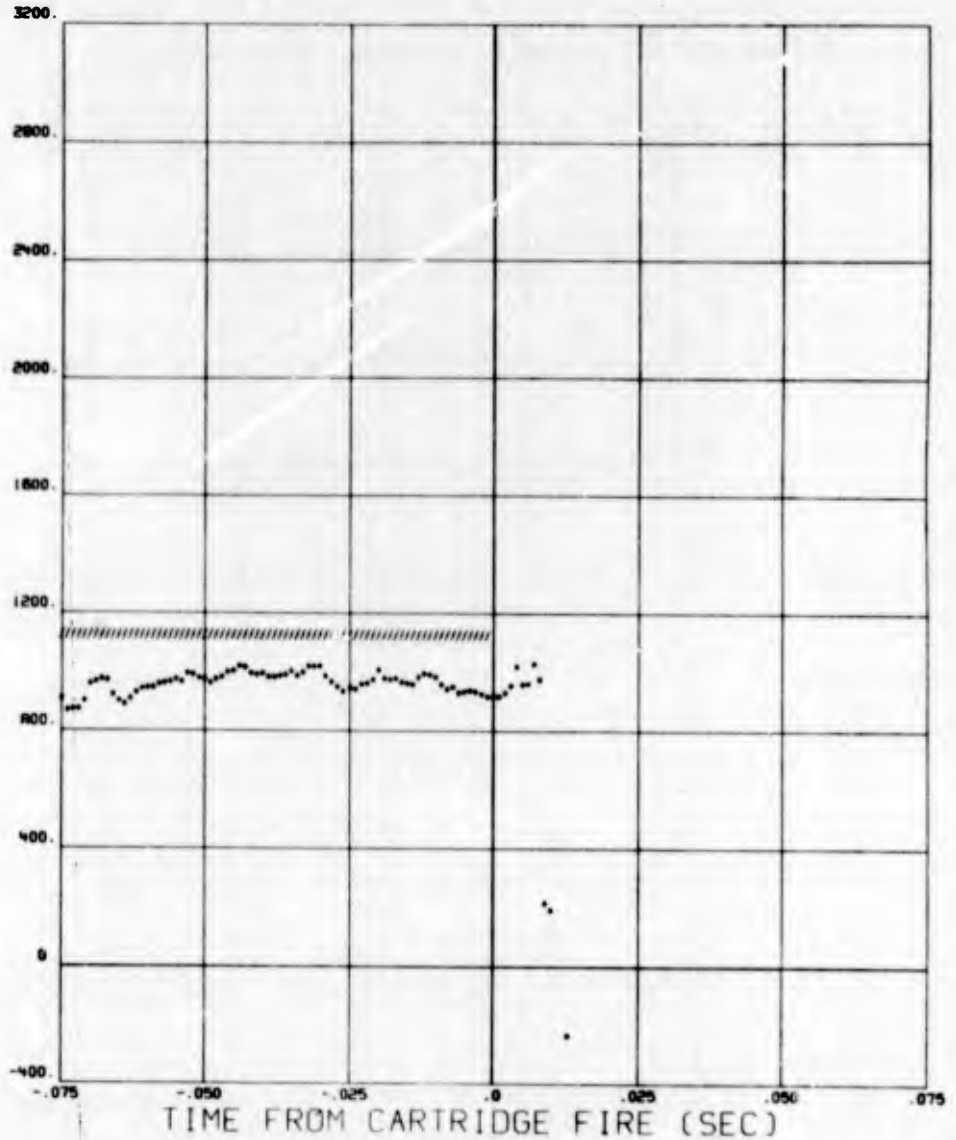
19/04/73 670AG018 19 MAY 72 MSN 102C BOMB

142^{R243}₅₀ 07

HOCK
REACTION
(LBS)
+ = FORWARD



HOOK
REACTION
(LBS)
* = AFT

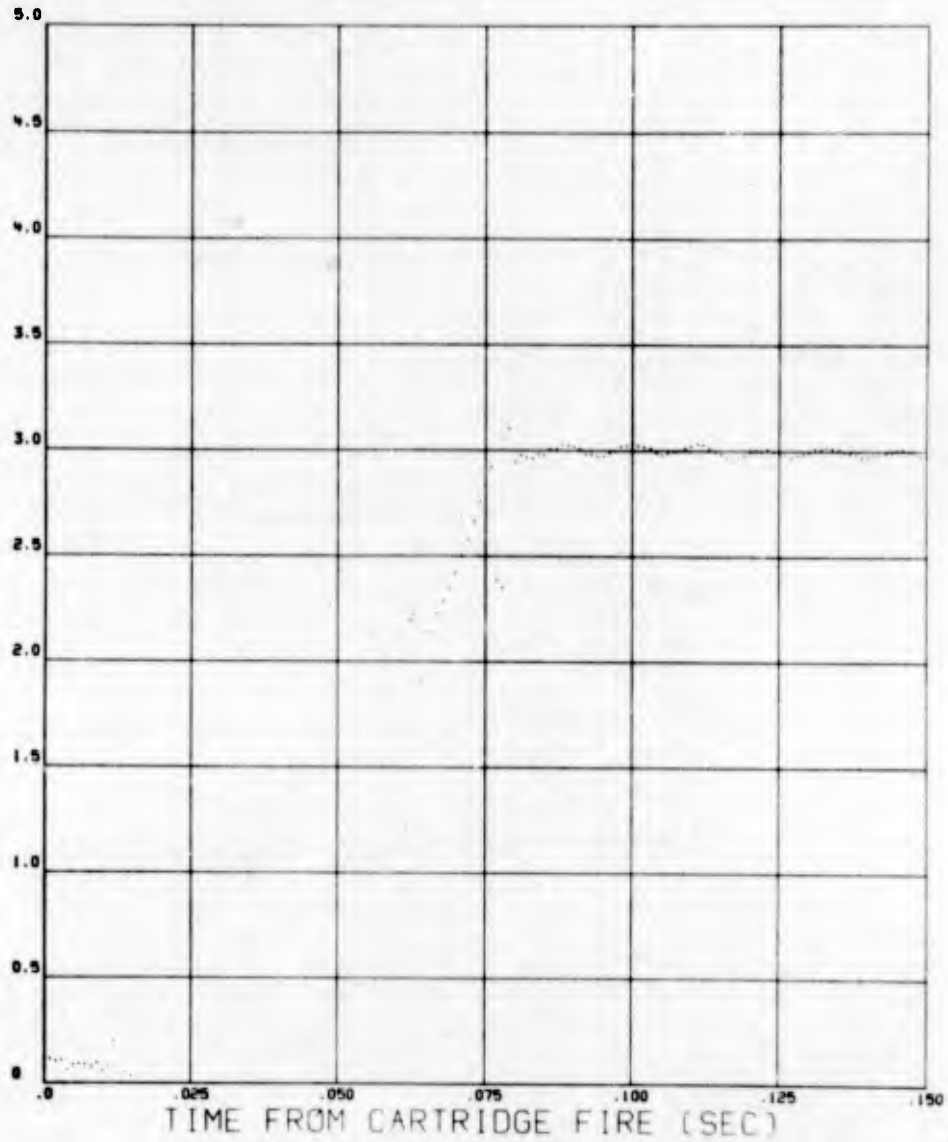


PLOT PREPARED BY TSX, ADTC

19/04/73 670AG018 19 MAY 72 MSN 102C BOMB

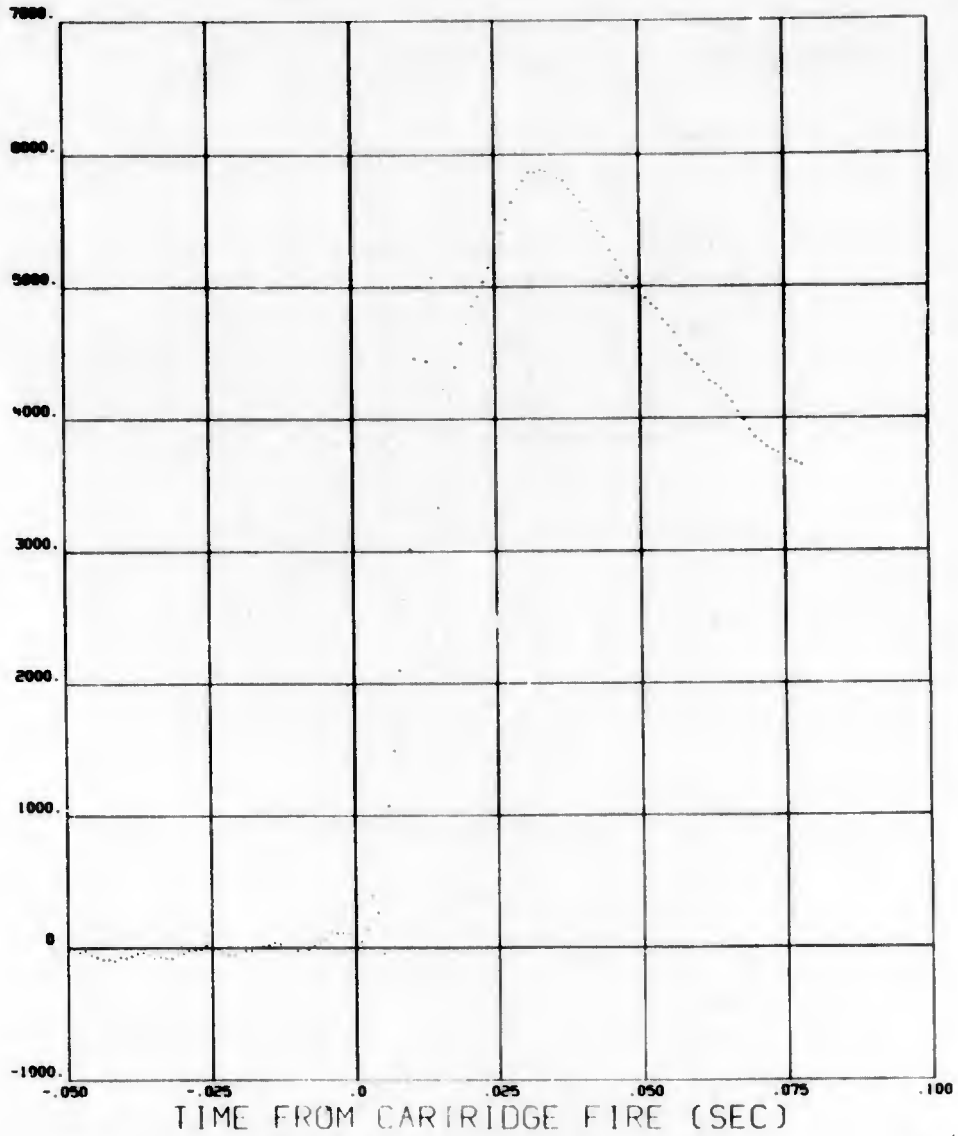
142^{R243} 52 07

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY TSA, ADTC

EJECTION
CHAMBER
PRESSURE
(PSI)

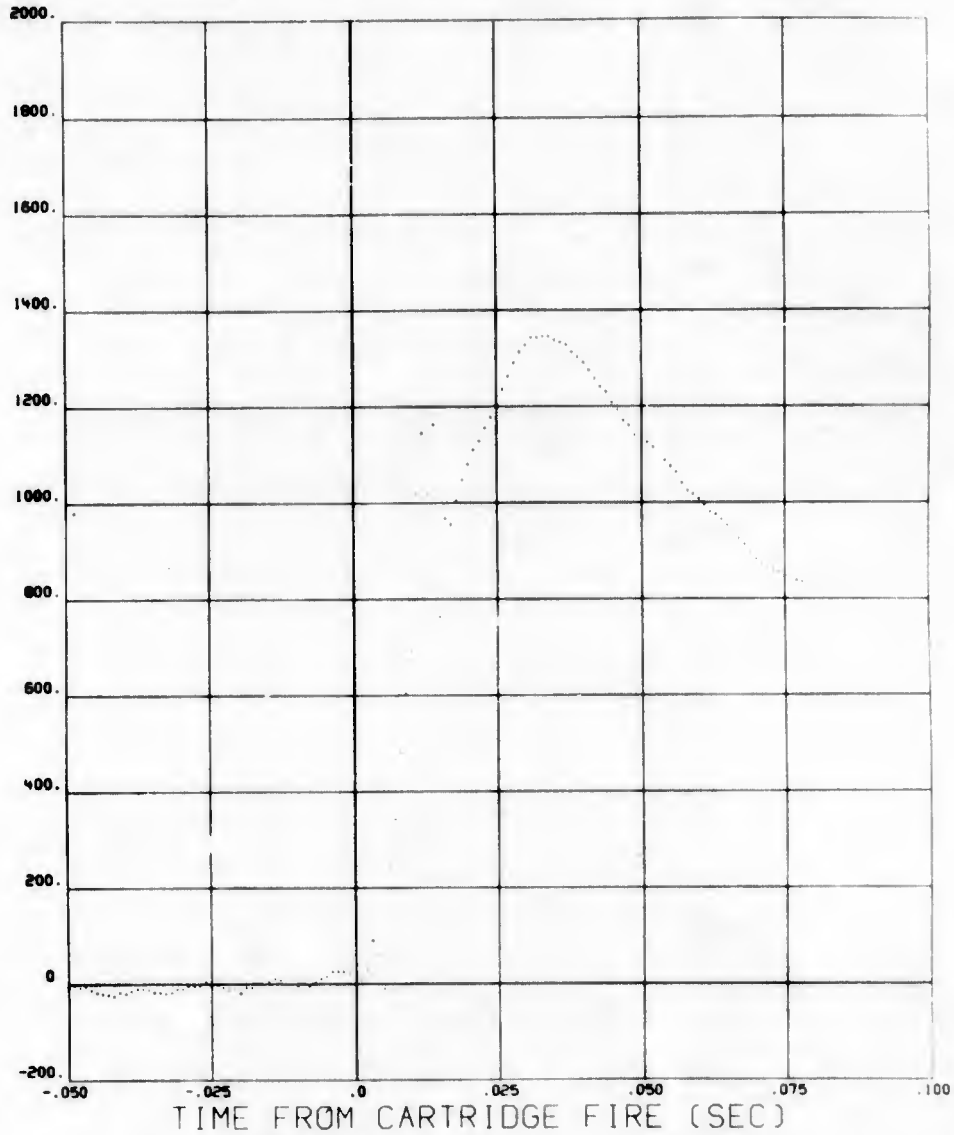


PLOT PREPARED BY 15X, ADTC

19/04/73 670AG018 19 MAY 72 MSN 102C BOMB

142^{R243}₅₄ 0

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY TSX, ADTC

DATE 19 MAY 72 MISSION 102S BOMB ID 140 BOMB WEIGHT 509.75 LBS

EJECTOR MOMENT ARM 2.875 INCHES
 TIME OF EJECTOR STROKE .071 SEC
 A/C ANGLE OF ATTACK AT RELEASE 3.310 DEG
 A/C PITCH ANGLE AT RELEASE 1.030 DEG
 A/C ROLL ANGLE AT RELEASE 1.300 DEG
 RACK EJECTION ANGLE -48.000 DEG

IMPACT RANGE FEET
 DEFLECTION FEET

RELEASE HISTORY
 PICKLE TIME
 CARTRIDGE FIRE
 INITIAL LINKAGE MOVEMENT
 EJECTOR FOOT (FIRST MOTION)
 STORE FIRST MOTION (FORWARD)
 STORE FIRST MOTION (AFT)
 EJECTOR FOOT FULL EXTENDED
 HOOK FIRST MOTION (FORWARD)
 HOOK FIRST MOTION (AFT)

HR	MIN	SEC	TIME DELAY MILLISECONDS
***	***	***	****
***	***	***	****
22	13	39.427	0
22	13	39.431	4
22	13	39.430	3
22	13	39.429	2
22	13	39.502	75
22	13	39.430	3
22	13	39.429	2

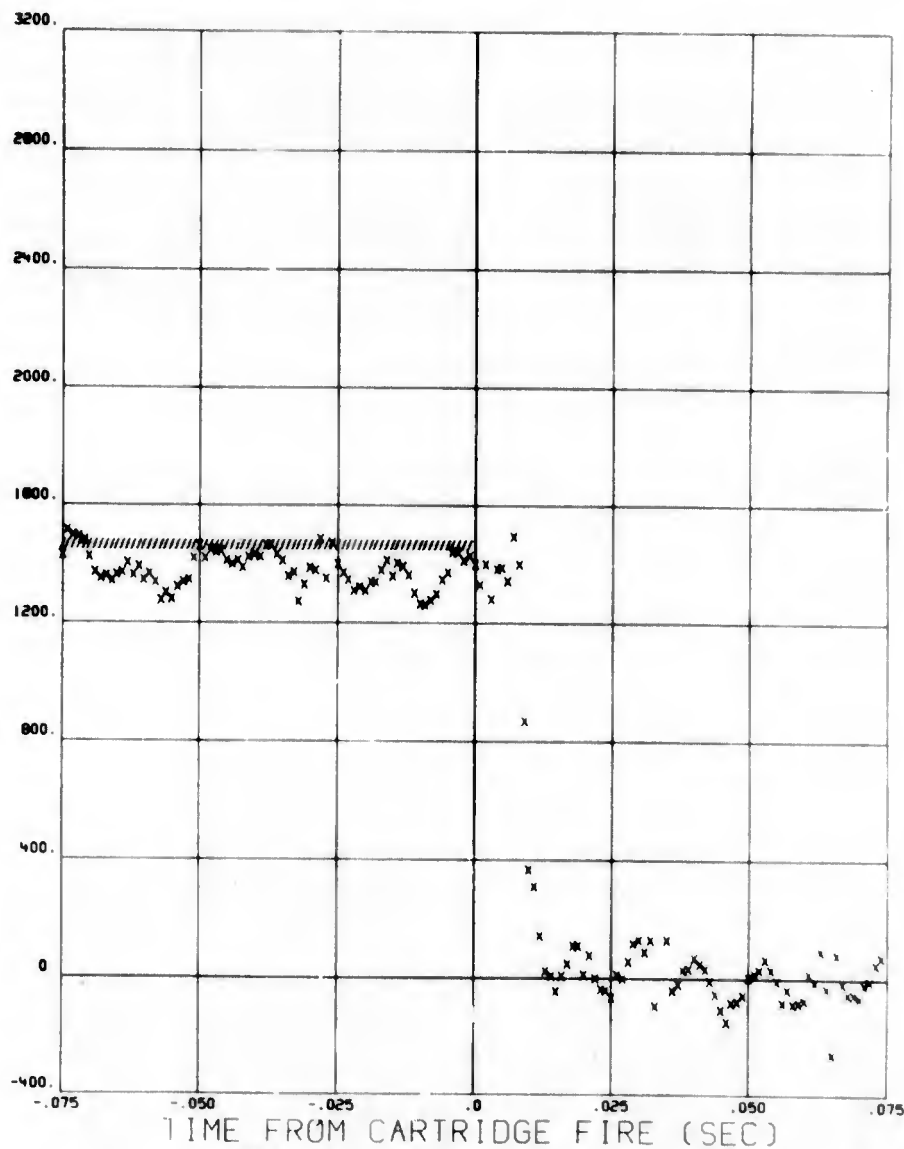
MAXIMUM PRE-FLT GROUND TEMPERATURE
 MAXIMUM POST-FLT GROUND TEMPERATURE
 MAXIMUM BREACH AMBIENT TEMPERATURE

SEPARATION VELOCITY
 DISPLACEMENT METHOD
 PRESSURE METHOD

74.17 DEG F
 86.50 DEG F
 41.00 DEG F

6.6 FT/SEC
 6.5 FT/SEC

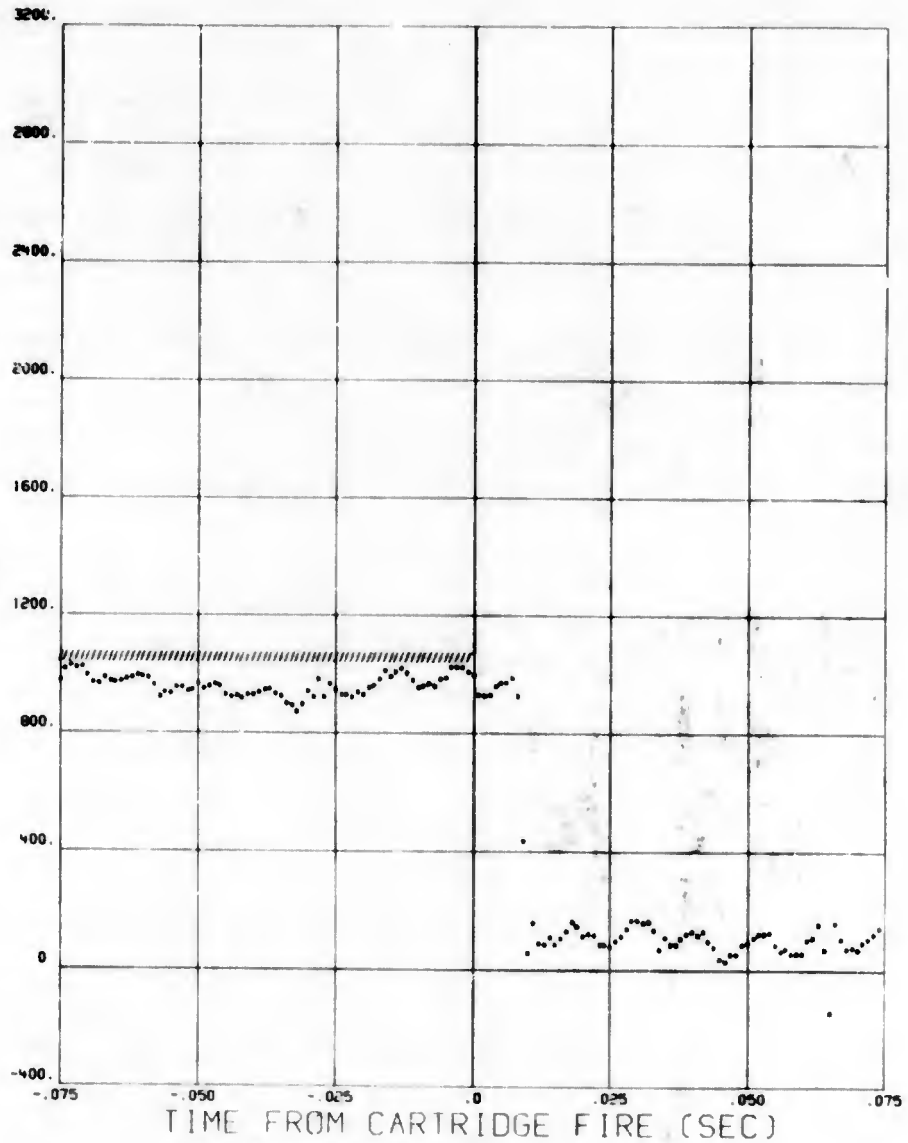
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



19/04/73 670AG018 19 MAY 72 MSN 102S BOMB

140^{RMS} 56 0 1

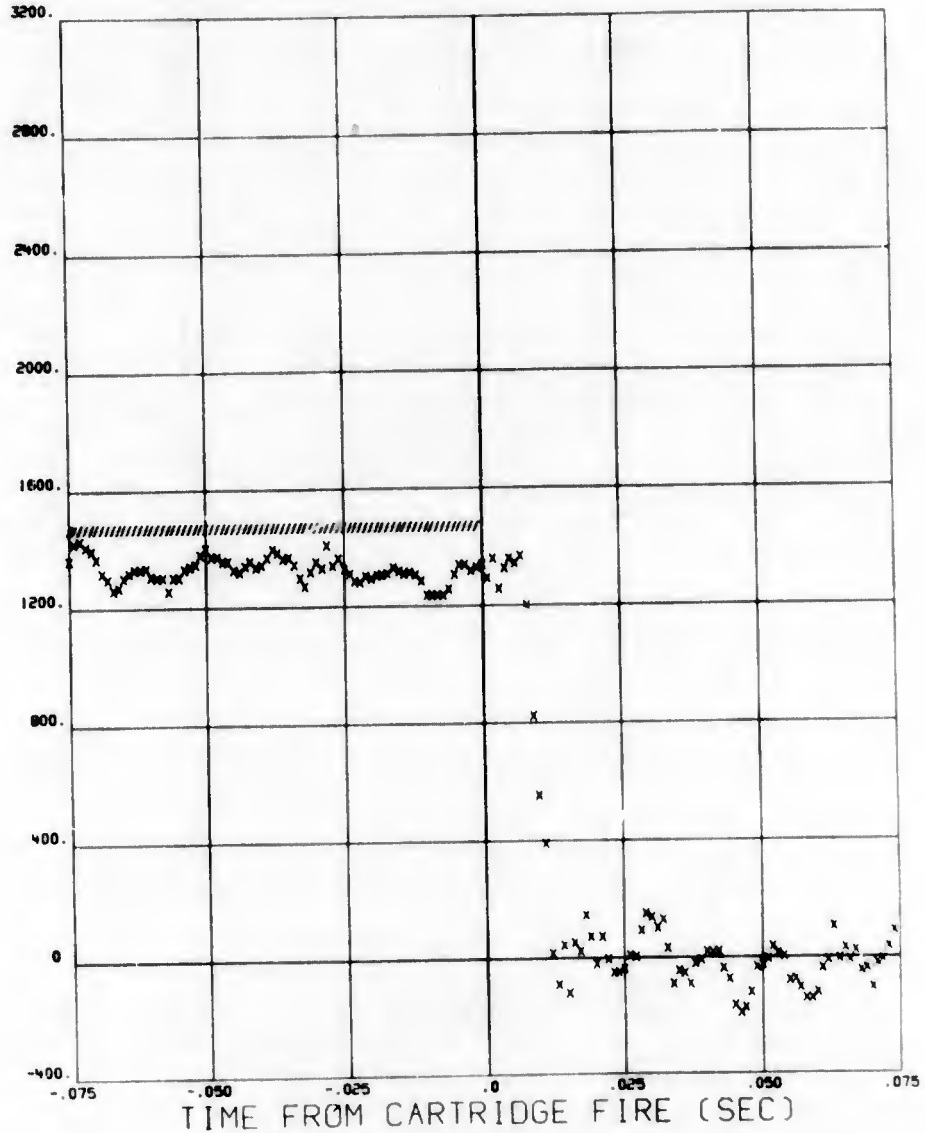
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



TIME FROM CARTRIDGE FIRE (SEC)

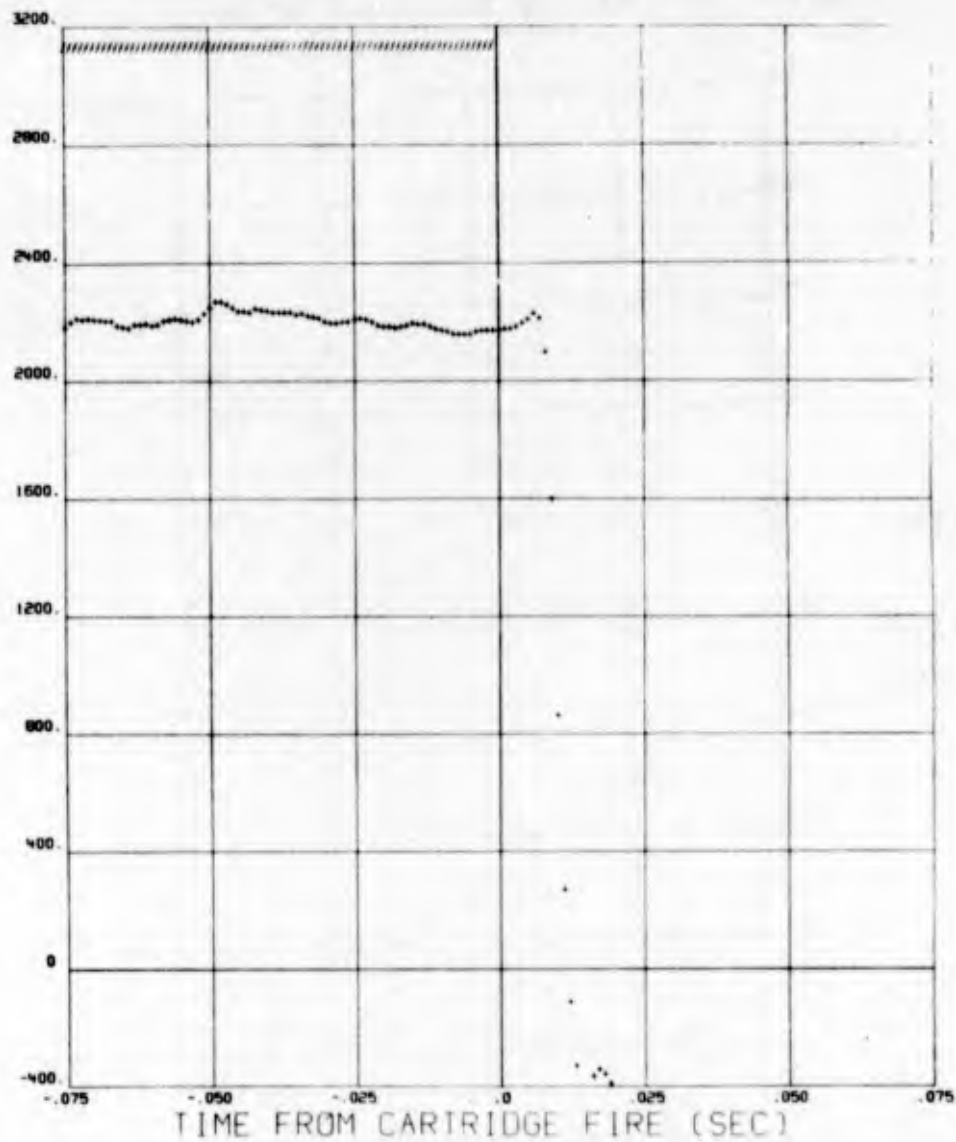
PLOT PREPARED BY TSK, ADIC

SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



L

HOOK
REACTION
(LBS)
+ = FORWARD

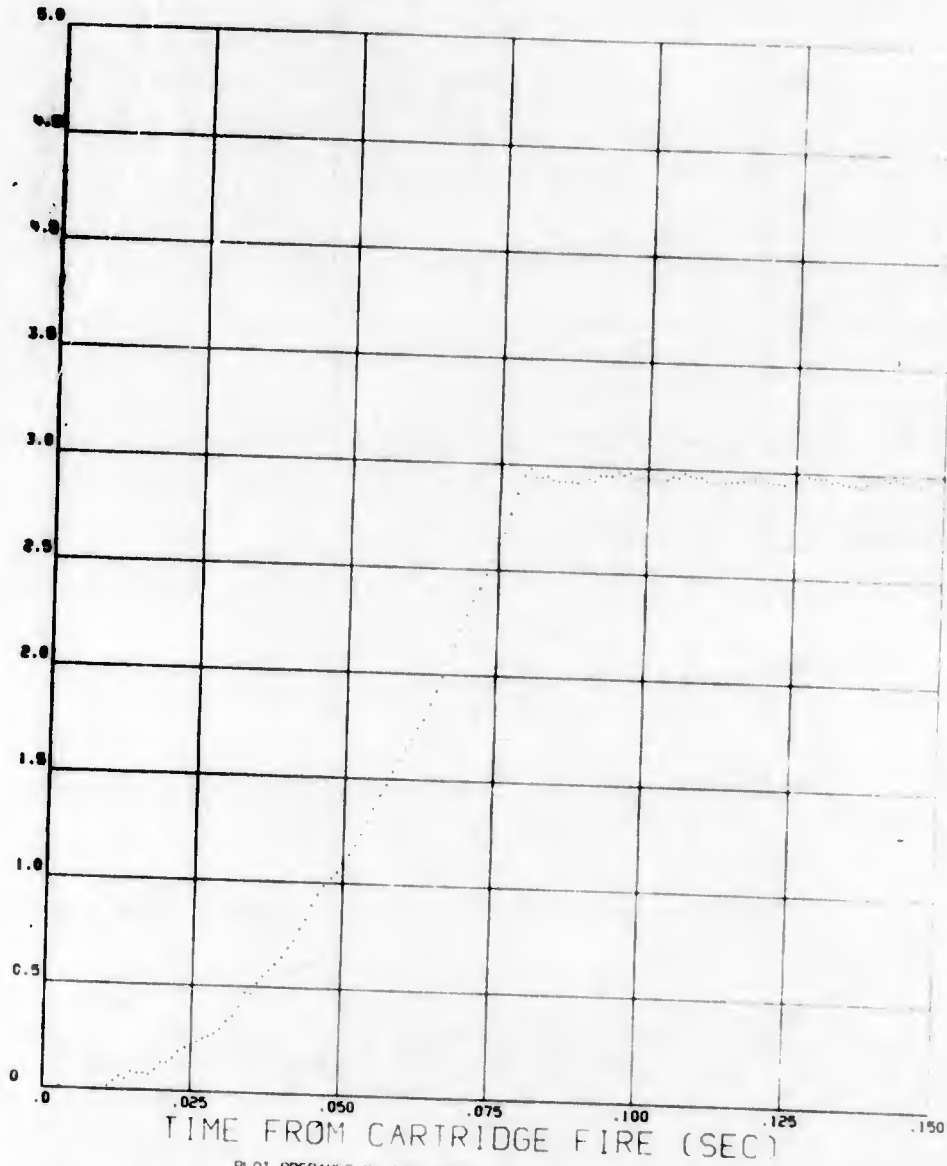


PLOT PREPARED BY TSX, ADTC

670AG018 19 MAY 72 MSN 102S BOMB

140 Rev 61

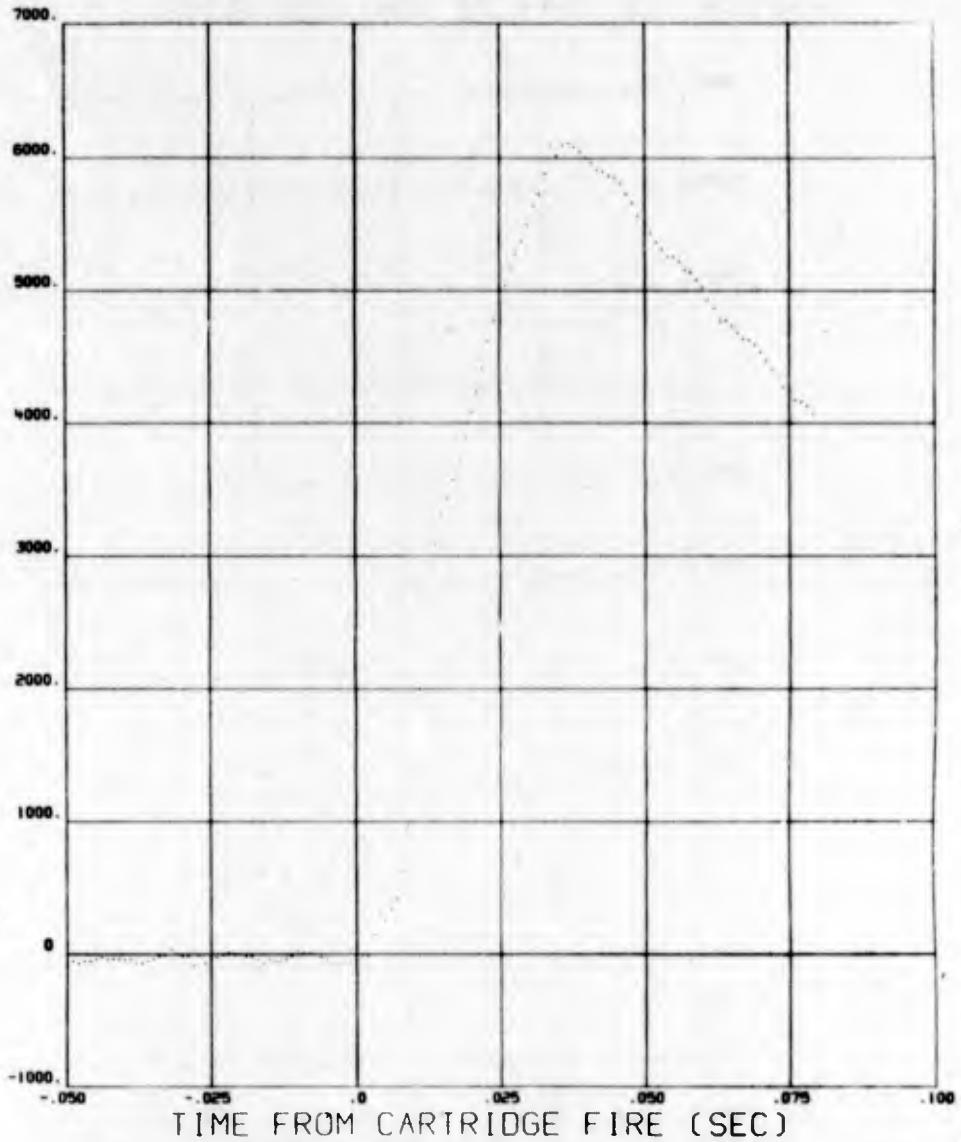
EJECTOR
FOOT
POSITION
(INCHES)



19/04/73 670AG018 19 MAY 72 MSN 102S BOMB

140^{R243}₆₂

EJECTION
CHAMBER
PRESSURE
(PSI)

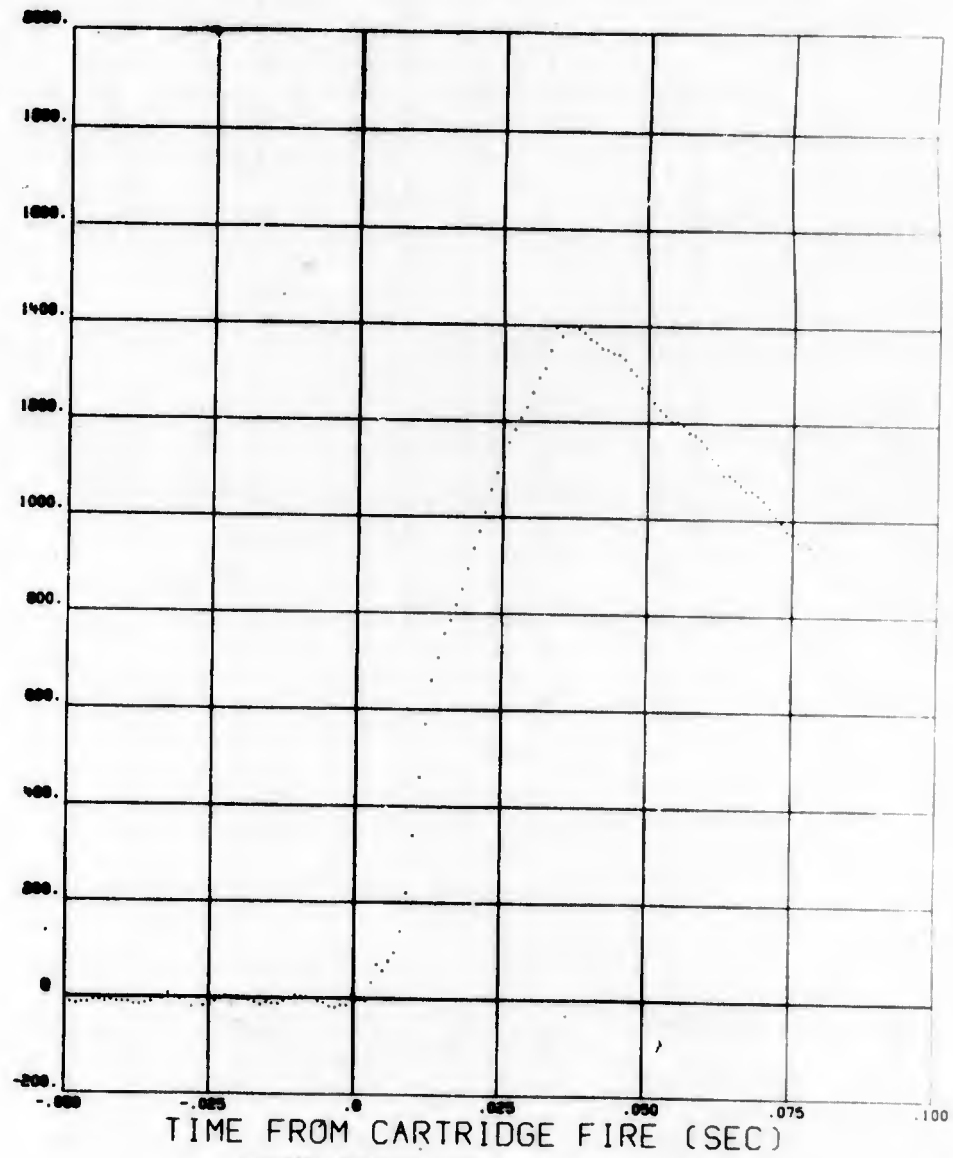


PLOT PREPARED BY 15X, ADTC

19/04/73 670AG018 19 MAY 72 MSN 102S BOMB

140^{R243}₆₃

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY 15X, ADTC

DATE 23 MAY 72 MISSION 106C BOMB ID 84 BOMB WEIGHT 518.50 LBS

EJECTOR MOMENT ARM
 TIME OF EJECTOR STROKE
 A/C ANGLE OF ATTACK AT RELEASE
 A/C PITCH ANGLE AT RELEASE
 A/C ROLL ANGLE AT RELEASE
 RACK EJECTION ANGLE

3.500 INCHES
 ***** SEC
 3.264 DEG
 .720 DEG
 2.500 DEG
 0.000 DEG

IMPACT RANGE DEFLECTION

FEET FEET

RELEASE HISTORY
 PICKLE TIME
 CARTRIDGE FIRE
 INITIAL LINKAGE MOVEMENT
 EJECTOR FOOT (FIRST MOTION)
 STORE FIRST MOTION (FORWARD)
 STORE FIRST MOTION (AFT)
 EJECTOR FOOT FULL EXTENDED
 HOOK FIRST MOTION (FORWARD)
 HOOK FIRST MOTION (AFT)

HR MIN SEC
 *** *** *****
 22 7 3.144
 22 7 3.155
 *** *** *****
 22 7 3.157
 22 7 3.156
 22 7 3.225
 22 7 3.157
 22 7 3.156

TIME DELAY
 MILLISECONDS
 0
 11

 13
 12
 81
 13
 12

MAXIMUM PRE-FLT GROUND TEMPERATURE
 MAXIMUM POST-FLT GROUND TEMPERATURE
 MAXIMUM BREECH AMBIENT TEMPERATURE

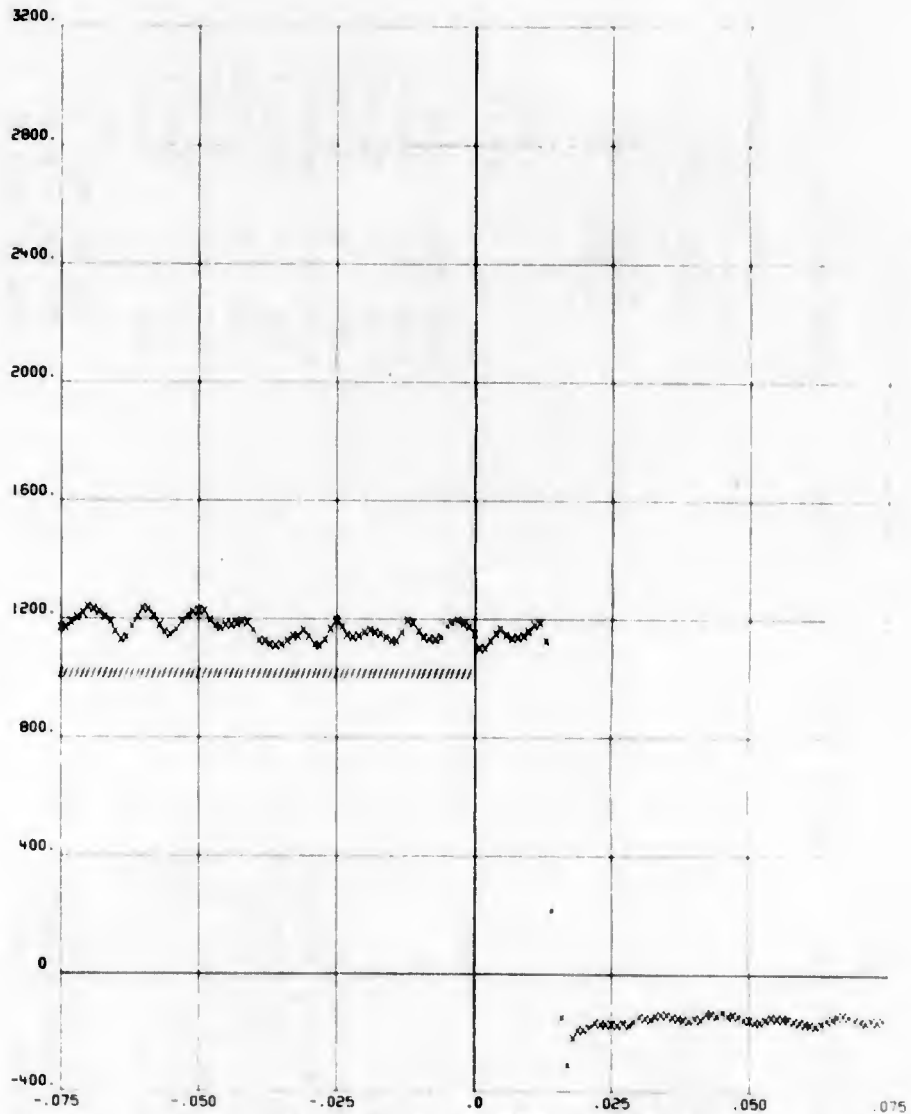
46.32 DEG F
 70.04 DEG F
 38.18 DEG F

SEPARATION VELOCITY
 DISPLACEMENT METHOD
 PRESSURE METHOD

***** FT/SEC
 ***** FT/SEC

1970-75 670AG018 2 MAY 77 MSN 1000 BOMB

SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



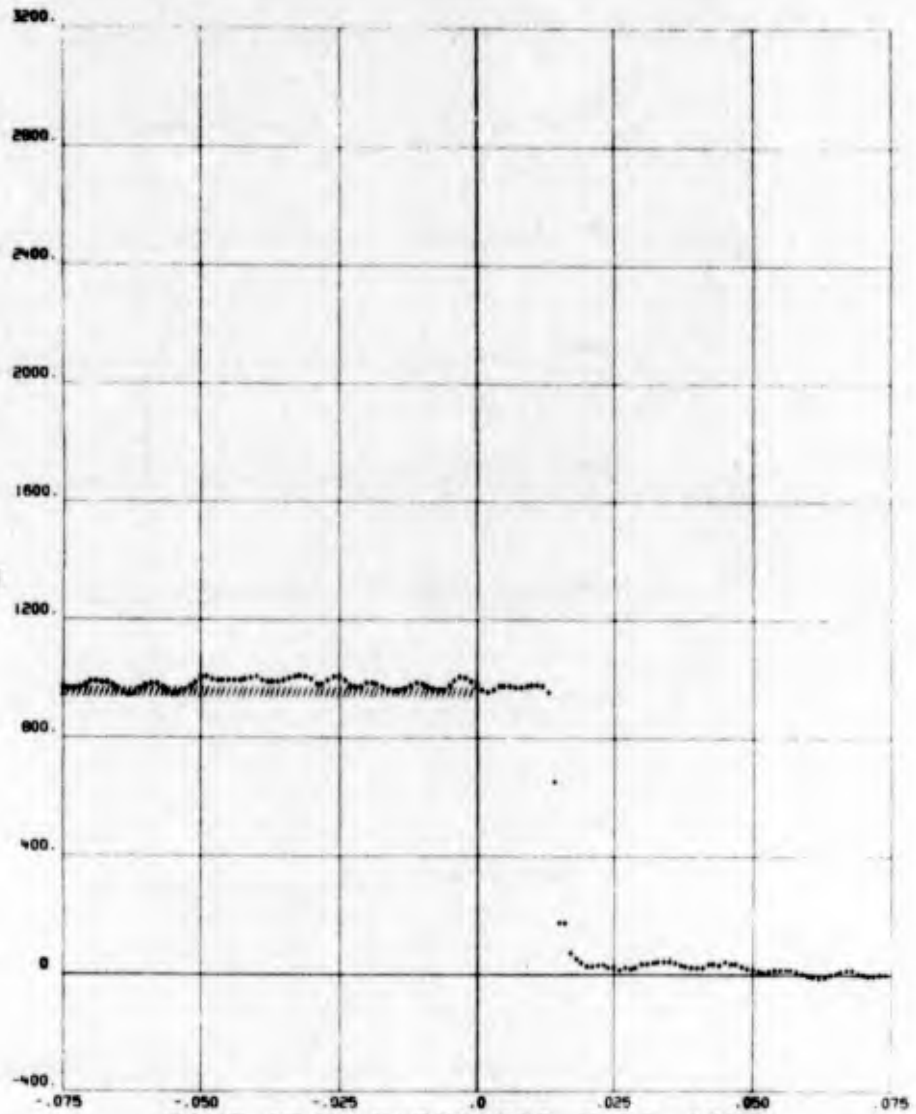
TIME FROM CARTRIDGE FIRE (SEC)

PREPARED BY: J. L. ADIC

AG018 23 MAY 72 MSN 1060 BOMB

84^{RMS} 65 0

▲ AIR
● WALL
○ BRAKE
□ BNT
* RIGHT FWD



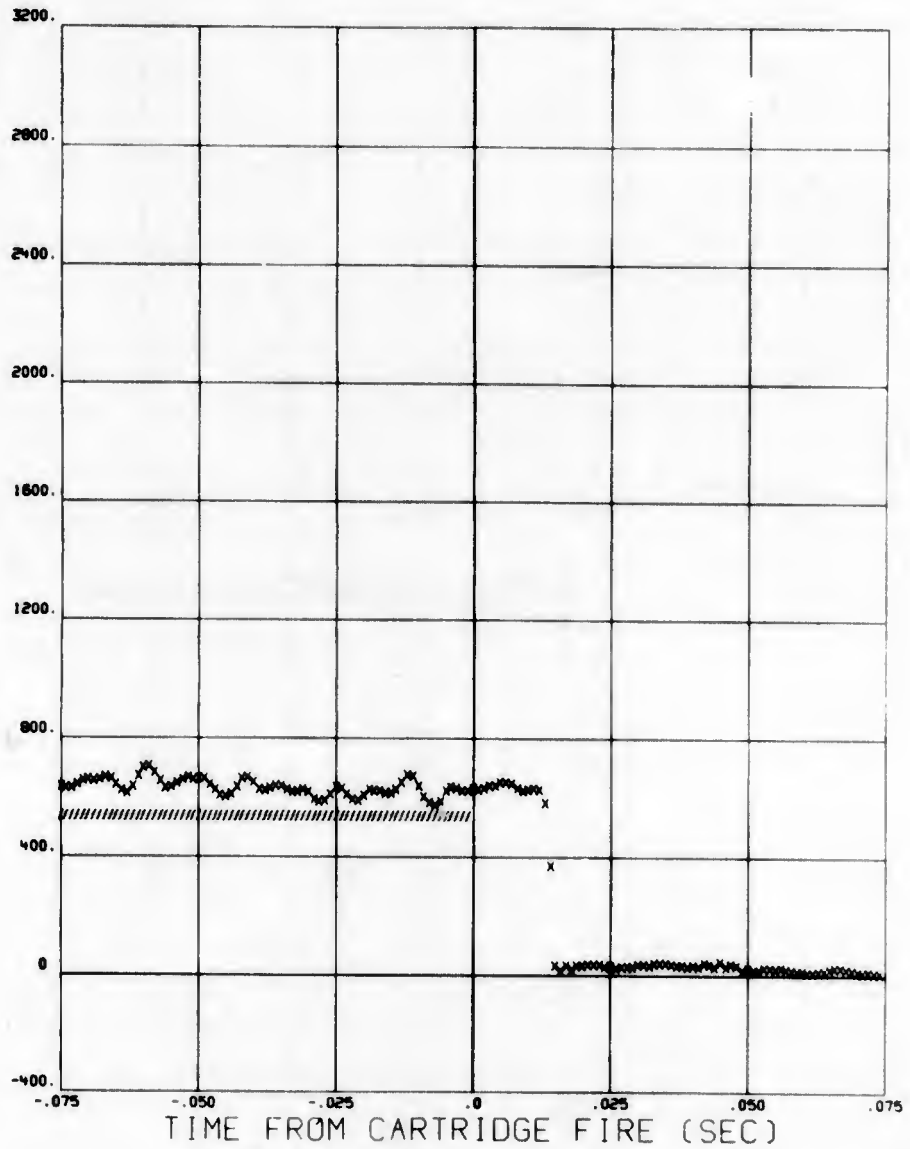
TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSA, ADIC

19 04 73 670AG018 23 MAY 72 MSN 106C BOMB

84^{R243} 66 0 7

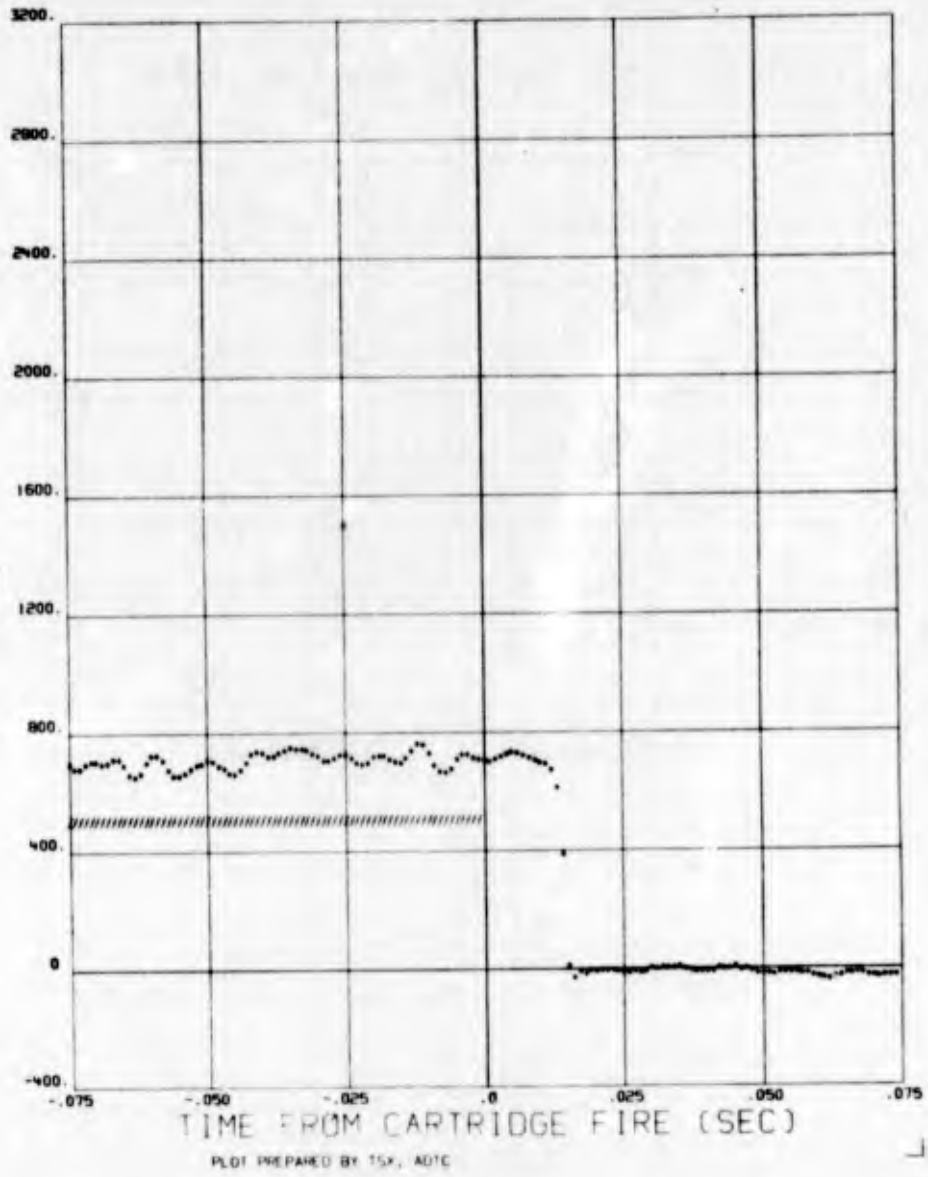
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



19 04 73 670AG018 23 MAY 72 MSN 106C BOMB

84^{R243} 67 07

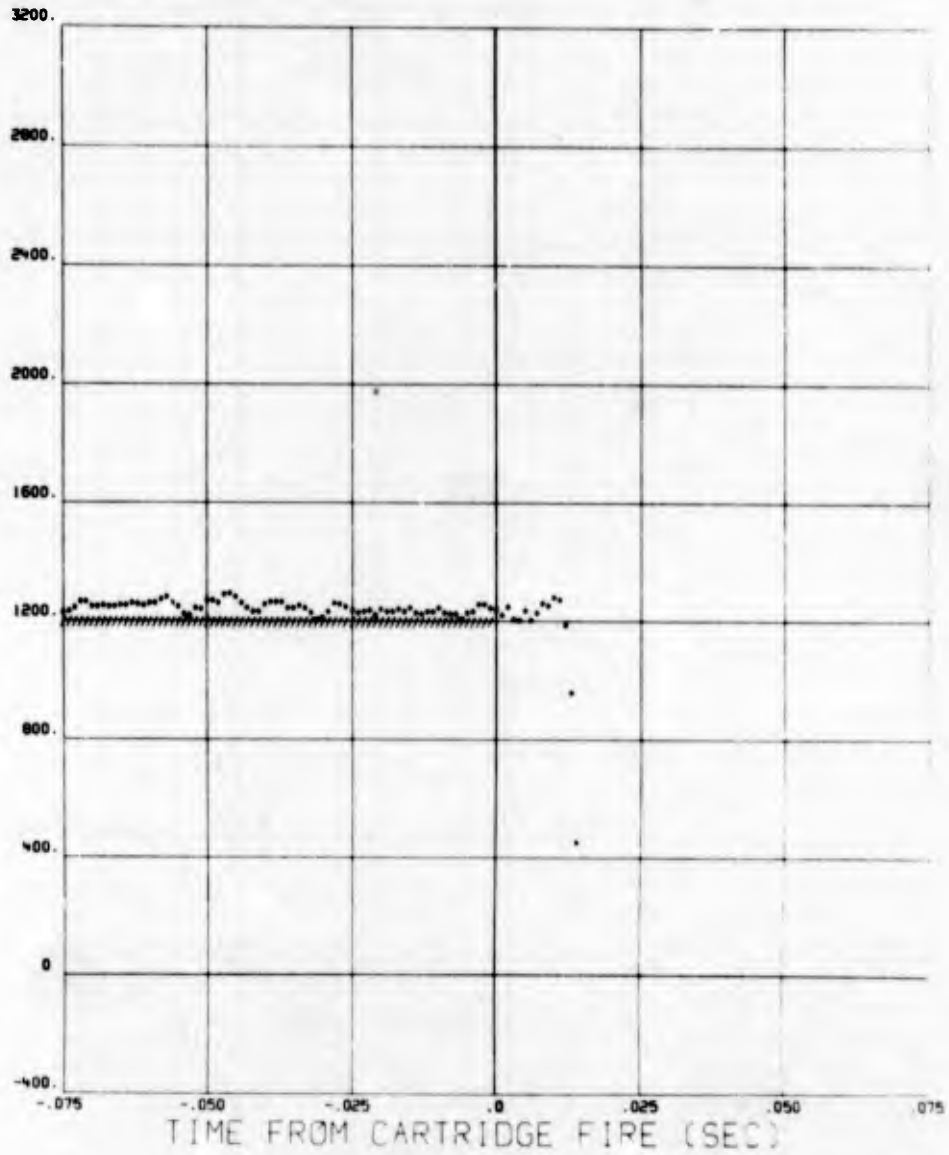
SWAY
BRACE
STRAIN
(LBS)
• - RIGHT AFT



19/04/73 670AG018 23 MAY 72 MSN 106C BOMB

84^{R2+3} 69

HOOK
REACTION
(LBS)
* = AFT



PLOT PREPARED BY TSX, ADIC

DATE 23 MAY 72 MISSION 106S BOMB ID 32 BOMB WEIGHT 509.75 LBS

EJECTOR MOMENT ARM
 TIME OF EJECTOR STROKE
 A/C ANGLE OF ATTACK AT RELEASE
 A/C PITCH ANGLE AT RELEASE
 A/C ROLL ANGLE AT RELEASE
 RACK EJECTION ANGLE

3.063 INCHES

 3.252 DEG
 .390 DEG
 1.560 DEG
 -48.000 DEG

IMPACT RANGE DEFLECTION

FEET FEET

RELEASE HISTORY
 PICKLE TIME
 CARTRIDGE FIRE
 INITIAL LINKAGE MOVEMENT
 EJECTOR FOOT (FIRST MOTION)
 STORE FIRST MOTION (FORWARD)
 STORE FIRST MOTION (AFT)
 EJECTOR FOOT FULL EXTENDED
 HOOK FIRST MOTION (FORWARD)
 HOOK FIRST MOTION (AFT)

TIME DELAY
 MILLISECONDS

HR MIN SEC
 *** **
 *** **
 *** **
 *** **
 22 7 26.450
 22 7 26.450
 22 7 26.522
 22 7 26.450
 22 7 26.450

 0
 0
 72
 0
 0

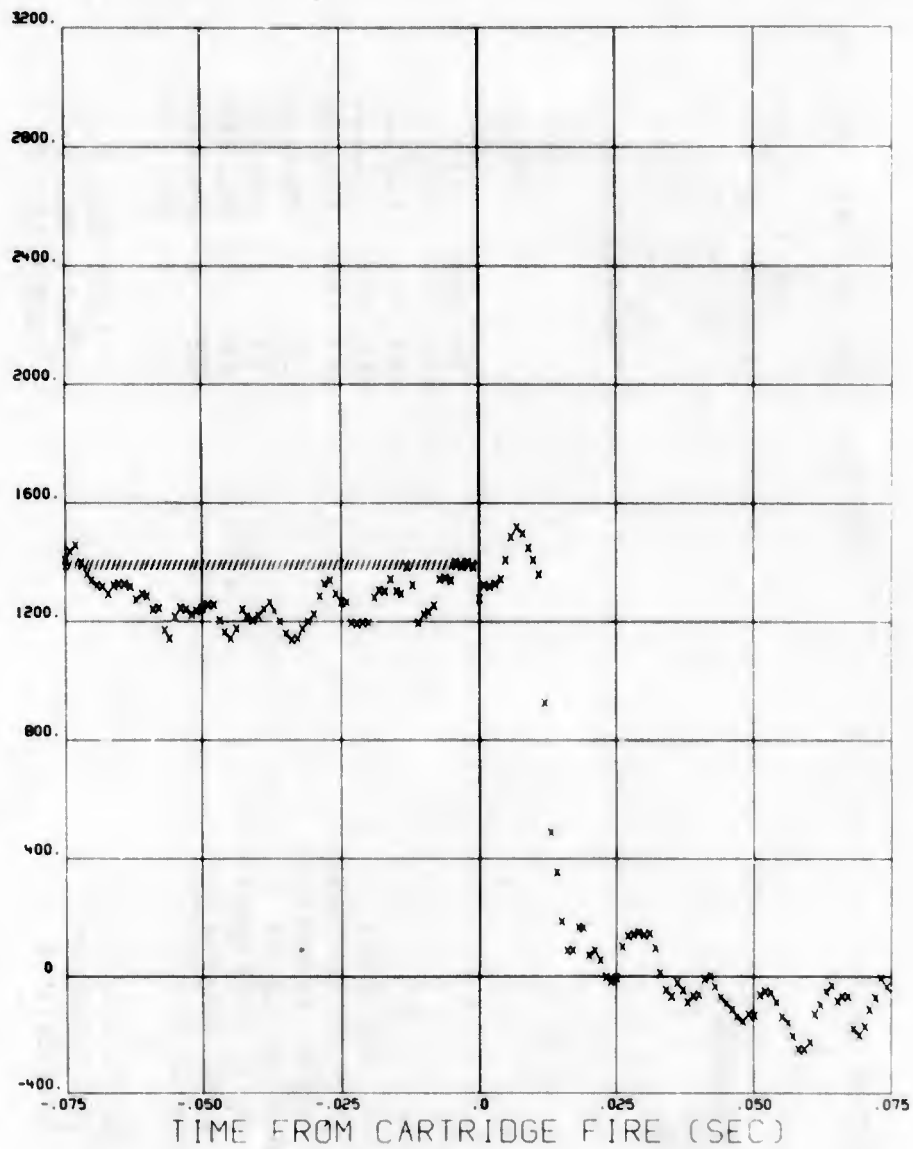
MAXIMUM PRE-FLT GROUND TEMPERATURE
 MAXIMUM POST-FLT GROUND TEMPERATURE
 MAXIMUM BREECH AMBIENT TEMPERATURE

46.32 DEG F
 70.04 DEG F
 38.03 DEG F

SEPARATION VELOCITY
 DISPLACEMENT METHOD
 PRESSURE METHOD

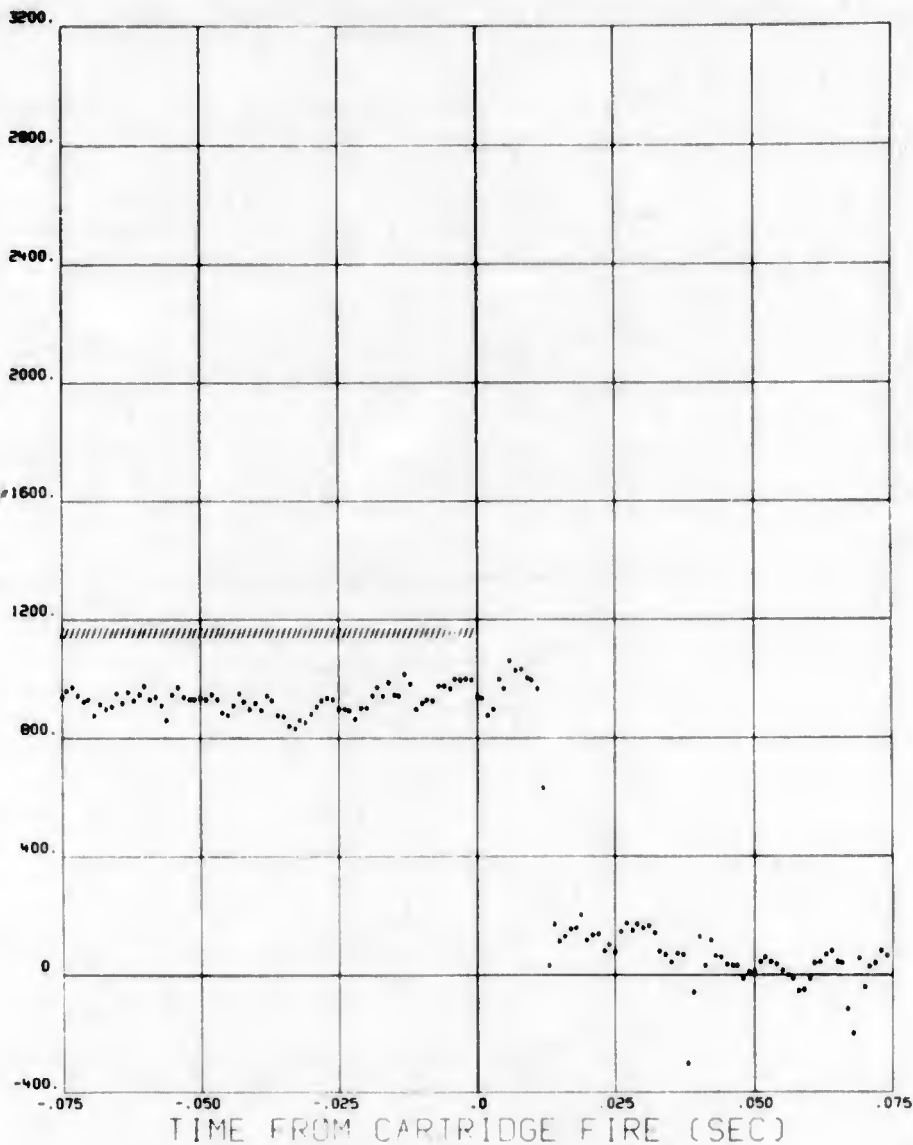
6.8 FT/SEC
 6.4 FT/SEC

SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



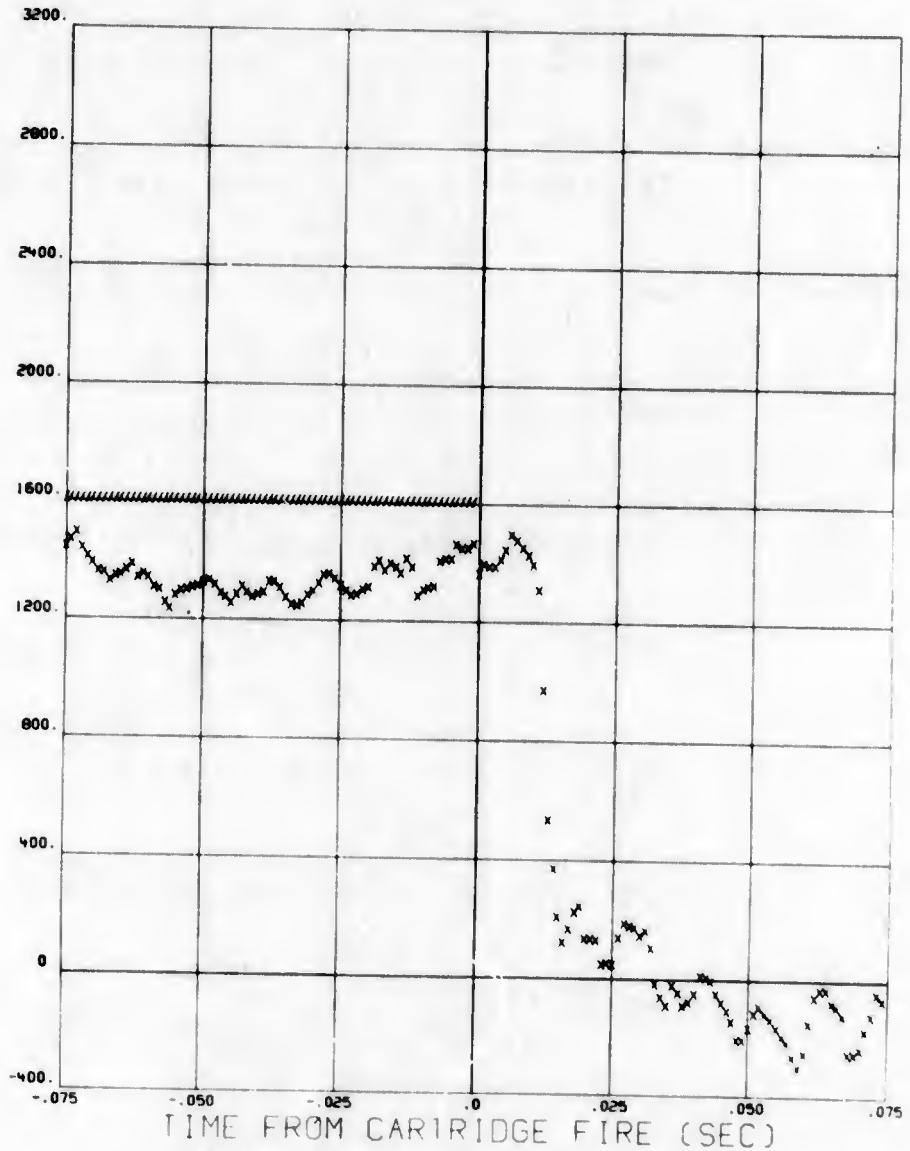
PLOT PREPARED BY TSX, ADTC

SWAY
BRACE
STRAIN
(LBS)
▶ = RIGHT FWD



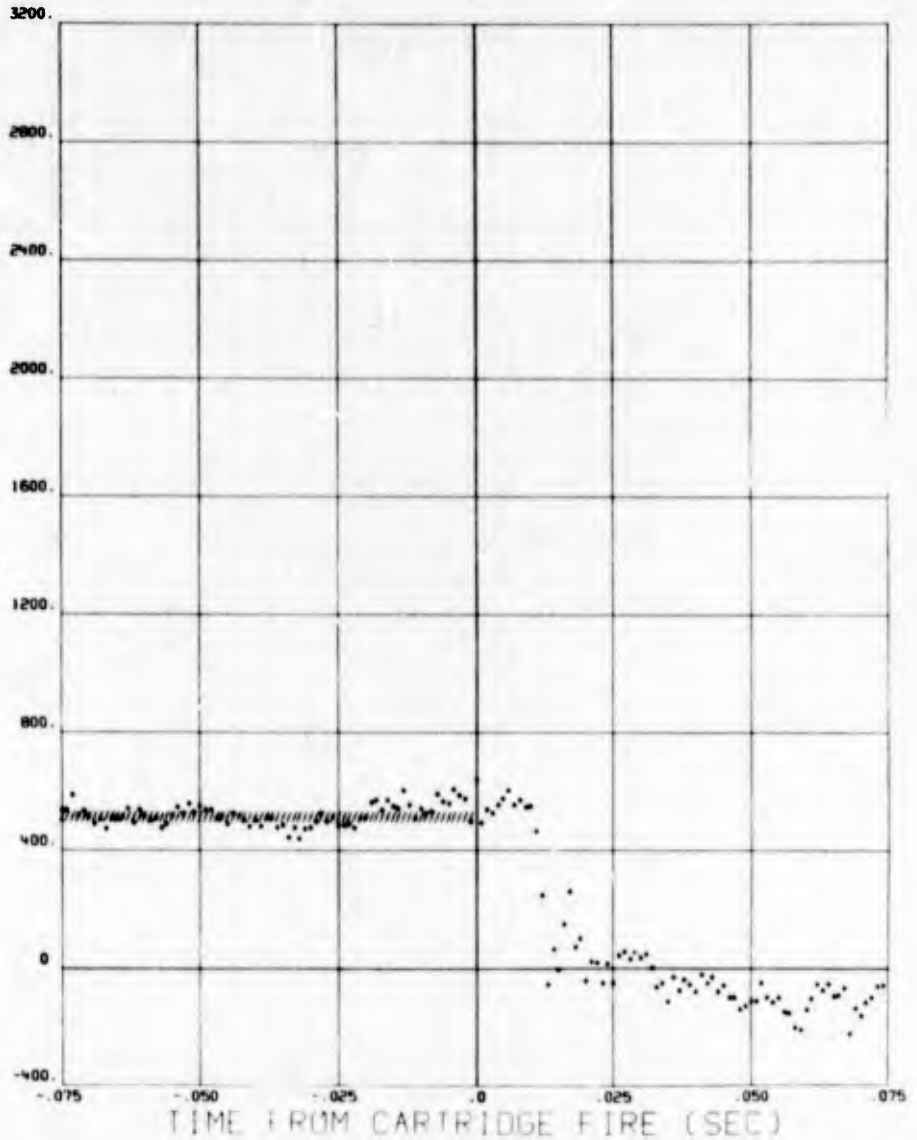
PLOT PREPARED BY ISX, ADTC

SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



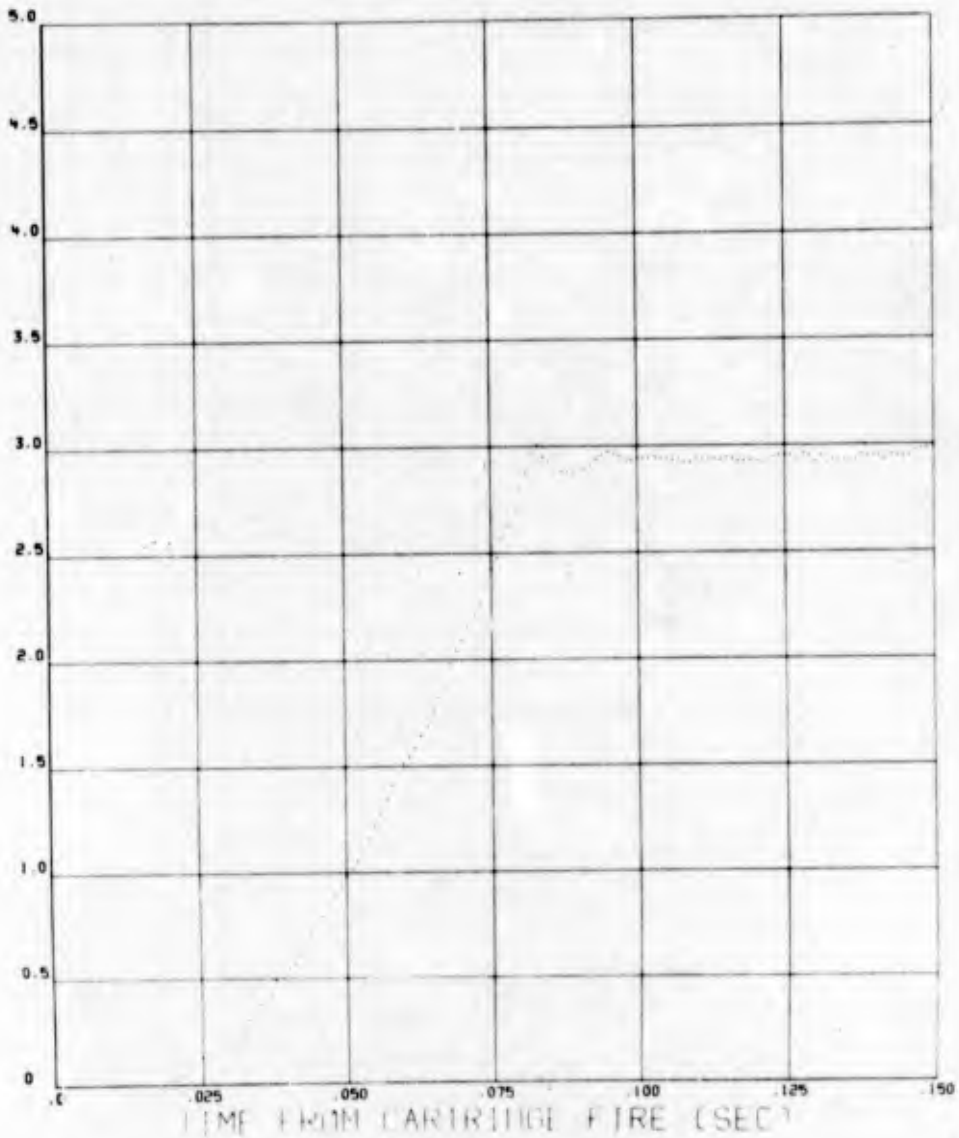
PLOT PREPARED BY TSX, ADIC

SWAY
BRACE
STRAIN
(LBS)
• = RIGHT AFT



PLOT PREPARED BY ISX, ADTC

EJECTOR
FOOT
POSITION
(INCHES)

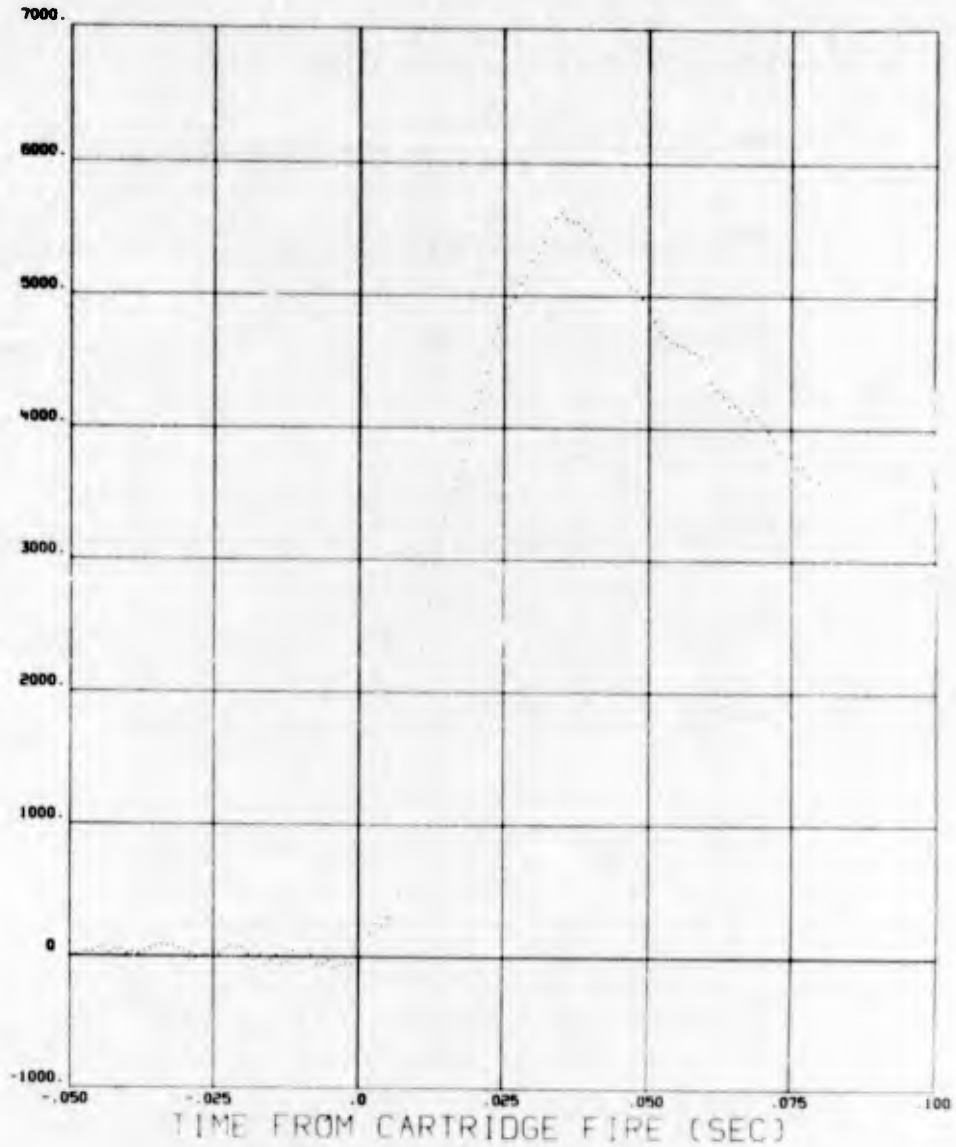


PL 01 198 1 048 01 158, ADI

6704G018 23 MAY 72 MSN 106S BOMB

32^{R243}₈₀ 07

EJECTION
CHAMBER
PRESSURE
(PSI)

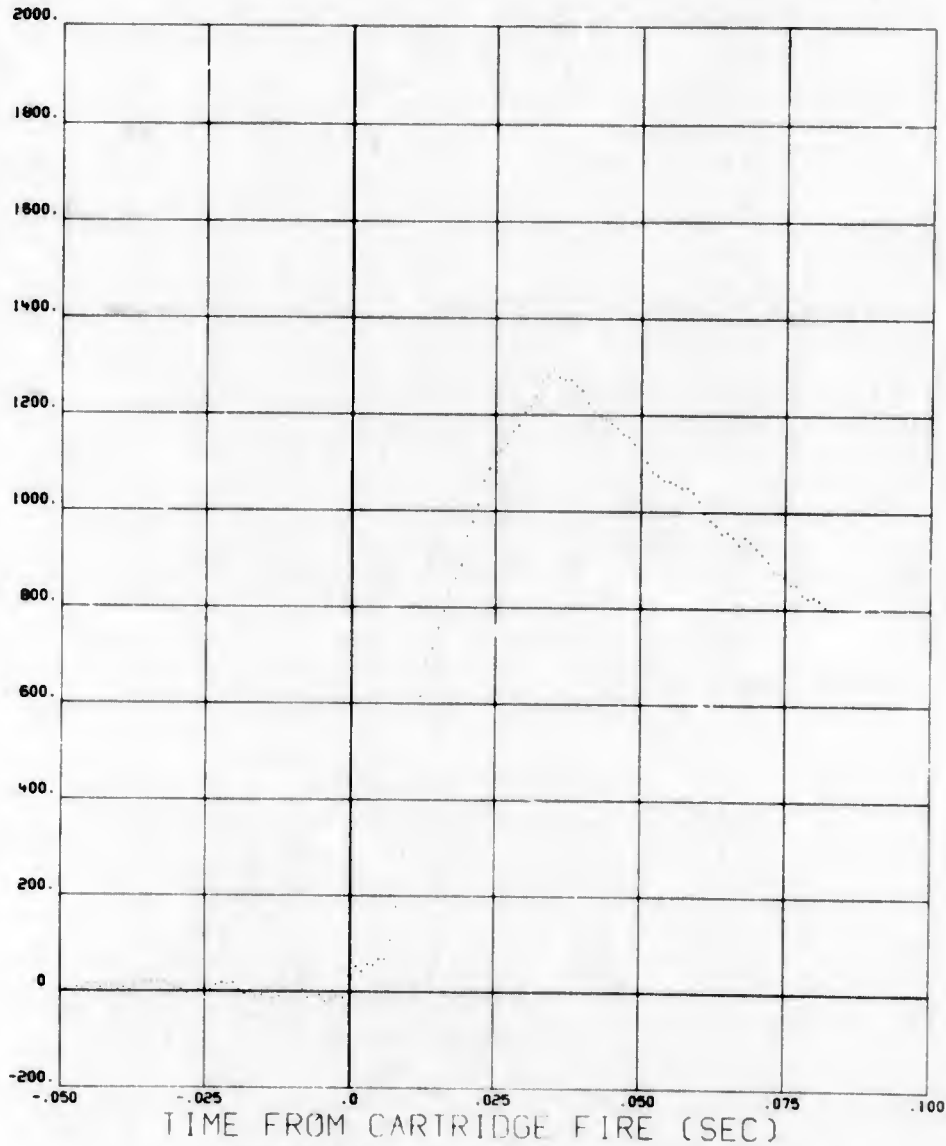


PLOT PREPARED BY TSX, ADIC

19/04/73 670AG018 23 MAY 72 MSN 106S BOMB

32^{R243} 01 07

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY 15X, ADIC

DATE 23 MAY 72 MISSION 107C BOMB ID 25 BOMB WEIGHT 503.25 LBS

EJECTOR MOMENT ARM
 TIME OF EJECTOR STROKE
 A/C ANGLE OF ATTACK AT RELEASE
 A/C PITCH ANGLE AT RELEASE
 A/C ROLL ANGLE AT RELEASE
 RACK EJECTION ANGLE

3.125 INCHES
 ***** SEC
 3.159 DEG
 .430 DEG
 2.640 DEG
 0.000 DEG

IMPACT RANGE DEFLECTION

FEET FEET

RELEASE HISTORY

PICKLE TIME
 CARTRIDGE FIRE
 INITIAL LINKAGE MOVEMENT
 EJECTOR FOOT (FIRST MOTION)
 STORE FIRST MOTION (FORWARD)
 STORE FIRST MOTION (AFT)
 EJECTOR FOOT FULL EXTENDED
 HOOK FIRST MOTION (FORWARD)
 HOOK FIRST MOTION (AFT)

HR	MIN	SEC
22	0	19.561
22	0	19.567
22	0	19.570
22	0	19.569
22	0	19.637
22	0	19.570
22	0	19.569

TIME DELAY
 MILLISECONDS

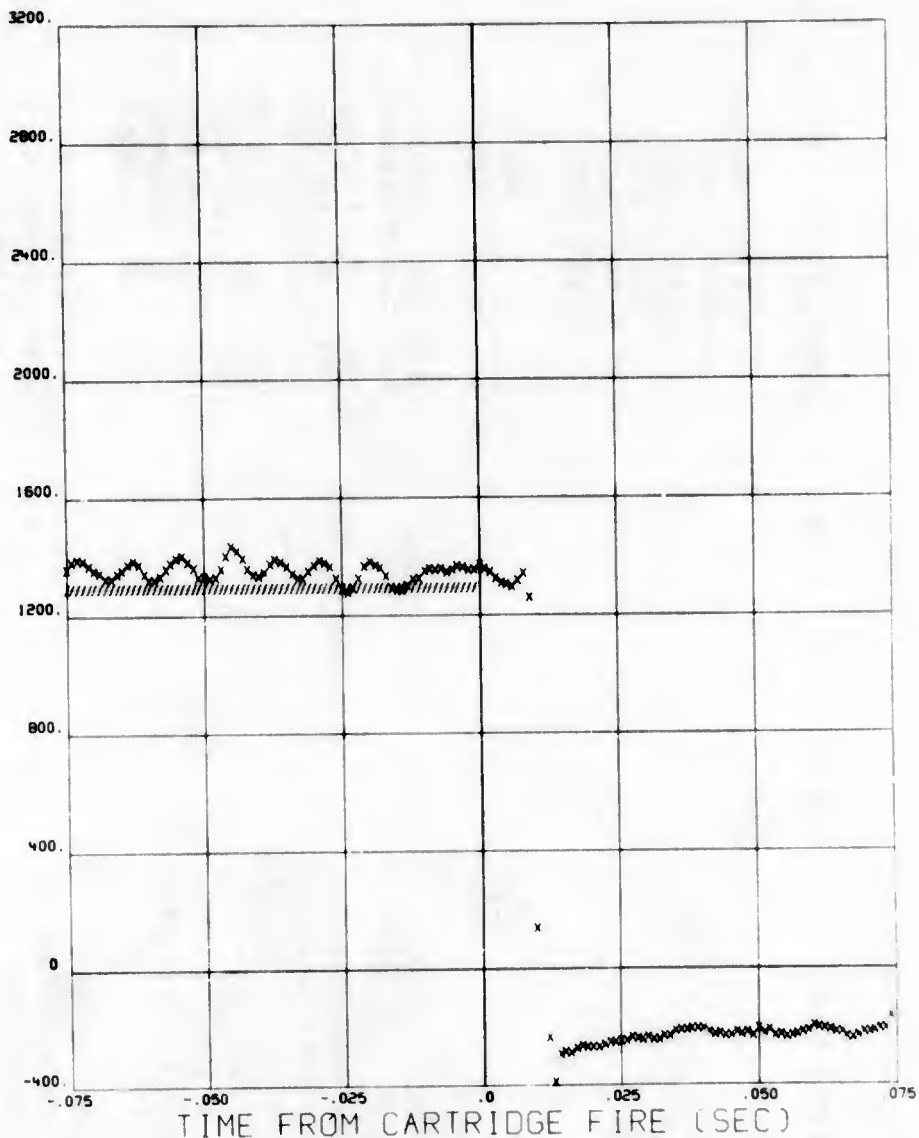
MAXIMUM PRE-FLT GROUND TEMPERATURE
 MAXIMUM POST-FLT GROUND TEMPERATURE
 MAXIMUM BREACH AMBIENT TEMPERATURE

70.47 DEG F
 79.93 DEG F
 47.12 DEG F

SEPARATION VELOCITY
 DISPLACEMENT METHOD
 PRESSURE METHOD

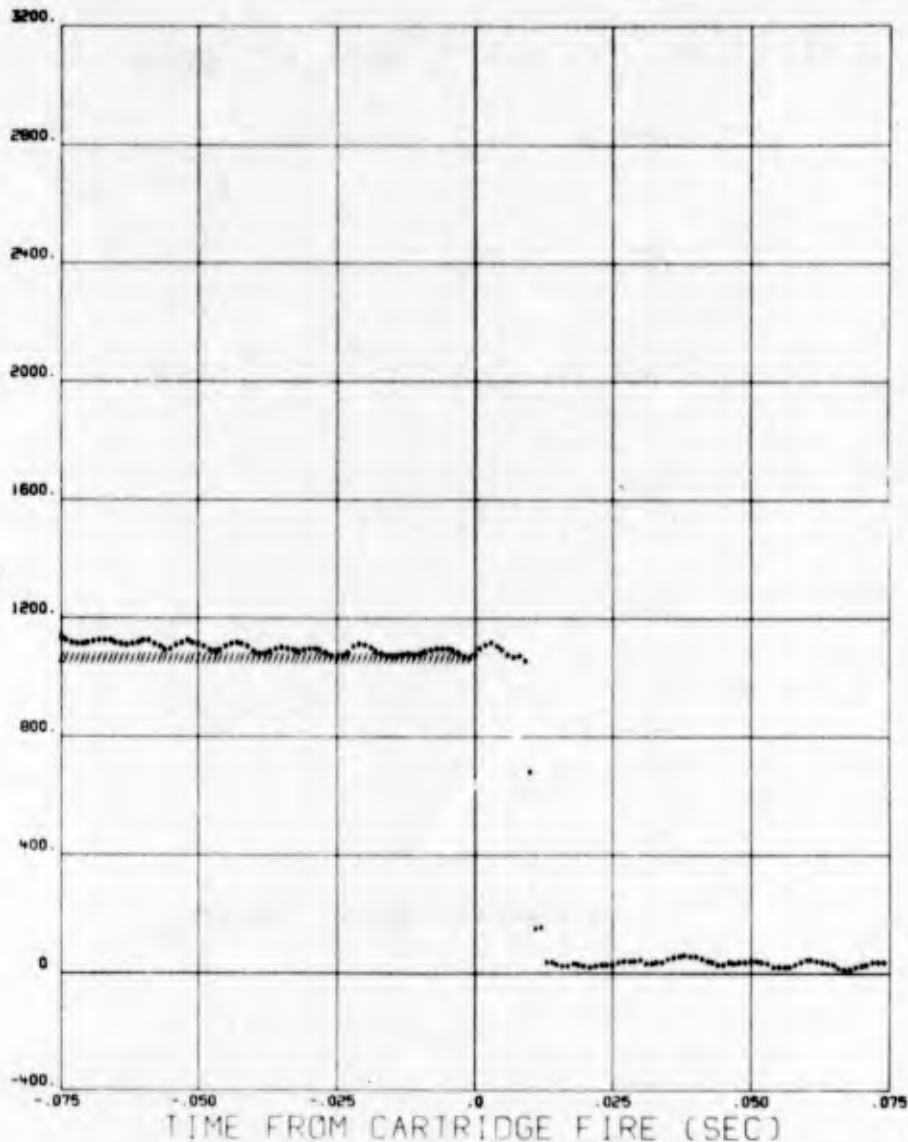
7.6 FT/SEC

SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



PLOT PREPARED BY TSX, ADTC

SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD

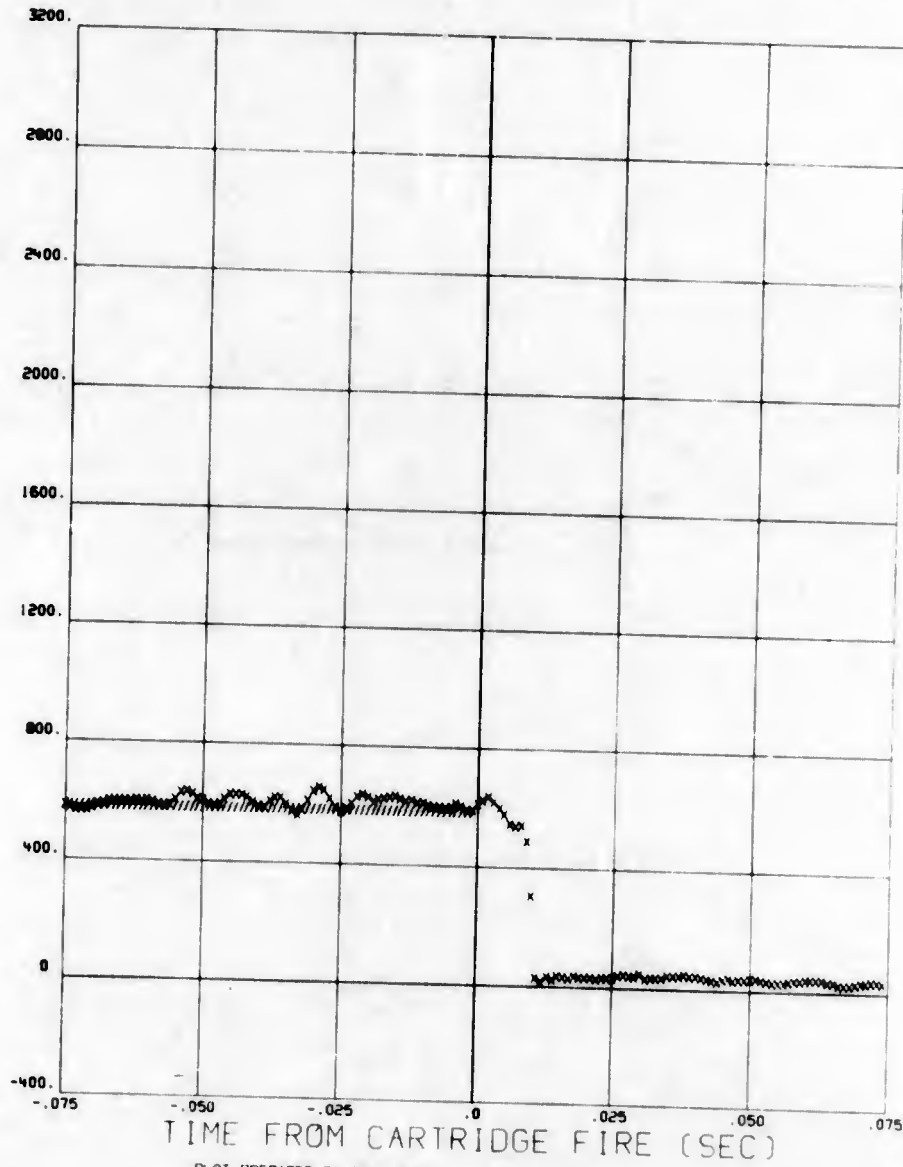


PLOT PREPARED BY TSX, ADTC

19 04/73 670AG018 23 MAY 72 MSN 107C BOMB

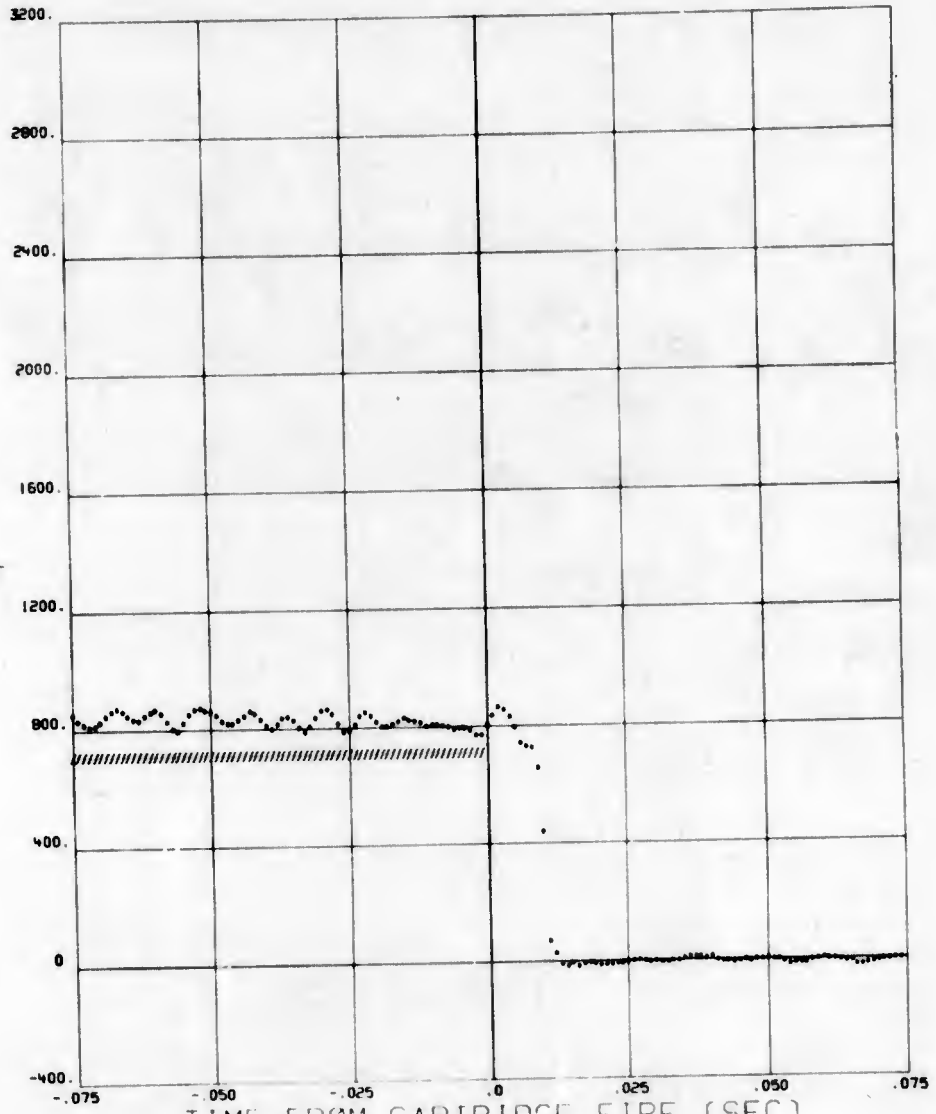
25^{R243}₈₄ 07

SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



PLOT PREPARED BY TSX, ADTC

SWAY
BRACE
TRAIN
LBS)
* = RIGHT AFT



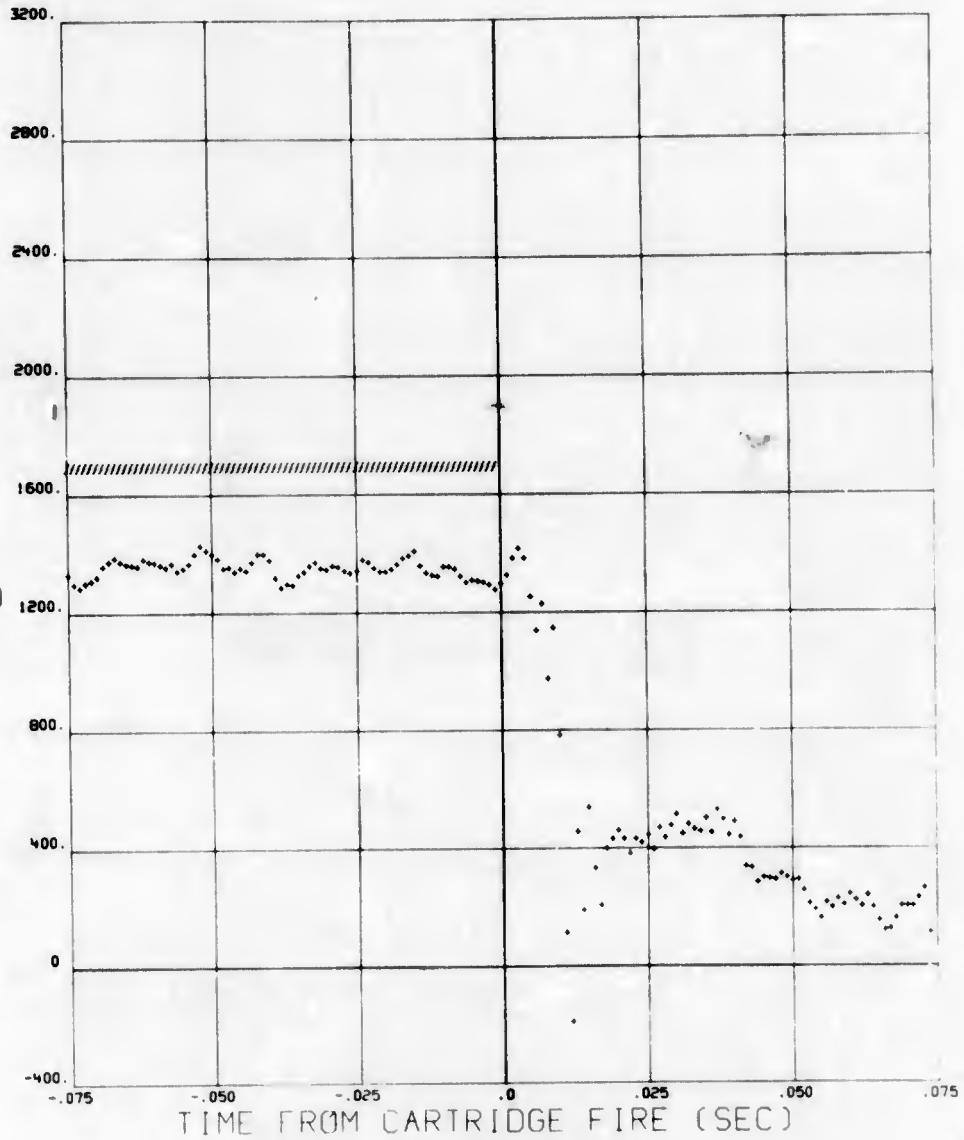
TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY 15X, ADTC

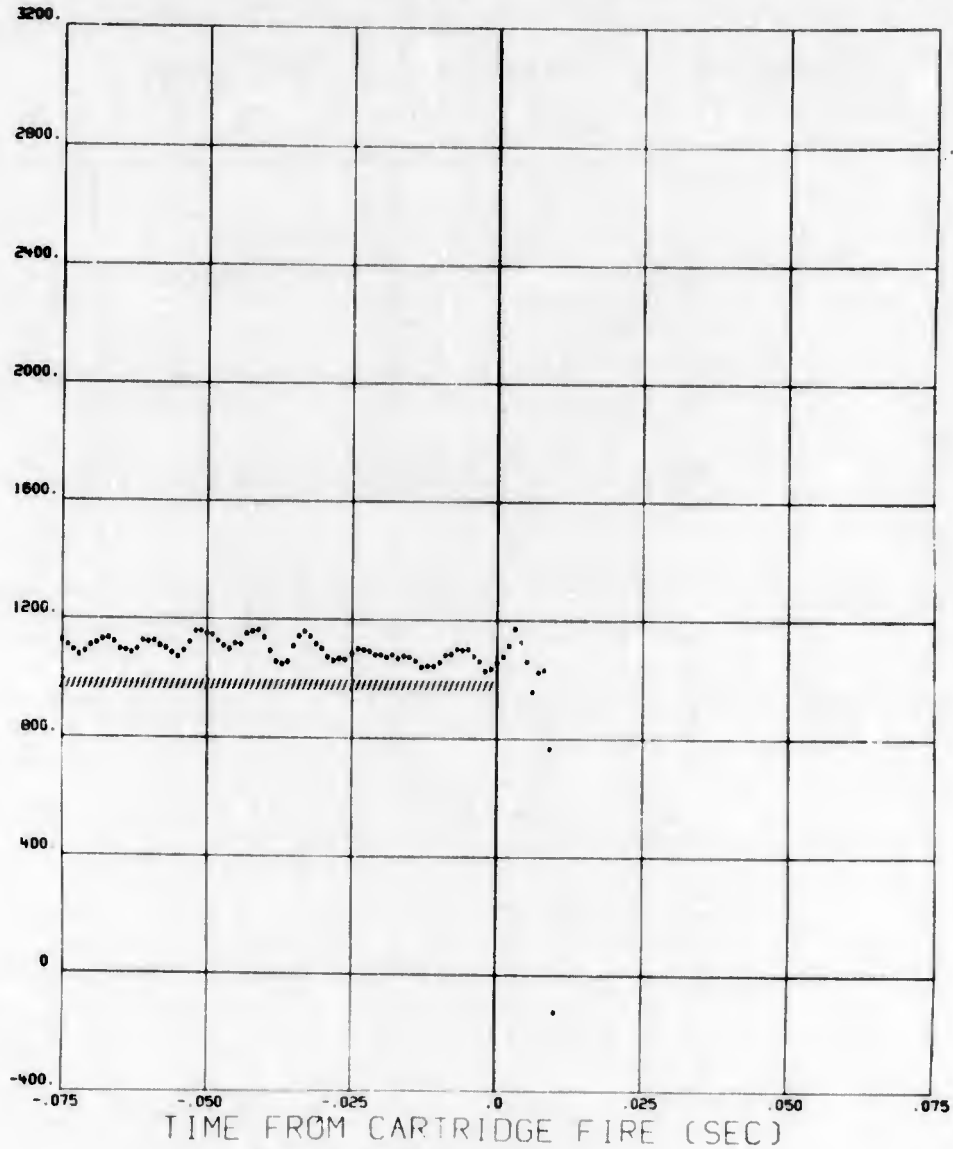
19/04/73 670AG018 23 MAY 72 MSN 107C BOMB

25^{R243} 86 07

HOOK
REACTION
(LBS)
+ = FORWARD



HOOK
REACTION
(LBS)
* = AFT

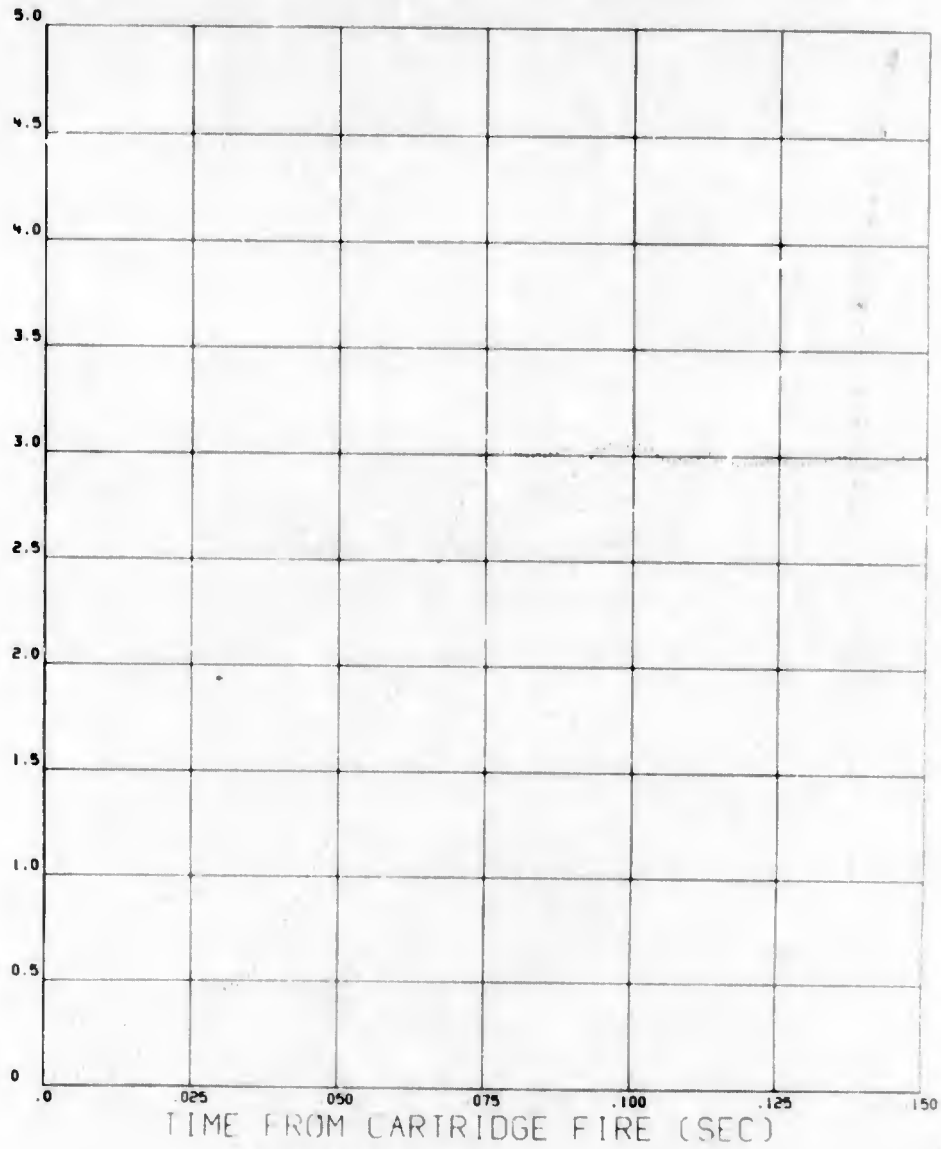


PLT PREPARED BY TSX, ADIC

19/04/73 670AG018 23 MAY 72 MSN 107C BOMB

25^{R243} 88 0

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY TSK, ADTC

DATE 24 MAY 72 MISSION 108C BOMB ID 160 BOMB WEIGHT 503.00 LBS

EJECTOR MOMENT ARM
TIME OF EJECTOR STROKE
A/C ANGLE OF ATTACK AT RELEASE
A/C PITCH ANGLE AT RELEASE
A/C ROLL ANGLE AT RELEASE
RACK EJECTION ANGLE

2.938 INCHES
.065 SEC
3.172 DEG
1.310 DEG
1.120 DEG
0.000 DEG

FEET
FEET

TIME DELAY
MILLISECONDS

HR MIN SEC
*** **
22 27 7.391
22 27 7.402
22 27 7.404
22 27 7.403
22 27 7.402
22 27 7.469
22 27 7.403
22 27 7.402

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*** **

54.28 DEG F
61.00 DEG F
49.83 DEG F

7.1 FT/SEC
7.9 FT/SEC

7.1 FT/SEC
7.9 FT/SEC

7.1 FT/SEC
7.9 FT/SEC

7.1 FT/SEC
7.9 FT/SEC

7.1 FT/SEC
7.9 FT/SEC

7.1 FT/SEC
7.9 FT/SEC

7.1 FT/SEC
7.9 FT/SEC

7.1 FT/SEC
7.9 FT/SEC

7.1 FT/SEC
7.9 FT/SEC

7.1 FT/SEC
7.9 FT/SEC

7.1 FT/SEC
7.9 FT/SEC

7.1 FT/SEC
7.9 FT/SEC

7.1 FT/SEC
7.9 FT/SEC

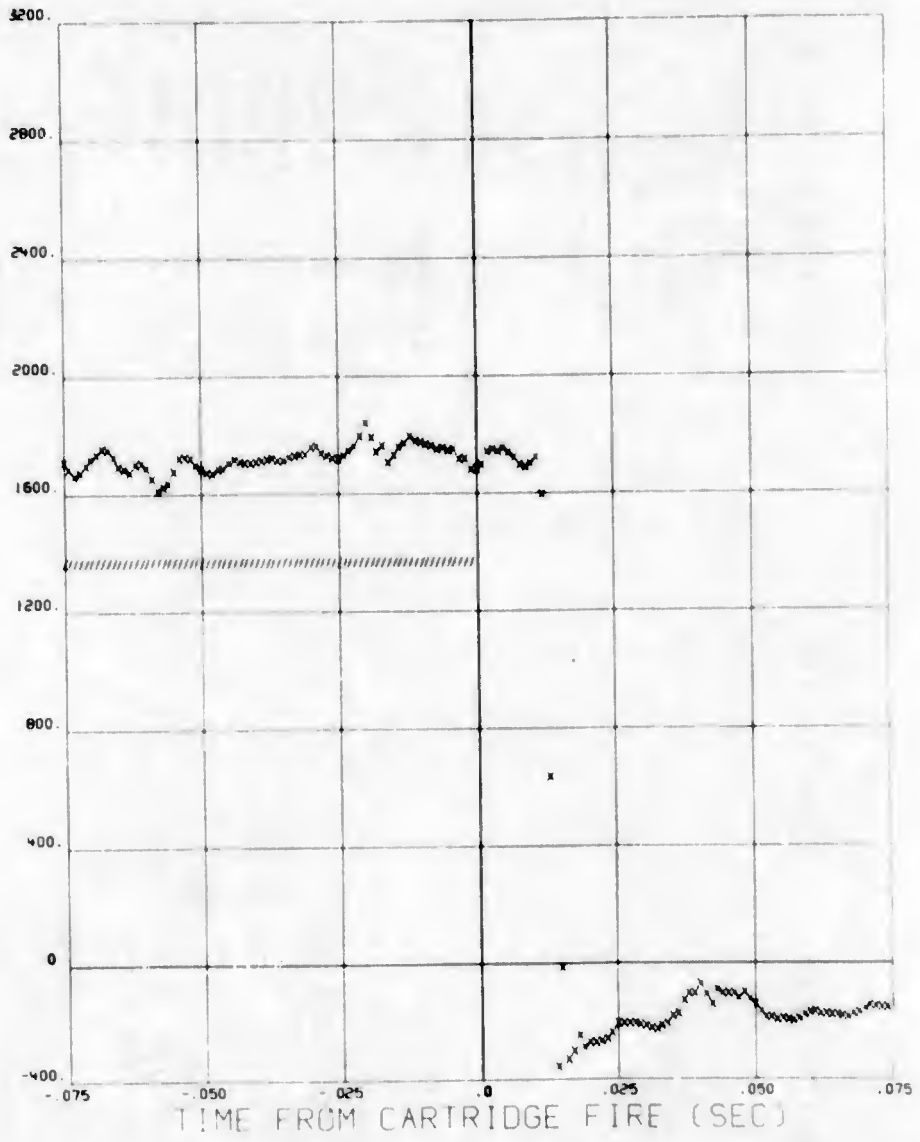
7.1 FT/SEC
7.9 FT/SEC

7.1 FT/SEC
7.9 FT/SEC

19 04 73 670AG018 24 MAY 72 MSN 108C BOMB 160

R243
91 0

SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD

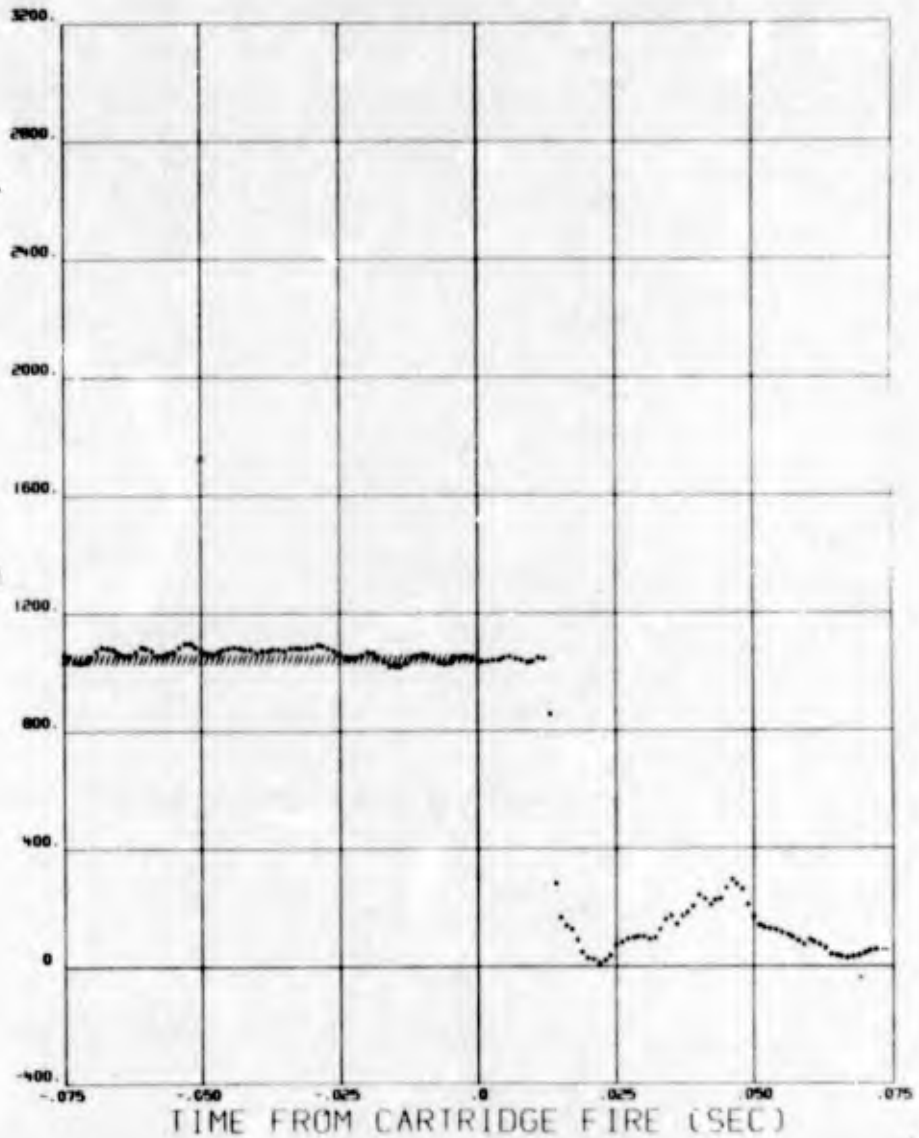


PLT PREPARED BY TSX, ADIC

19 04 73 670AG018 24 MAY 72 MSN 108C BOMB 160

PP-5 92 0

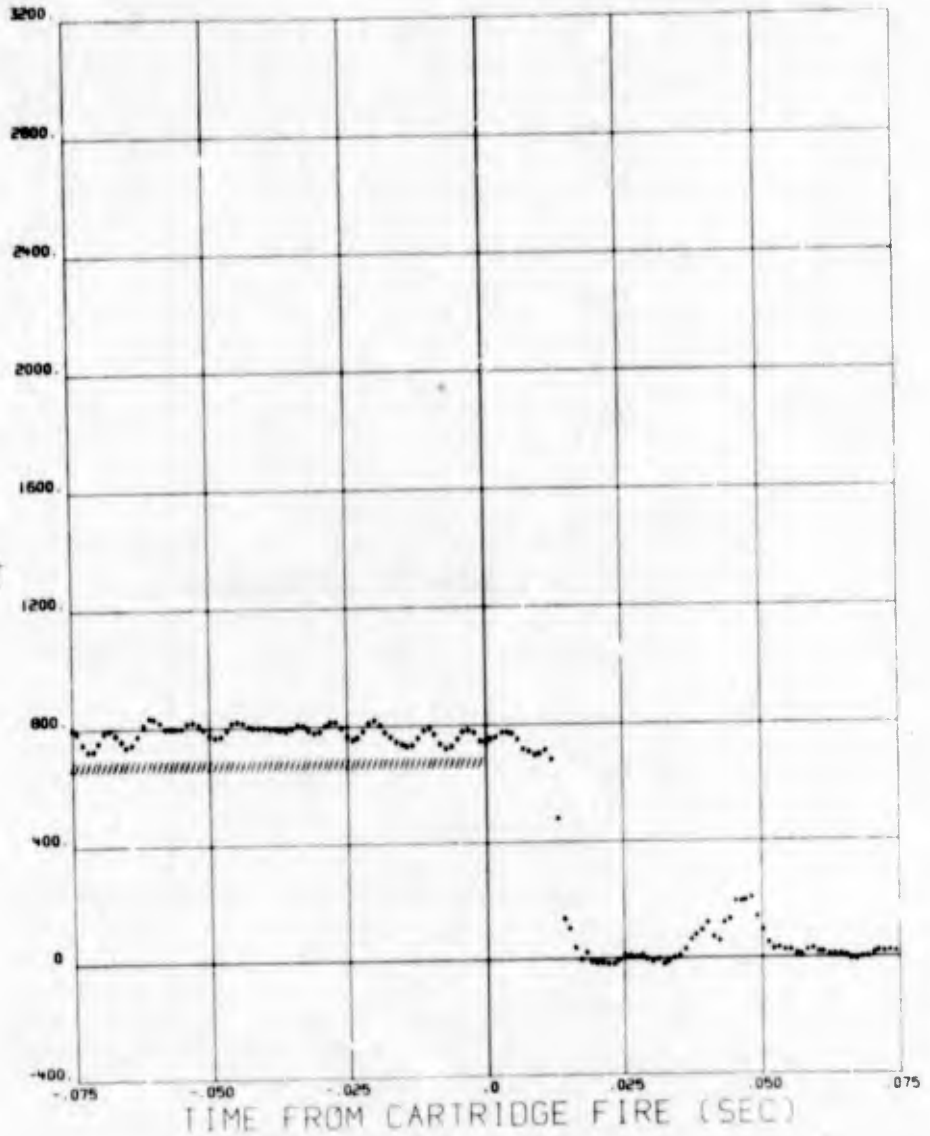
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



19/04/73 670AG018 24 MAY 72 MSN 108C BOMB 160

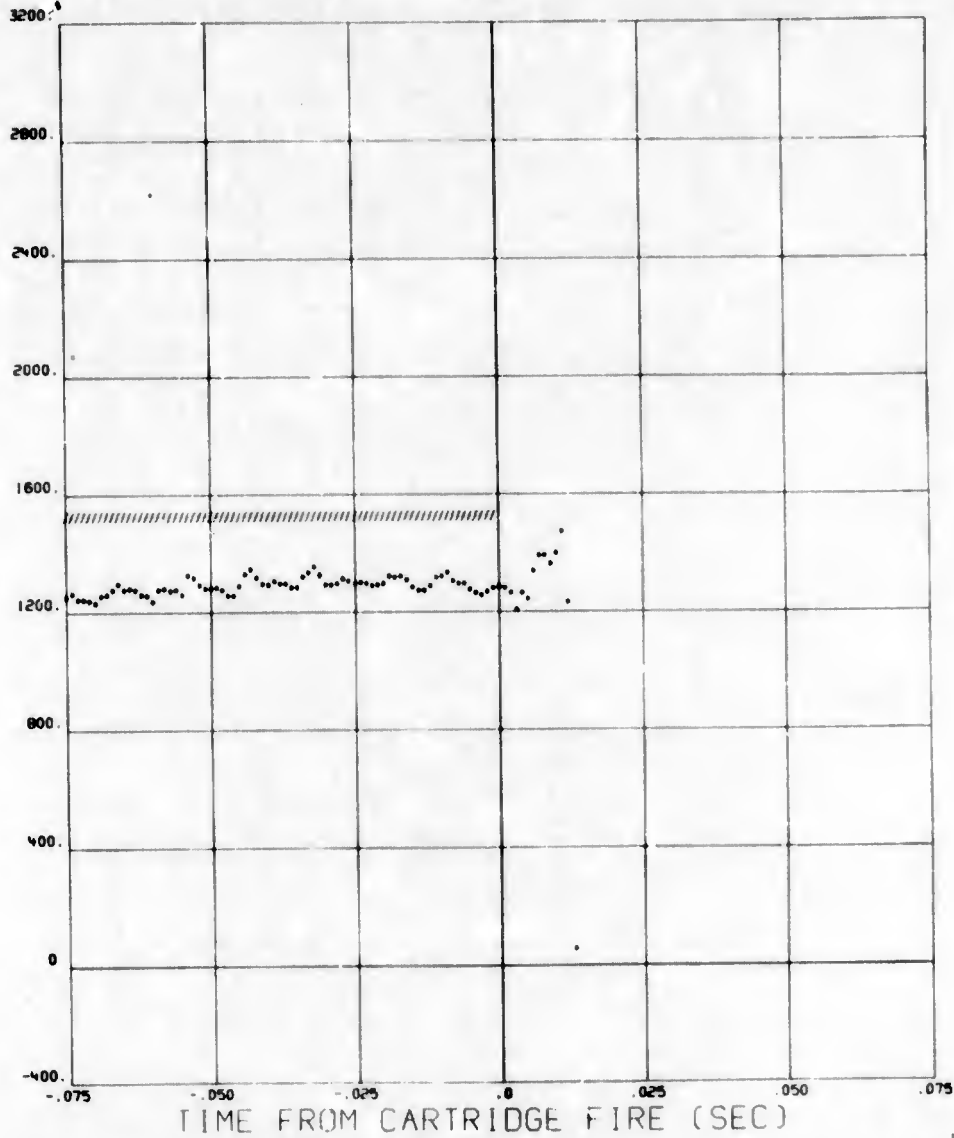
R24.3
34 0 1

SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



PLOT PREPARED BY TSX, ADTC

HOOK
REACTION
(LBS)
* = AFT

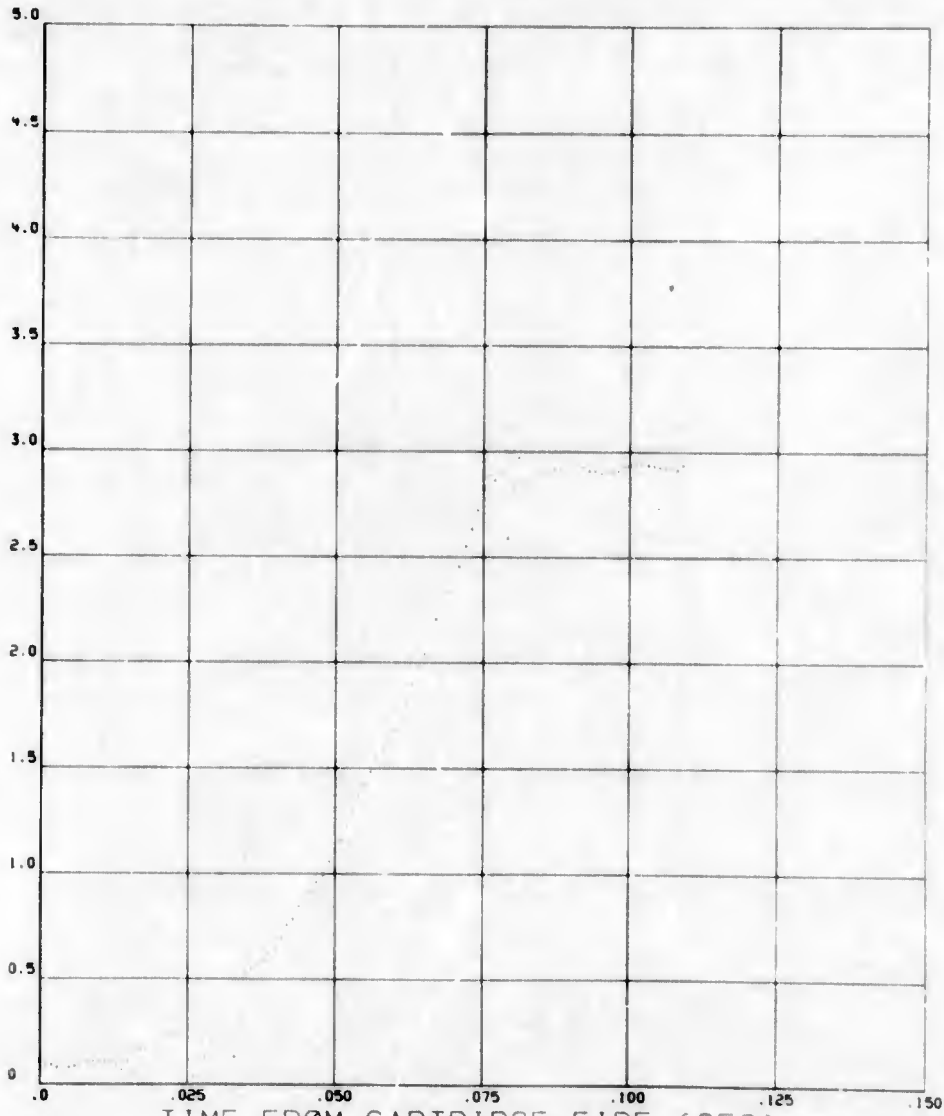


PILOT PREPARED BY 15X, ADIC

19/04/73 670AG018 24 MAY 72 MSN 108C BOMB 160

R243
97 0

EJECTOR
FOOT
POSITION
(INCHES)



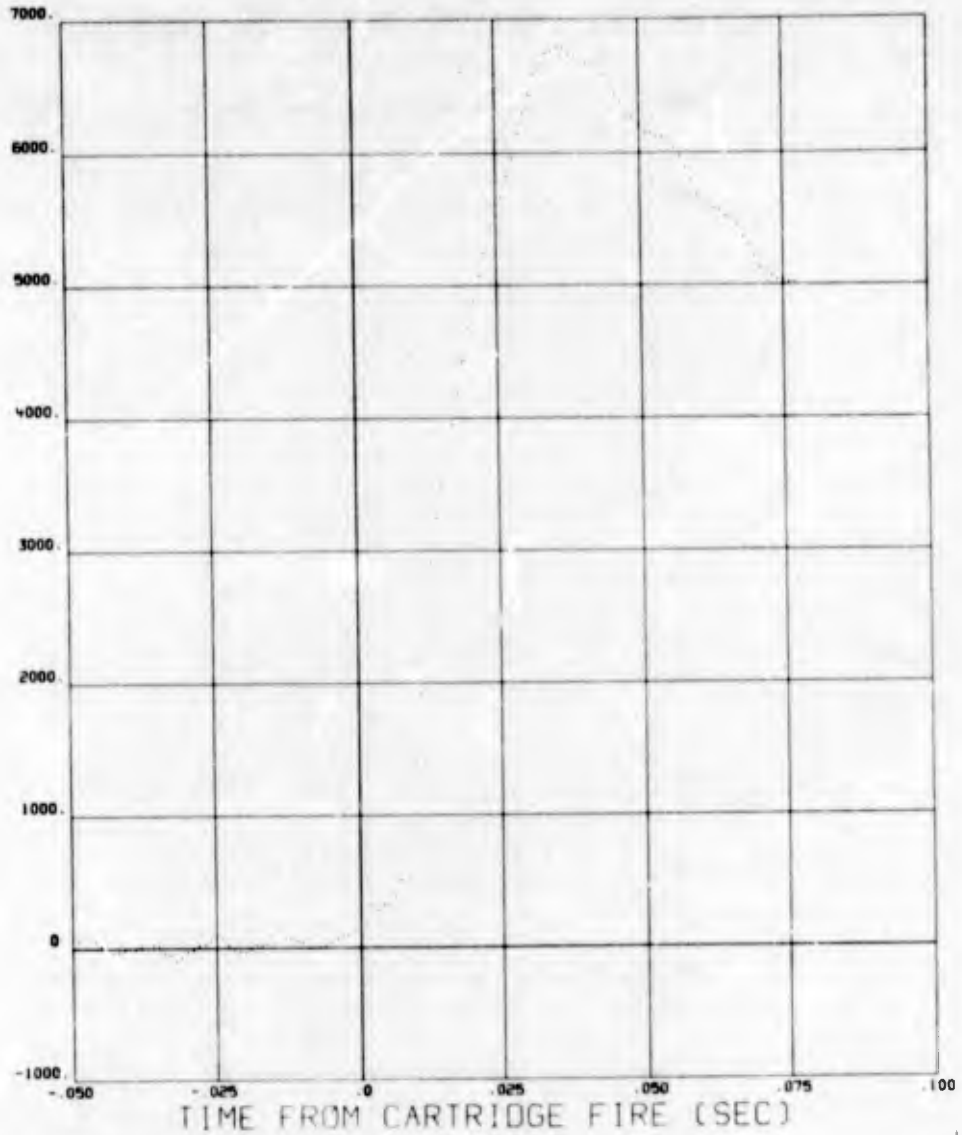
TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

19 04 73 670AG018 24 MAY 72 MSN 108C BOMB 160

R243 98 0 7

EJECTION
CHAMBER
PRESSURE
(PSI)

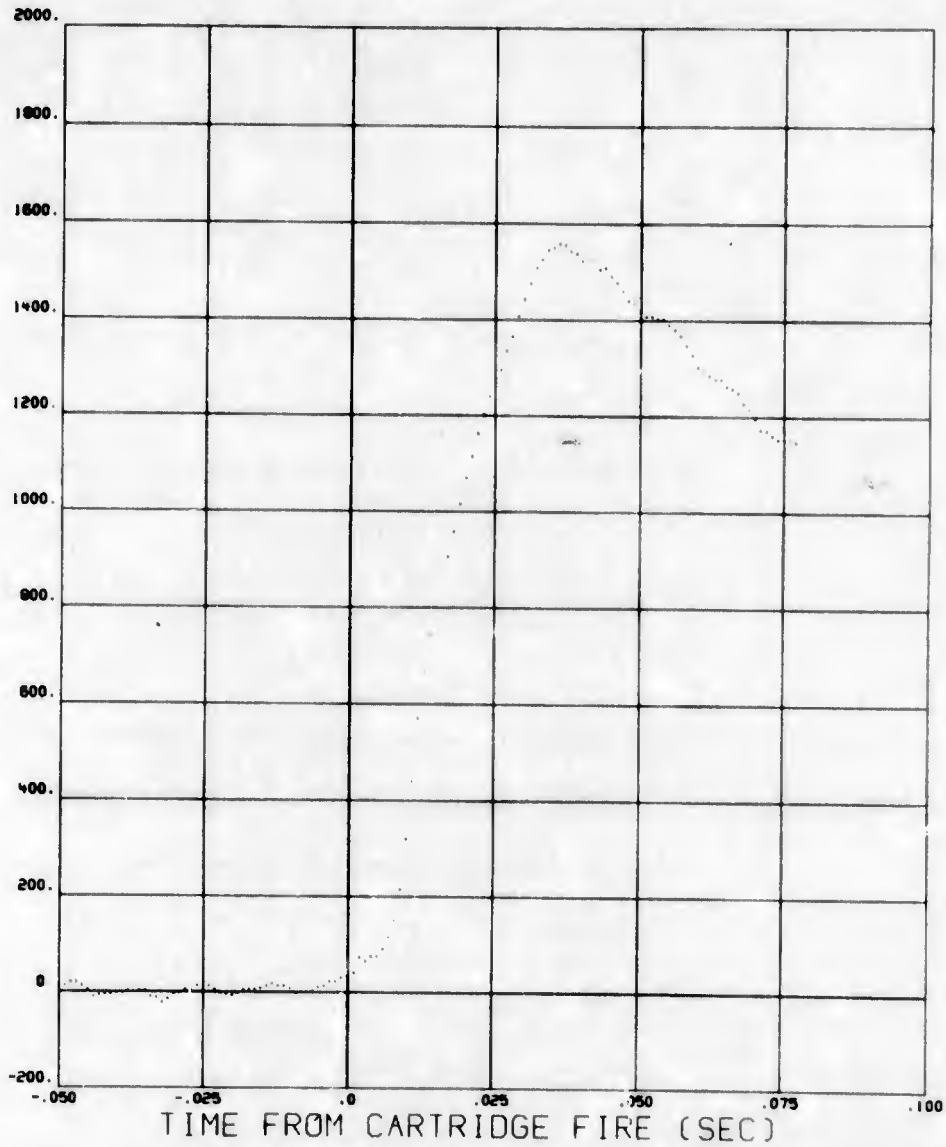


PLOT PREPARED BY TSX, ADTC

19/04/73 670AG018 24 MAY 72 MSN 108C BOMB 160

R243
99 07

EJECTOR
FOOT
FORCE
(LBS)



DATE 24 MAY 72 MISSION 108S BOMB ID 1050 BOMB WEIGHT 512.25 LBS

EJECTOR MOMENT ARM
TIME OF EJECTOR STROKE
A/C ANGLE OF ATTACK AT RELEASE
A/C PITCH ANGLE AT RELEASE
A/C ROLL ANGLE AT RELEASE
RACK EJECTION ANGLE

2.563 INCHES
.071 SEC
3.505 DEG
1.360 DEG
.725 DEG
-48.000 DEG

IMPACT RANGE DEFLECTION

RELEASE HISTORY
PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

HR MIN SEC
*** **

22	27	38.648
22	27	38.650
22	27	38.649
22	27	38.649
22	27	38.721

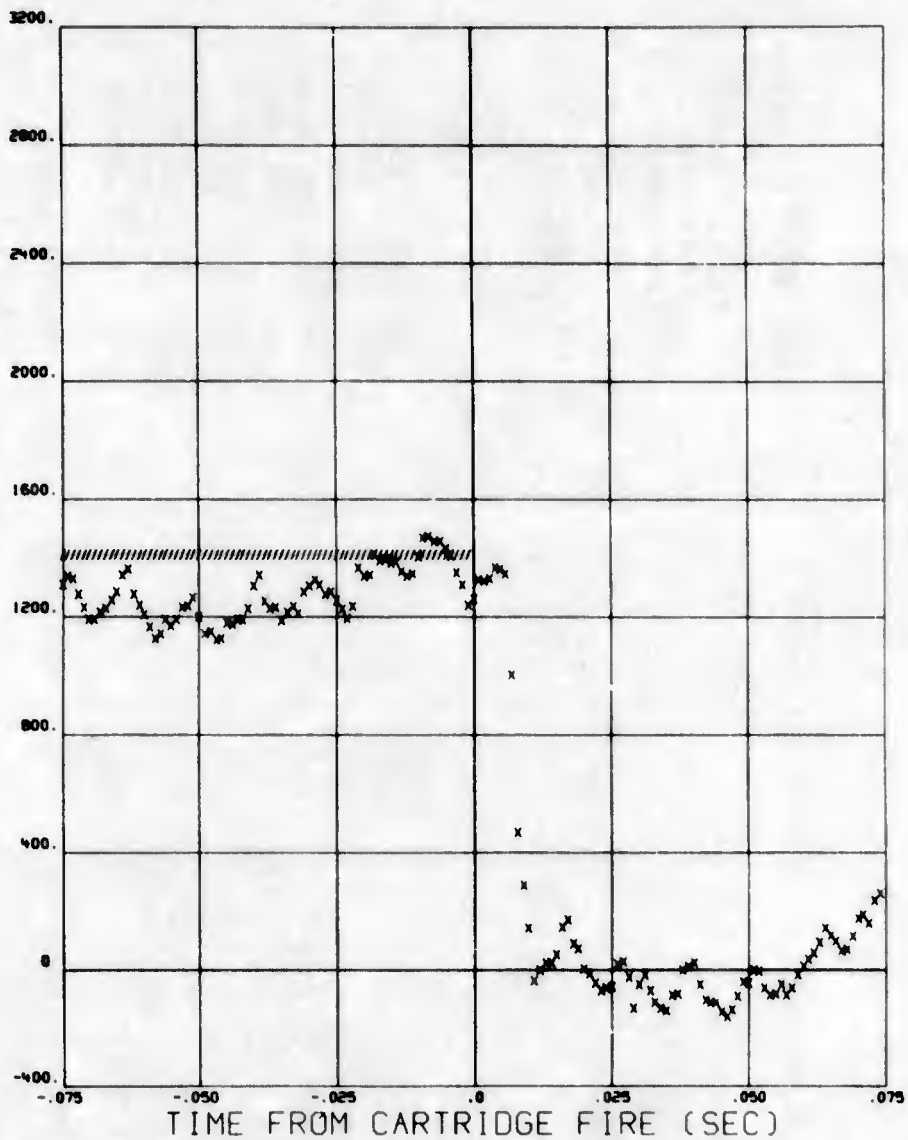
*** **

54.28 DEG F
81.00 DEG F
44.00 DEG F

TIME DELAY
MILLISECONDS

0
2
1
1
73

SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



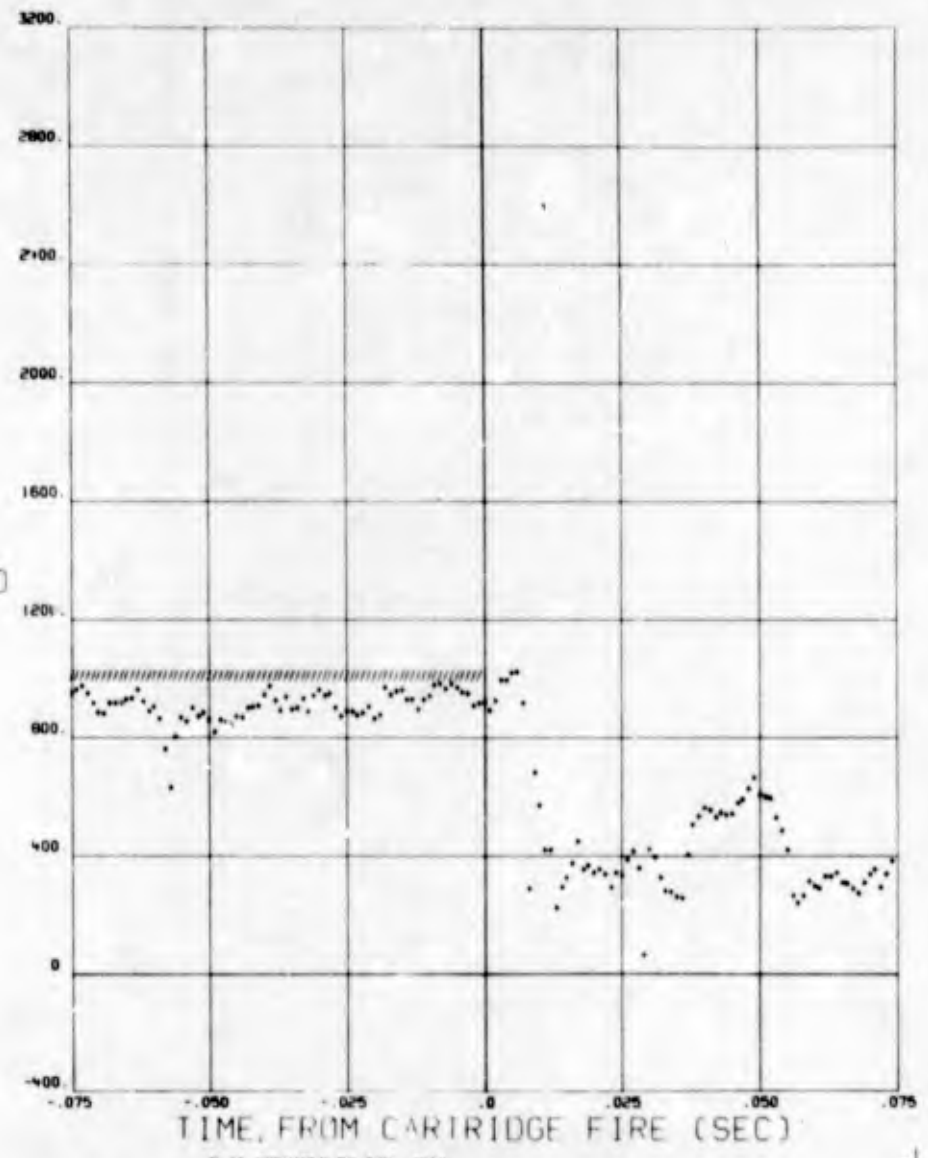
TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

04:018 24 MAY 72 MSN 1085 BOMB 1850

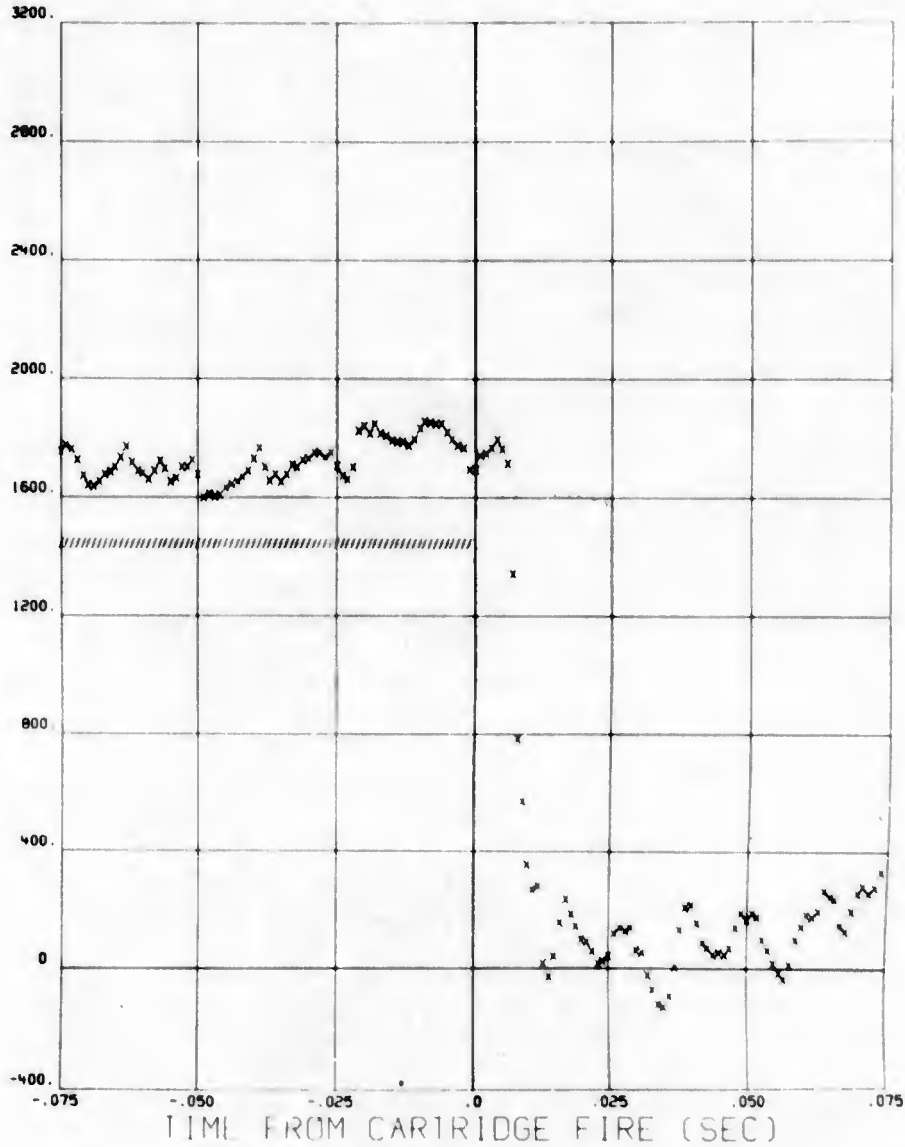
001 101 0 7

SWAY
BRACE
STRAIN
(LBS)
* - RIGHT FWD



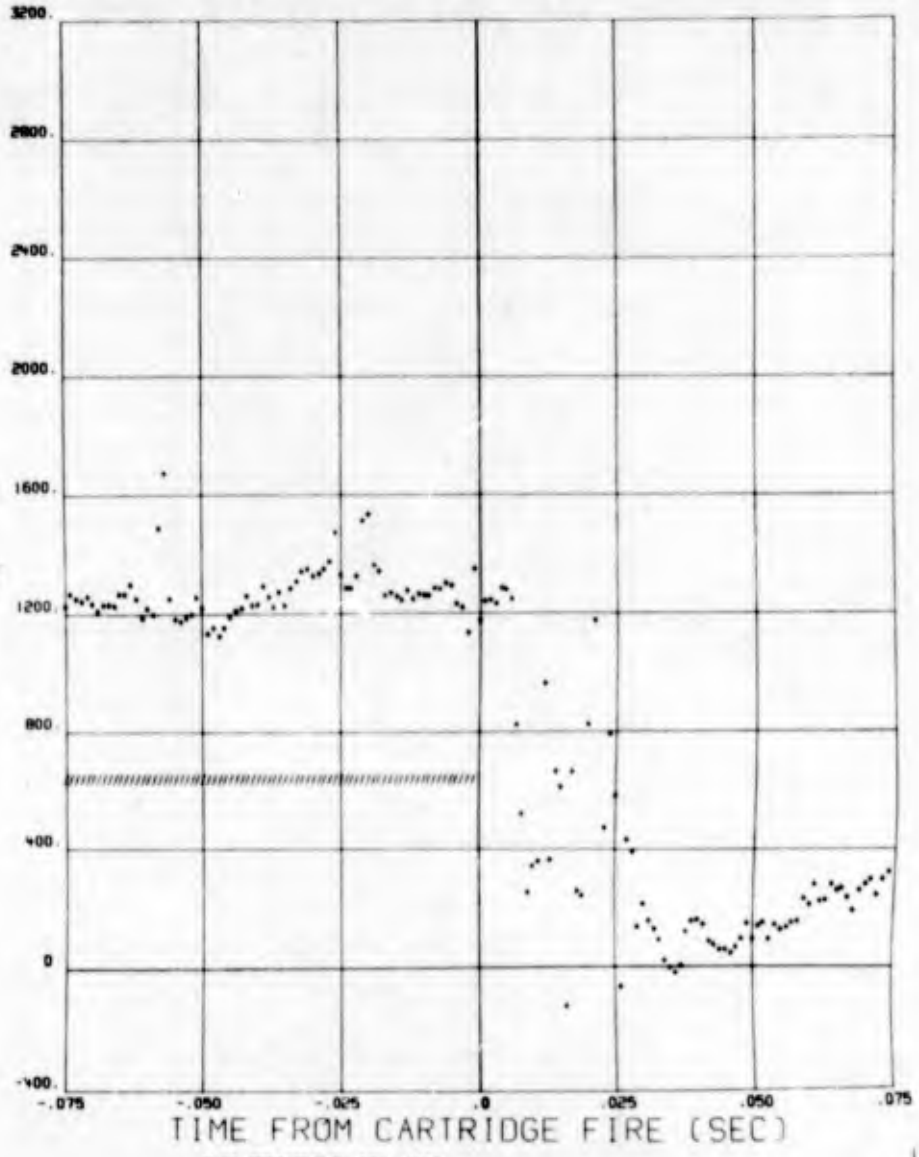
PLOT PREPARED BY TSK, AITC

SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



PLOT PREPARED BY 15X, ADIC

SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT

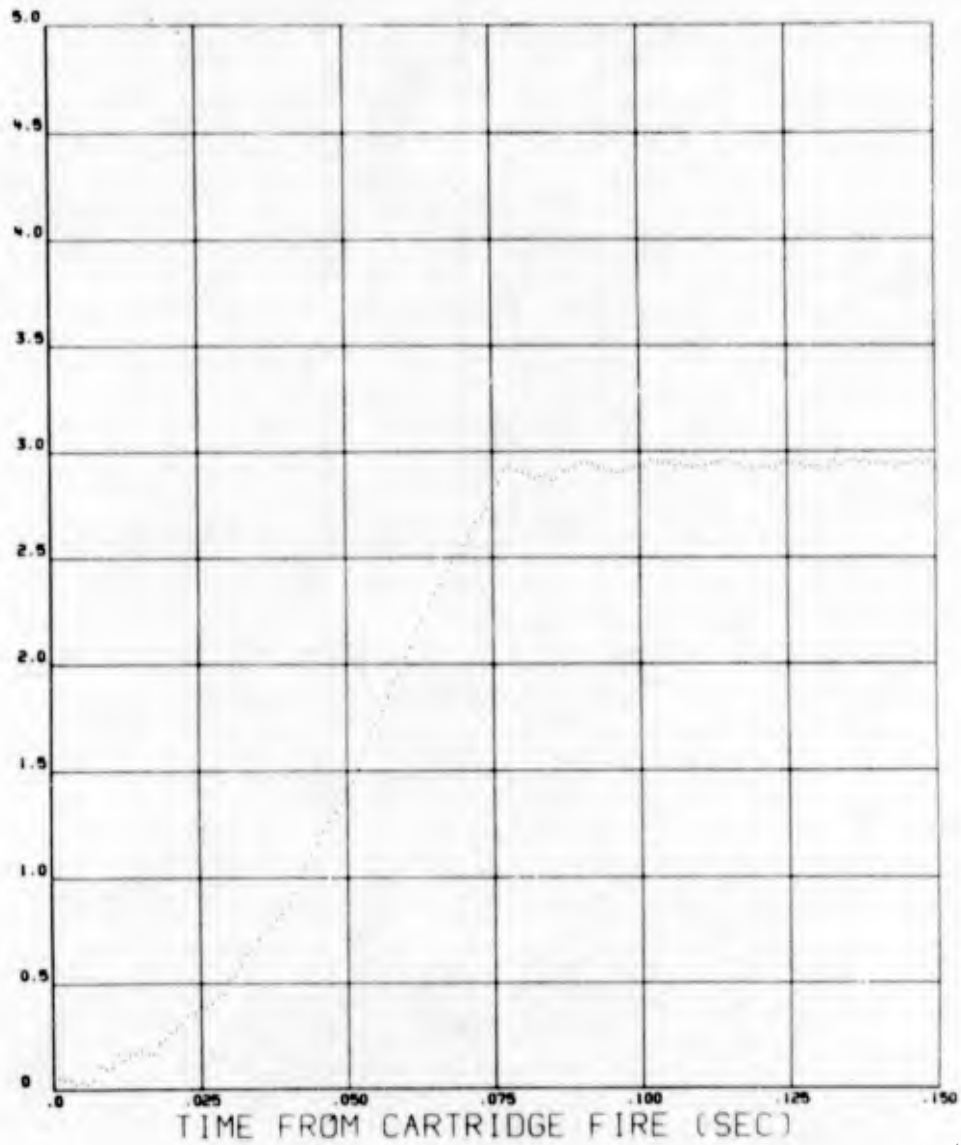


PLOT PREPARED BY TSX, ADIC

19/04/73 670AG018 24 MAY 72 MSN 108S BOMB 185D

R243
106 0

EJECTOR
FOOT
POSITION
(INCHES)

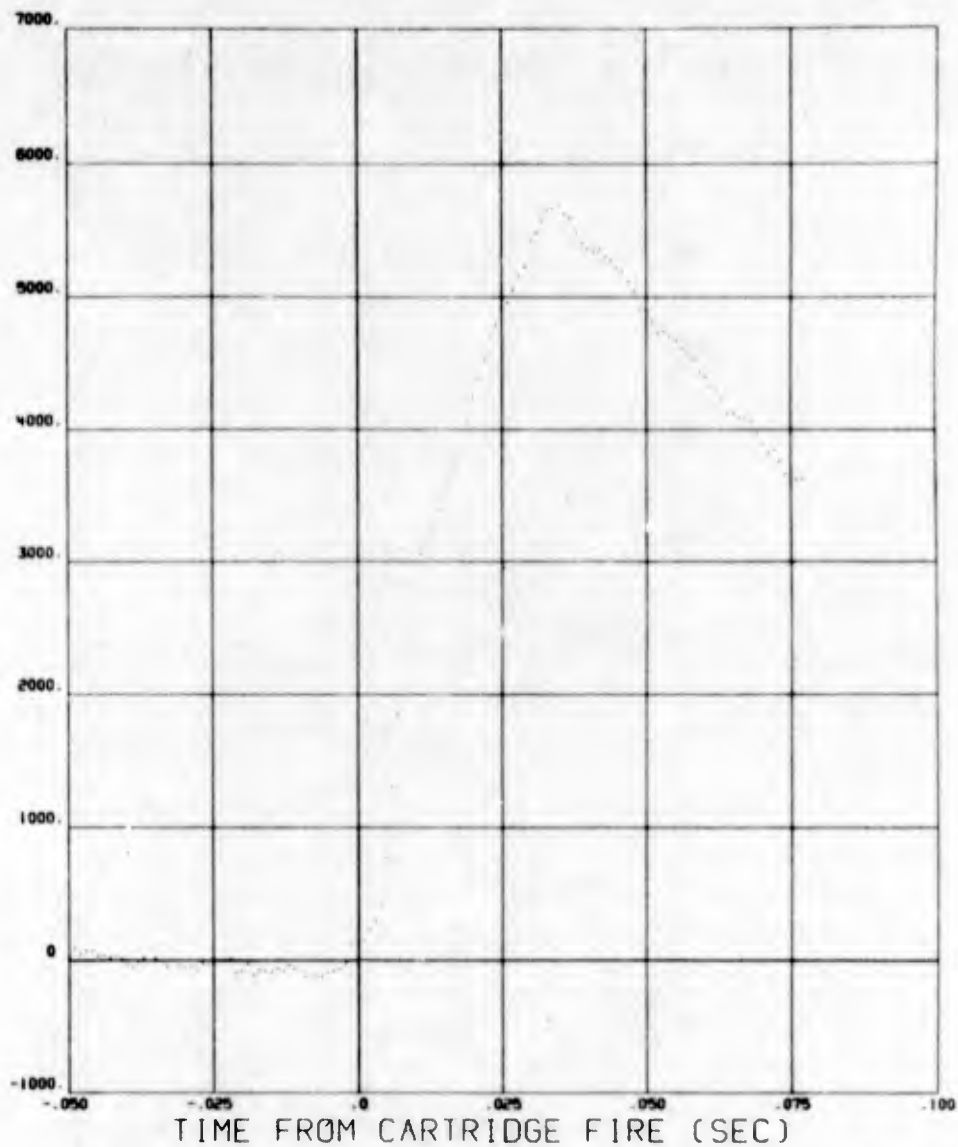


PLOT PREPARED BY TSX, ADTC

19/04/73 670AG018 24 MAY 72 MSN 108S BOMB 185D

R243
107 0

EJECTION
CHAMBER
PRESSURE
(PSI)

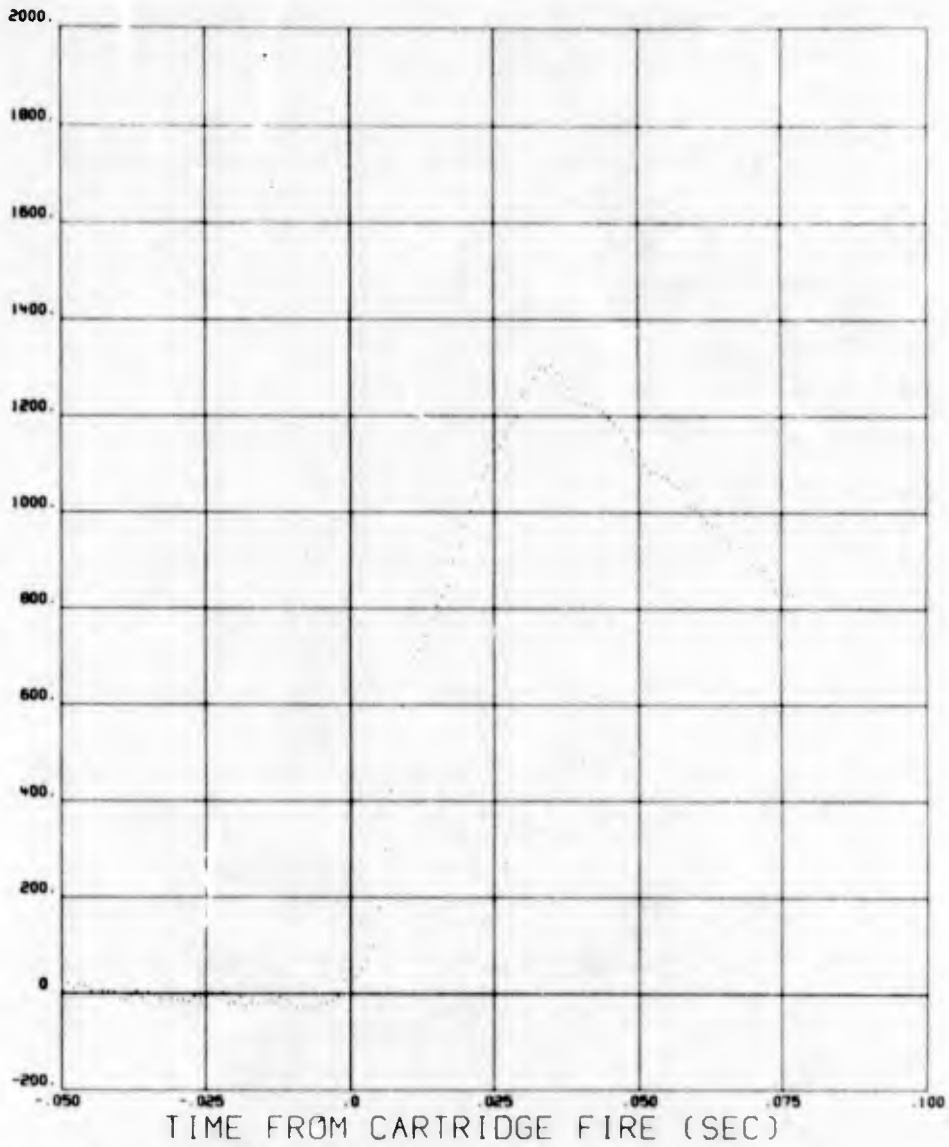


PLOT PREPARED BY TSX, ADIC

19/04/73 670AG018 24 MAY 72 MSN 108S BOMB 185D

R243
108 0

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY TSX, ADTC

DATE 24 MAY 72 MISSION 109C BOMB ID 172 BOMB WEIGHT 496.25 LBS

EJECTOR MOMENT ARM 3.313 INCHES
TIME OF EJECTOR STROKE .071 SEC
A/C ANGLE OF ATTACK AT RELEASE 3.411 DEG
A/C PITCH ANGLE AT RELEASE 1.400 DEG
A/C ROLL ANGLE AT RELEASE .210 DEG
RACK EJECTION ANGLE 0.000 DEG

IMPACT RANGE FEET
DEFLECTION FEET

RELEASE HISTORY
PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

HR MIN SEC
*** **

22	33	57.778
22	33	57.784
22	33	57.791
22	33	57.788
22	33	57.786
22	33	57.882
22	33	57.789
22	33	57.786

TIME DELAY
MILLISECONDS
0
6
13
10
8
84
11
3

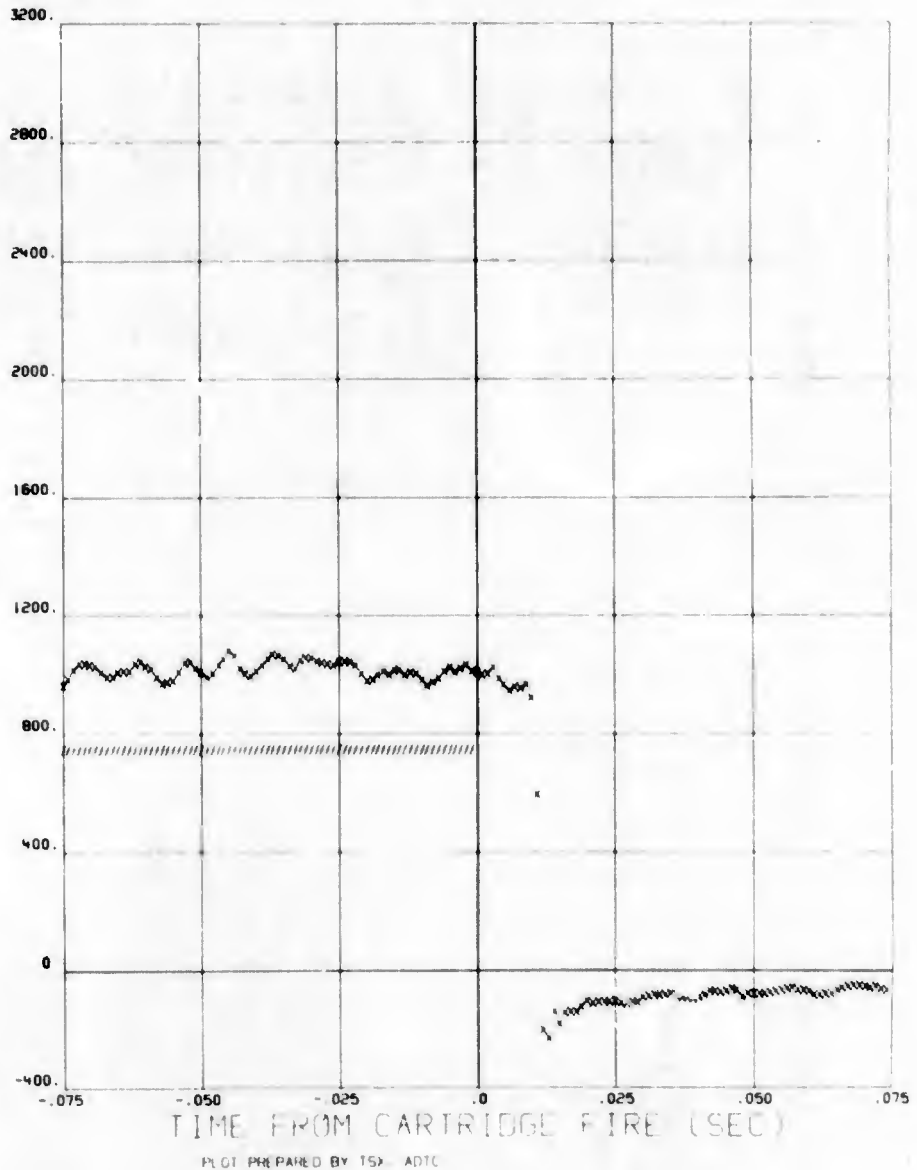
MAXIMUM PRE-FLT GROUND TEMPERATURE 86.60 DEG F
MAXIMUM POST-FLT GROUND TEMPERATURE ***** DEG F
MAXIMUM BREECH AMBIENT TEMPERATURE 50.97 DEG F

SEPARATION VELOCITY
DISPLACEMENT METHOD ***** FT/SEC
PRESSURE METHOD 6.3 FT/SEC

19 08 73 610AG018 24 MAY 72 MSN 109C BOMB

172 R244 109

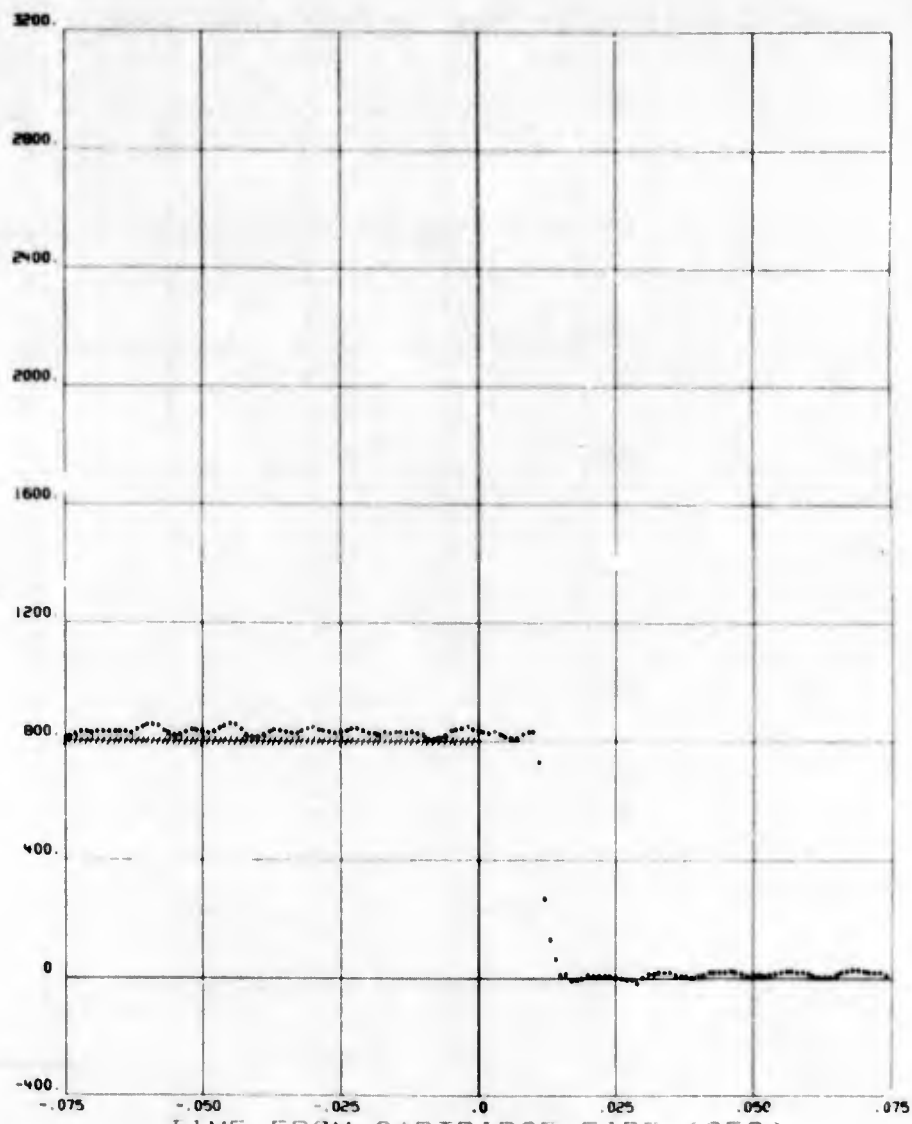
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
X LEFT FWD



670A0018 24 MAY 72 MSN 109C BOMB

172⁰²⁴³₁₁₀ 07

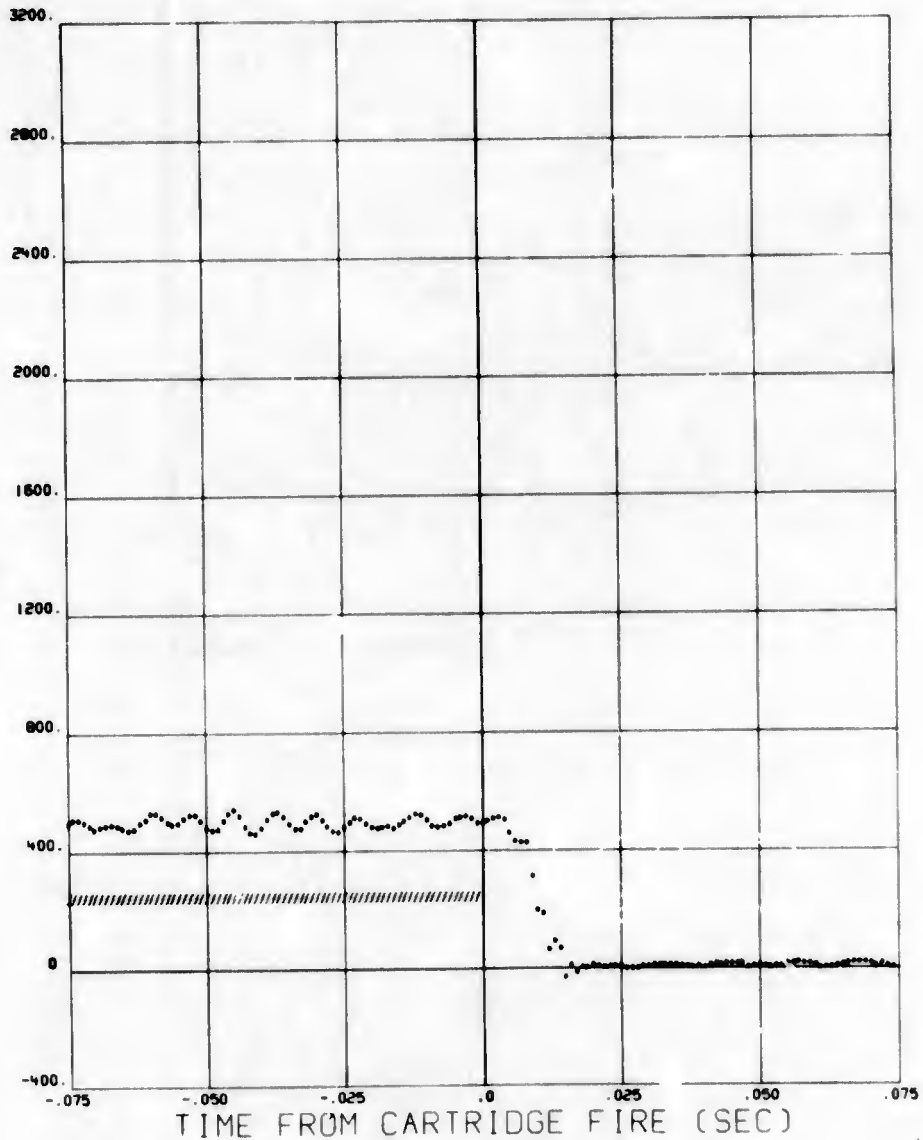
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* RIGHT FWD



TIME FROM CARTRIDGE FIRE (SEC)

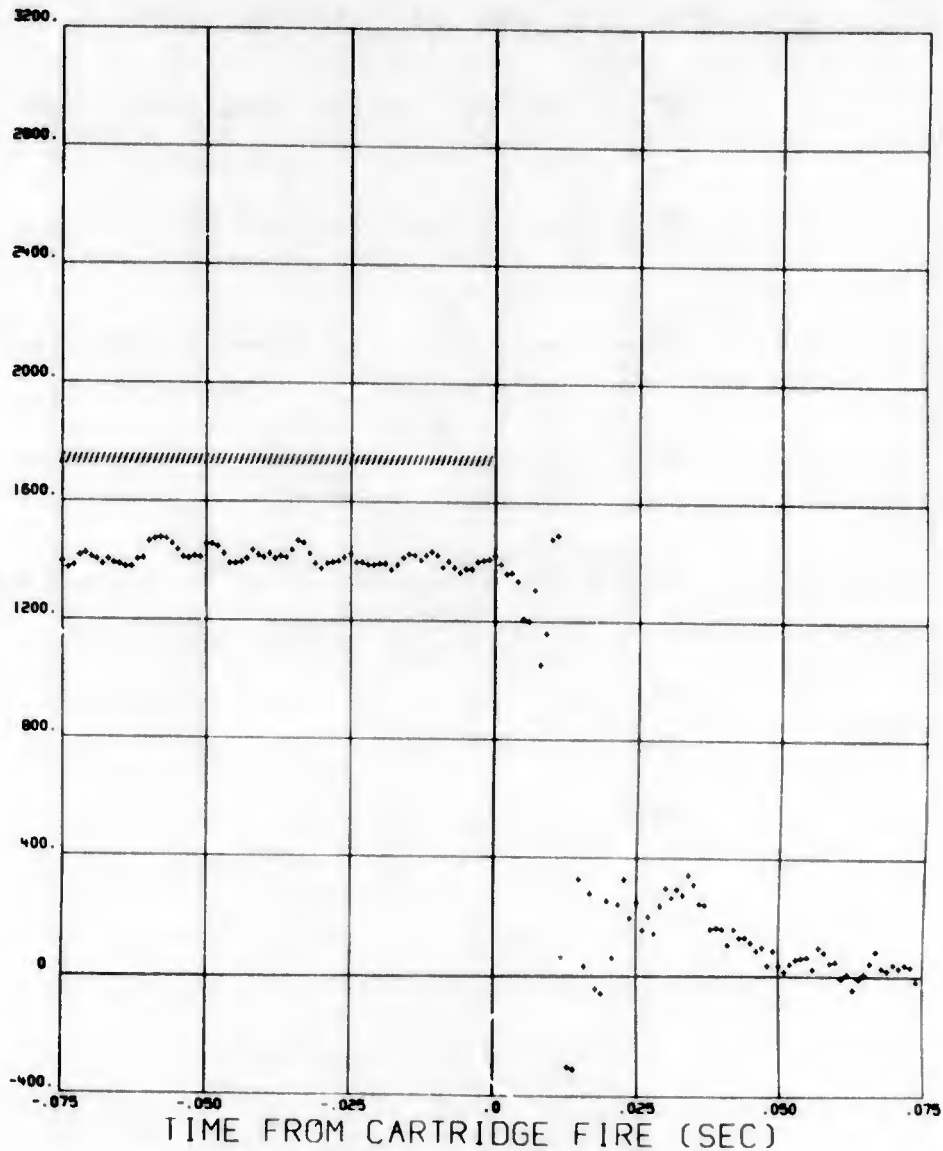
PLOT PREPARED BY TSX, ADTC

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



PLOT PREPARED BY TSX, ADIC

RELATIVE
HOOK
REACTION
(LBS)
+ = FORWARD

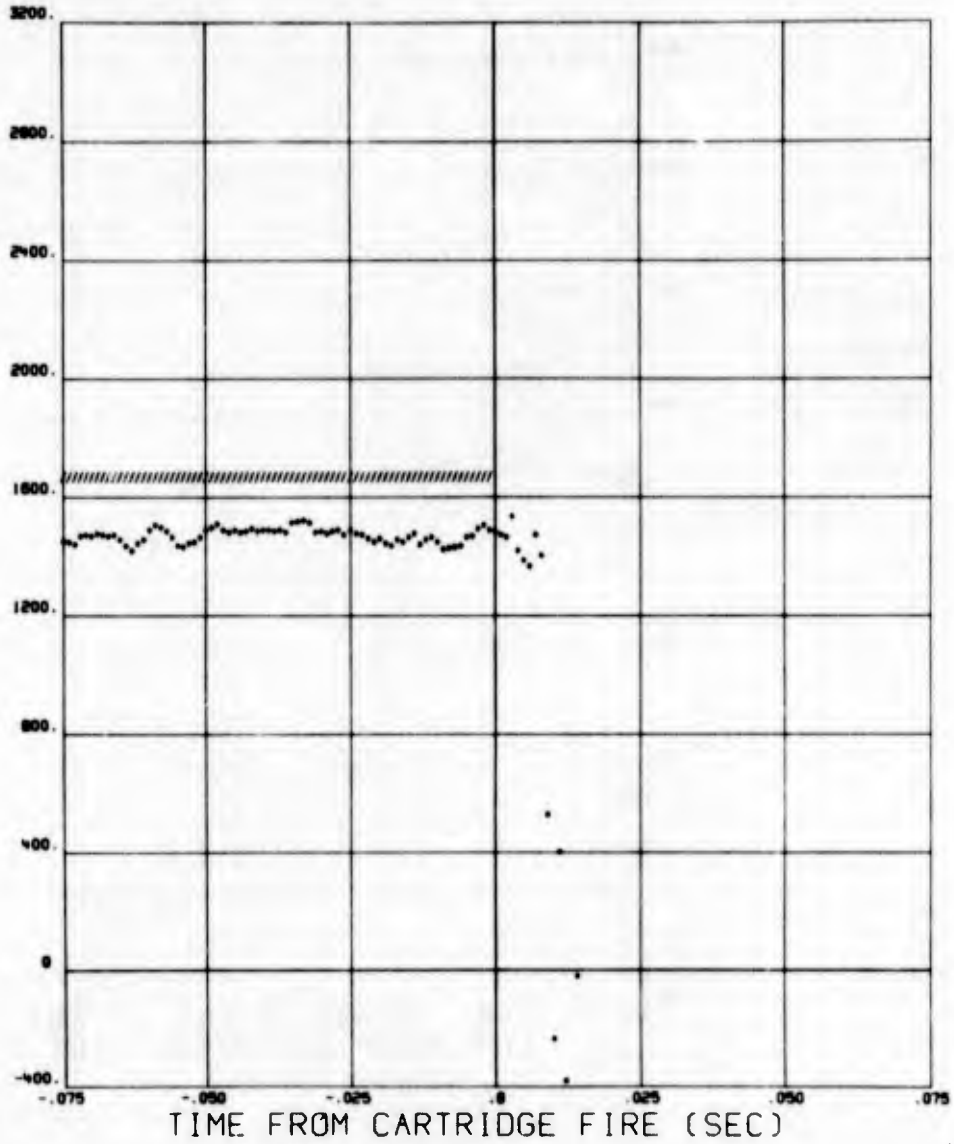


PLOT PREPARED BY 15X, ADIC

19/04/73 670AG018 24 MAY 72 MSN 109C BOMB

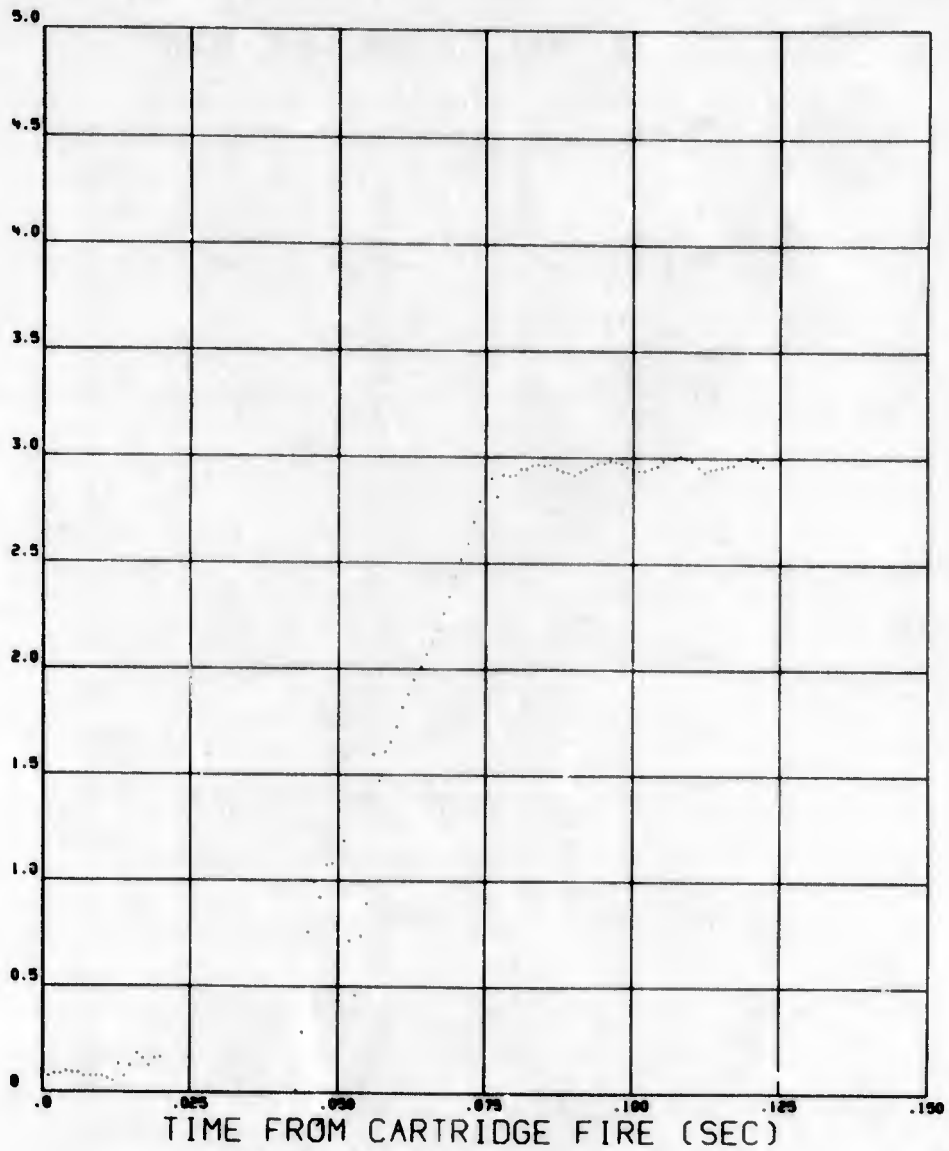
172 ^{REV 3} 114 0

RELATIVE
HOOK
REACTION
(LBS)
* = AFT



PLOT PREPARED BY TSX, ADTC

EJECTOR
FOOT
POSITION
(INCHES)



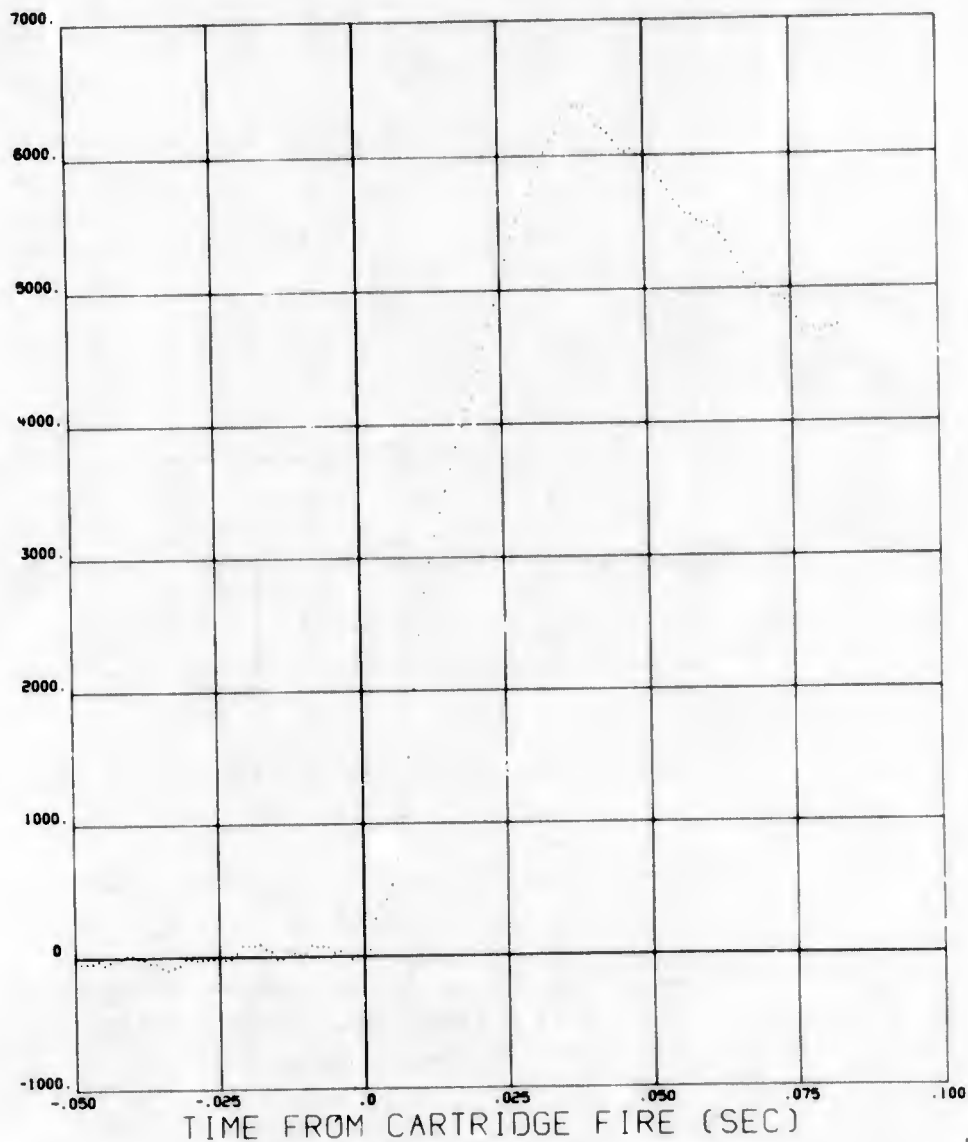
TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSM, ADTC

19/04/73 670AG018 24 MAY 72 MSN 109C BOMB

172 ^{RP43} 116 07

EJECTION
CHAMBER
PRESSURE
(PSI)



PLOT PREPARED BY TSX, ADTC

DATE 24 MAY 72 MISSION 1099 BOMB ID 173 BOMB HEIGHT 508.75 LBS

EJECTOR MOMENT ARM
TIME OF EJECTOR STROKE
A/C ANGLE OF ATTACK AT RELEASE
A/C PITCH ANGLE AT RELEASE
A/C ROLL ANGLE AT RELEASE
RACK EJECTION ANGLE

2.688 INCHES
.072 SEC
2.747 DEG
-23.030 DEG
6.270 DEG
-40.000 DEG

IMPACT RANGE
DEFLECTION

FEET
FEET

RELEASE HISTORY

PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

HR MIN SEC
*** *** *****
*** *** *****
22 34 20.059
22 34 20.060
22 34 20.060
22 34 20.060
22 34 20.132
22 34 20.060
22 34 20.060

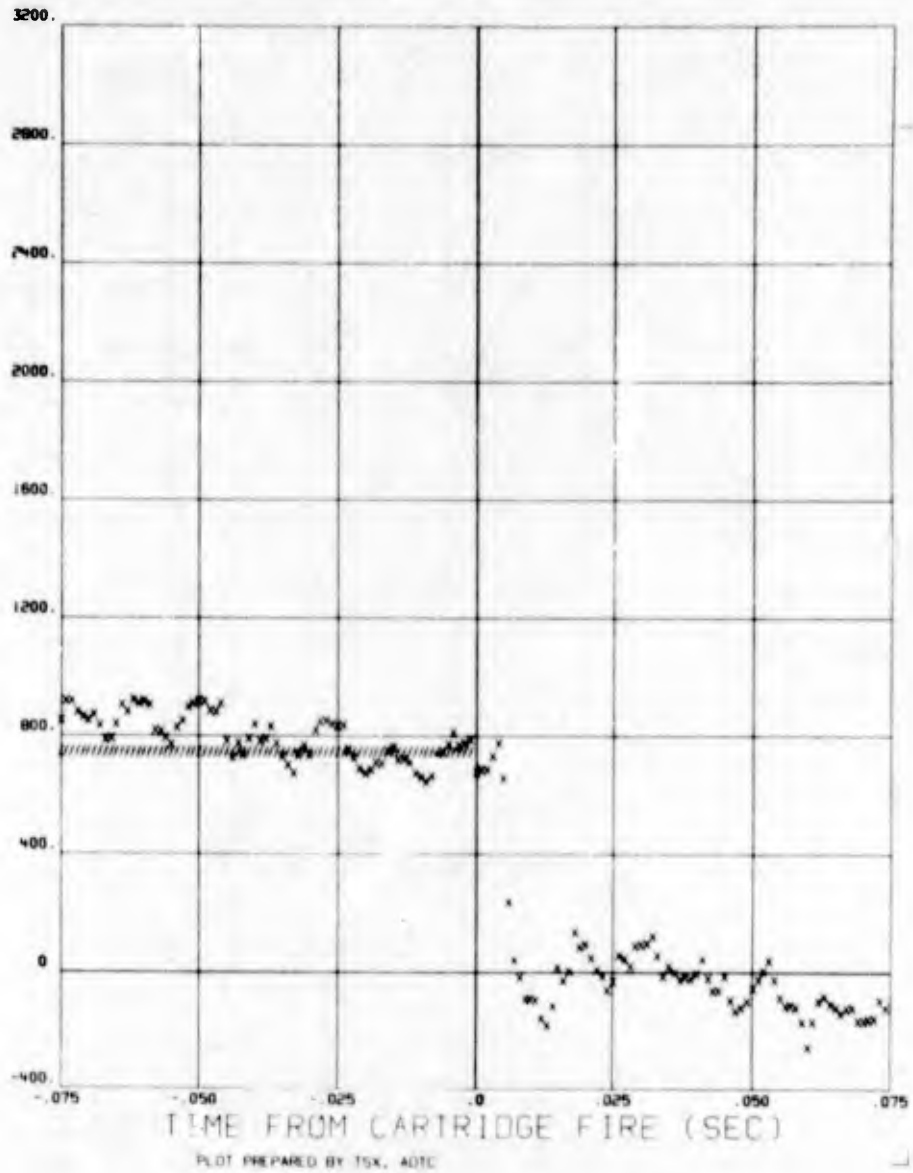
MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREACH AMBIENT TEMPERATURE

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

86.60 DEG F
***** DEG F
51.98 DEG F

3.3 FT/SEC
5.0 FT/SEC

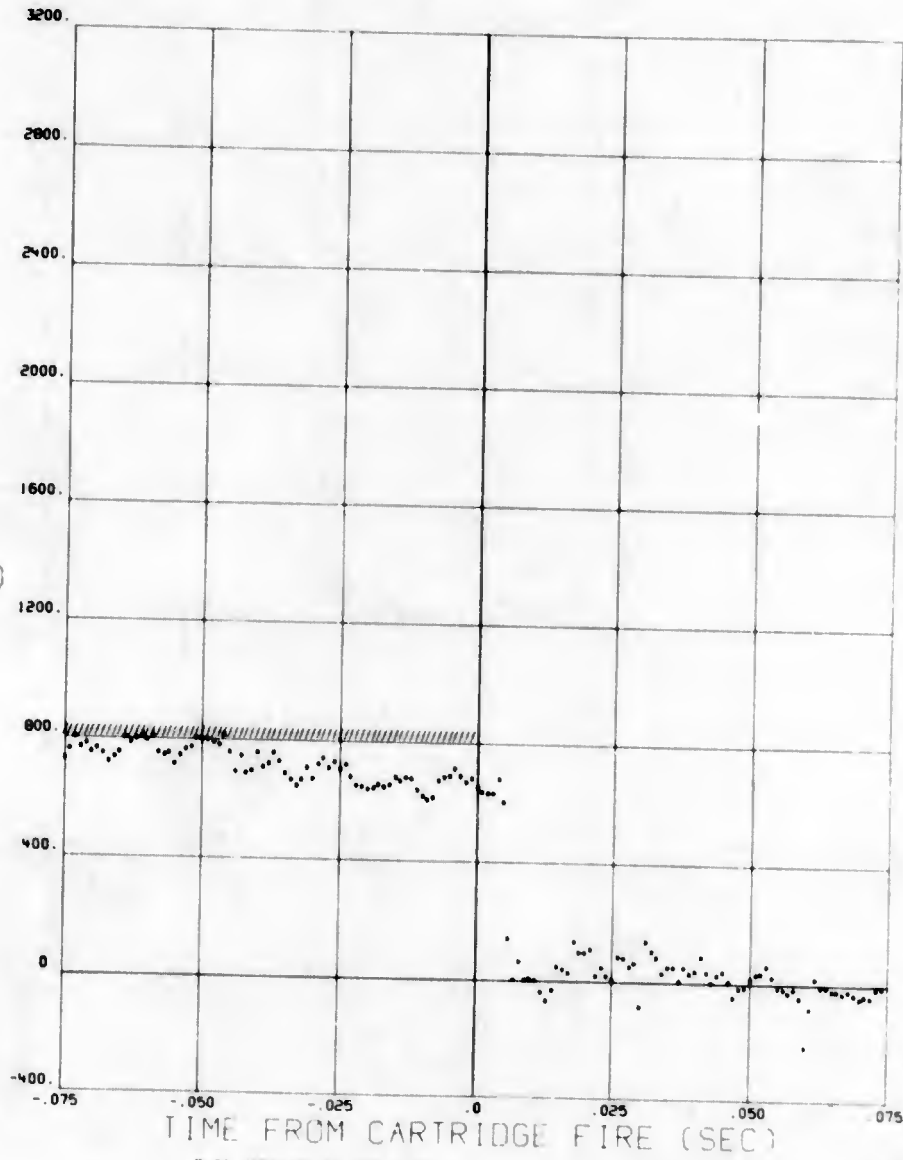
RELATIVE
SWAY
BRACE
STRAIN
(LBS)
K = LEFT FWD



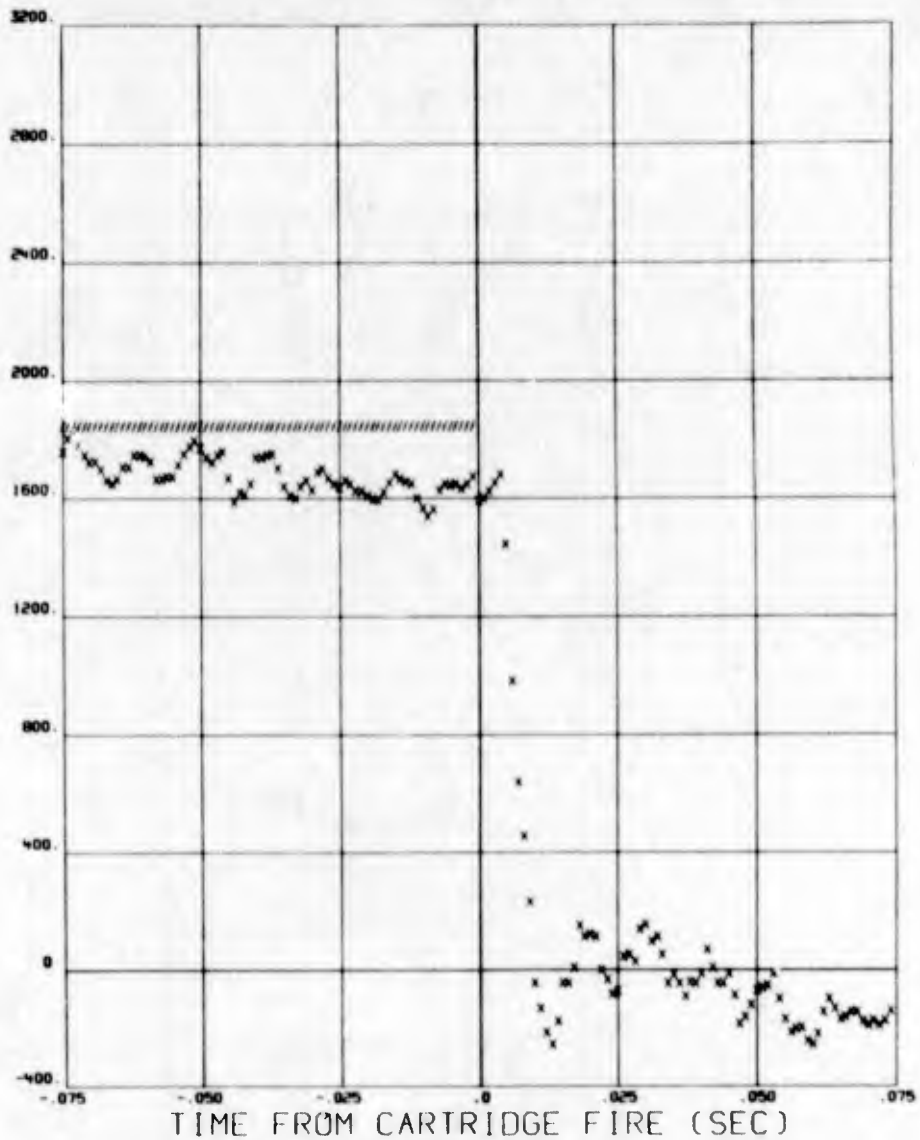
19/04/73 670AG018 24 MAY 72 MSN 109S BOMB

173^{R243}₁₁₉ 0 1

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



RELATIVE
SWAY
BRACE
STRAIN
(LBS)
x = LEFT AFT



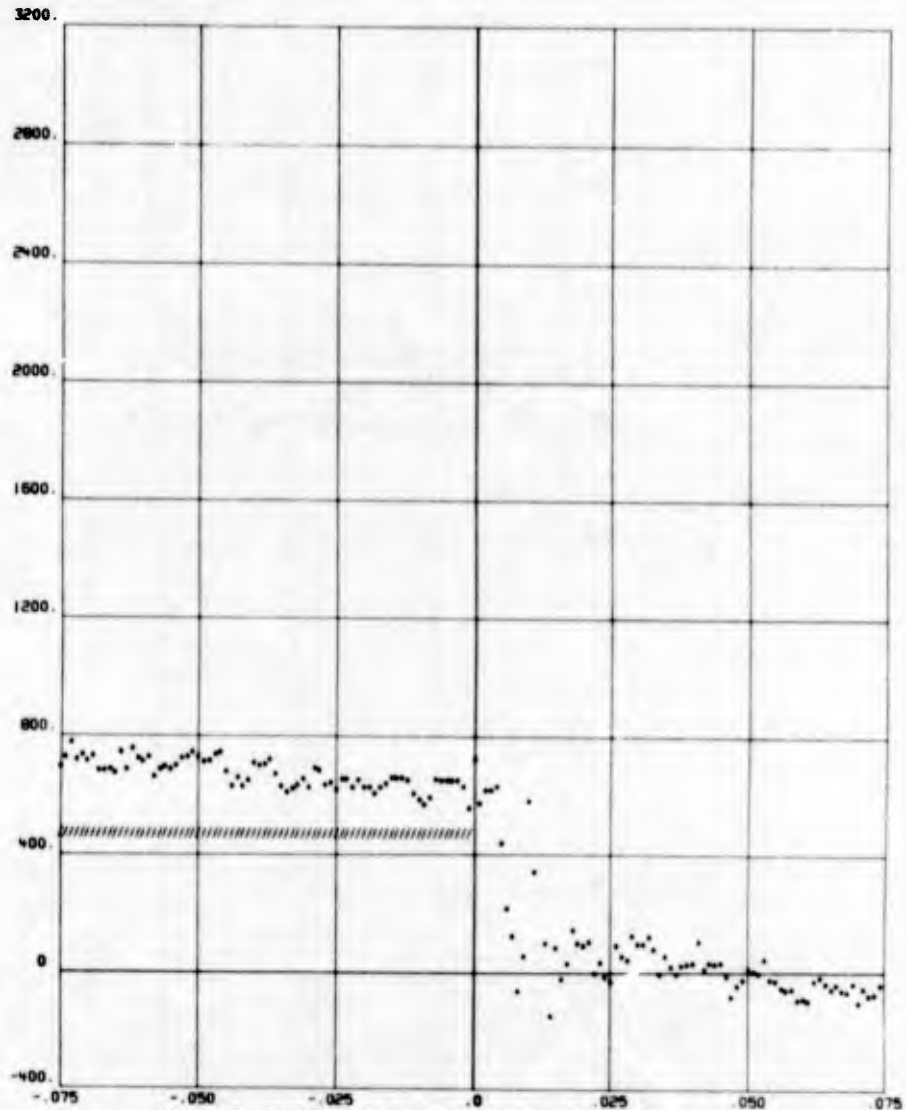
TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY 15X, AOTC

19/04/73 670AG018 24 MAY 72 MSN 109S BOMB

173^{R243}₁₂₁ 07

RELATIVE
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT

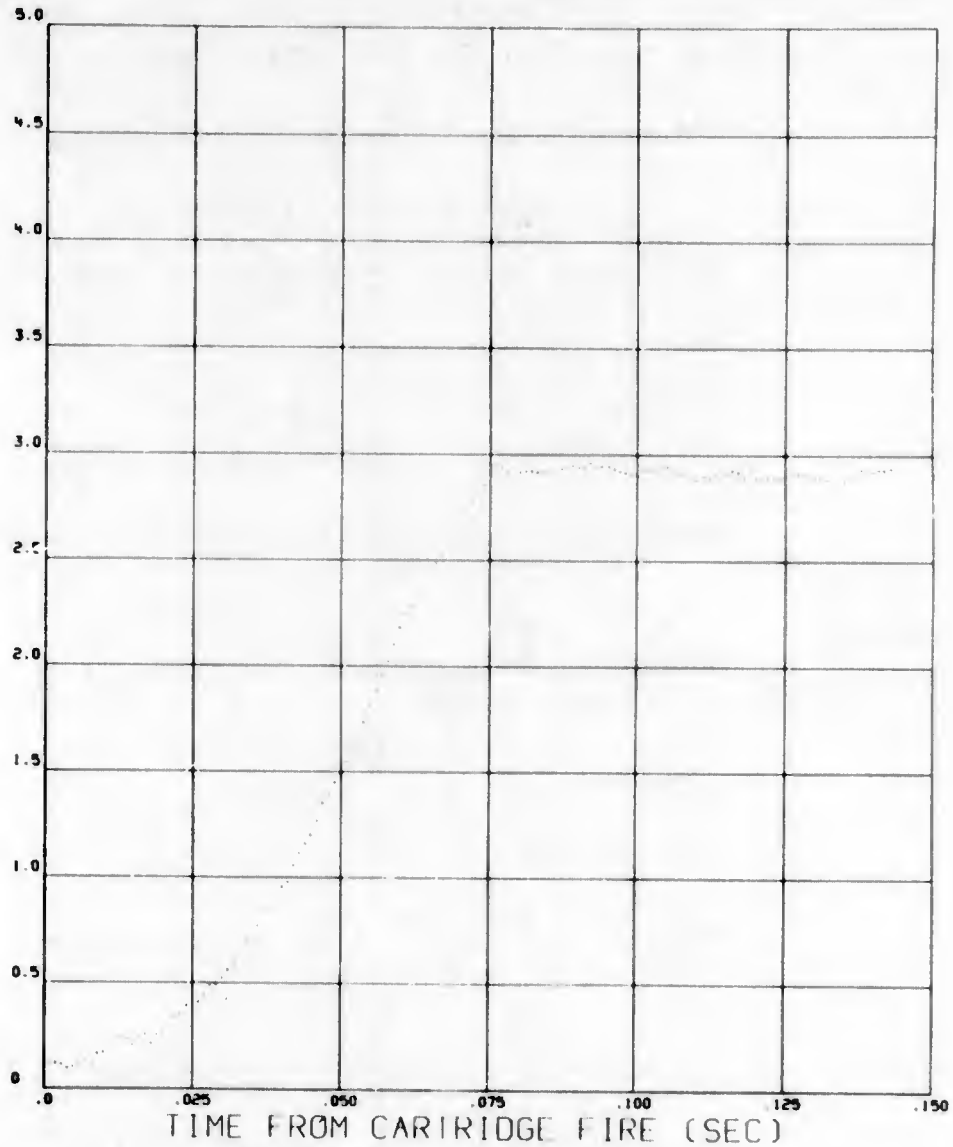


PLOT PREPARED BY TSX, ADTC

19/04/73 670AG018 24 MAY 72 MSN 109S BOMB

173^{R243}₁₂₄ 0

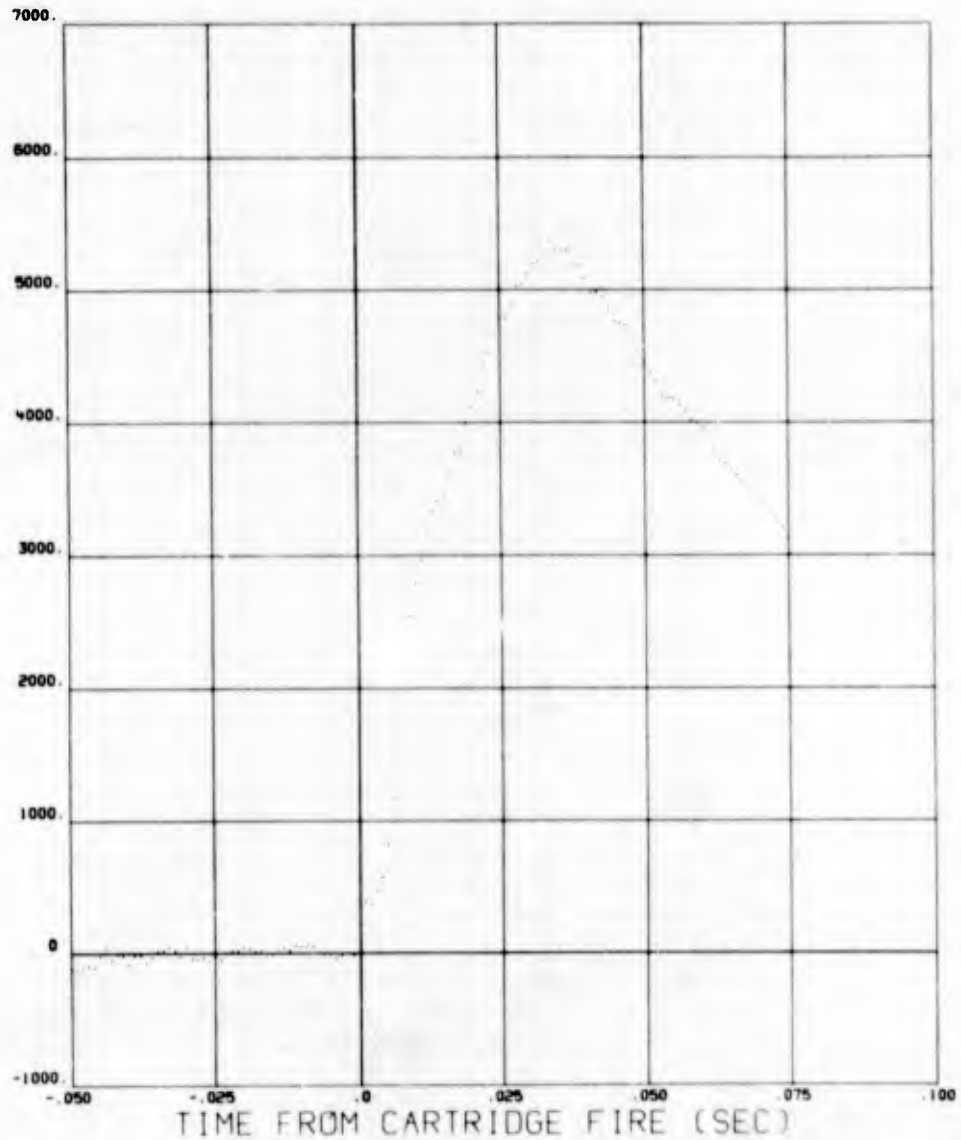
EJECTOR
FOOT
POSITION
(INCHES)



19/04/73 670AJ018 24 MAY 72 MSN 109S BOMB

173 ^{R1+3} 125 0 7

EJECTION
CHAMBER
PRESSURE
(PSI)

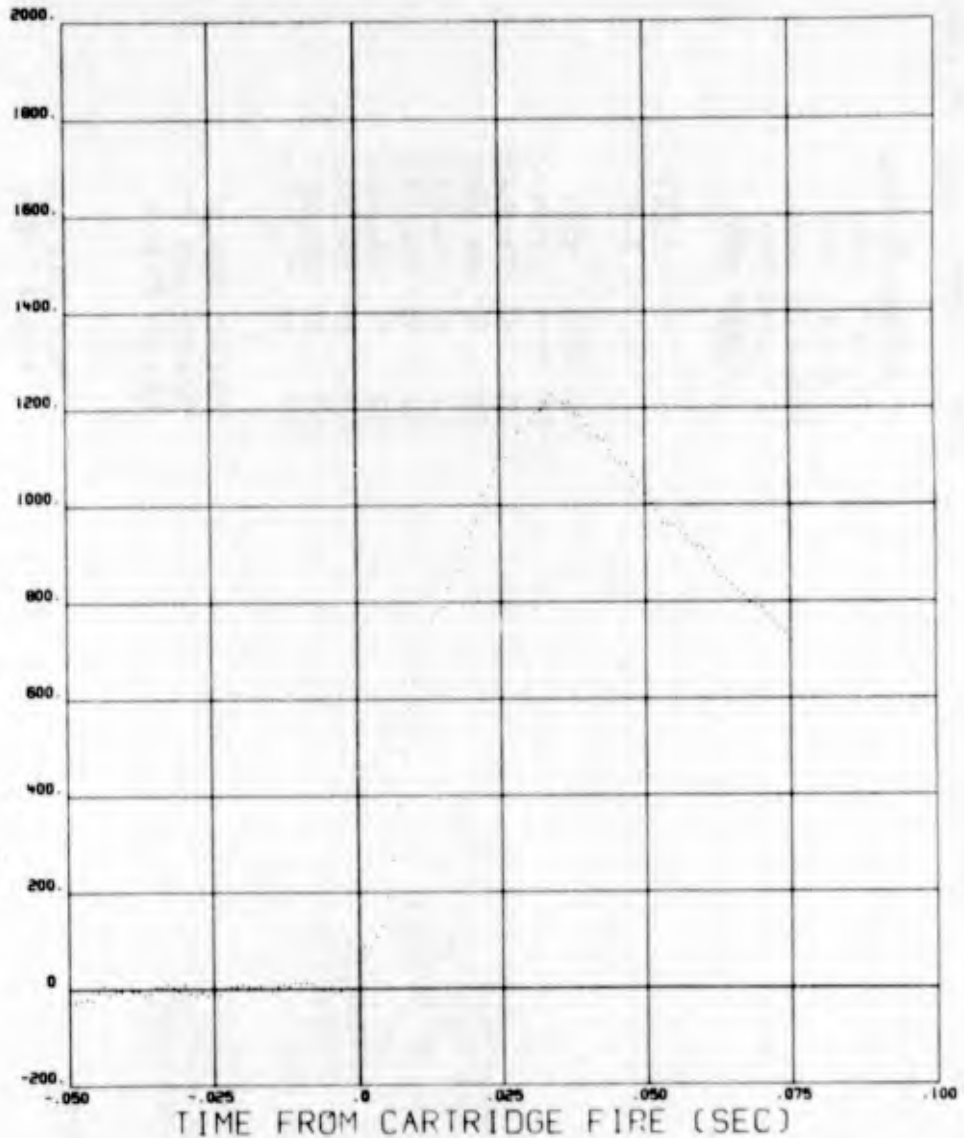


PLOT PREPARED BY TSX, ADIC

19/04/73 670AG018 24 MAY 72 MSN 109S BOMB

173 ^{R243} 126 0

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY TSX, ADTC

DATE 25 MAY 72 MISSION 1100 BOMB ID 190 BOMB WEIGHT 513.75 LBS

EJECTOR MOMENT ARM
TIME OF EJECTOR STROKE
A/C ANGLE OF ATTACK AT RELEASE
A/C PITCH ANGLE AT RELEASE
A/C ROLL ANGLE AT RELEASE
RACK EJECTION ANGLE

2.500 INCHES
.076 SEC
2.167 DEG
-25.030 DEG
.000 DEG
0.000 DEG

IMPACT RANGE DEFLECTION

FEET FEET

RELEASE HISTORY
PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

HR MIN SEC
*** **
23 6 34.426
23 6 34.432
23 6 34.435
23 6 34.435
23 6 34.435
23 6 34.511
23 6 34.437
23 6 34.437

TIME DELAY
MILLISECONDS
0
6
9
9
9
95
11
11

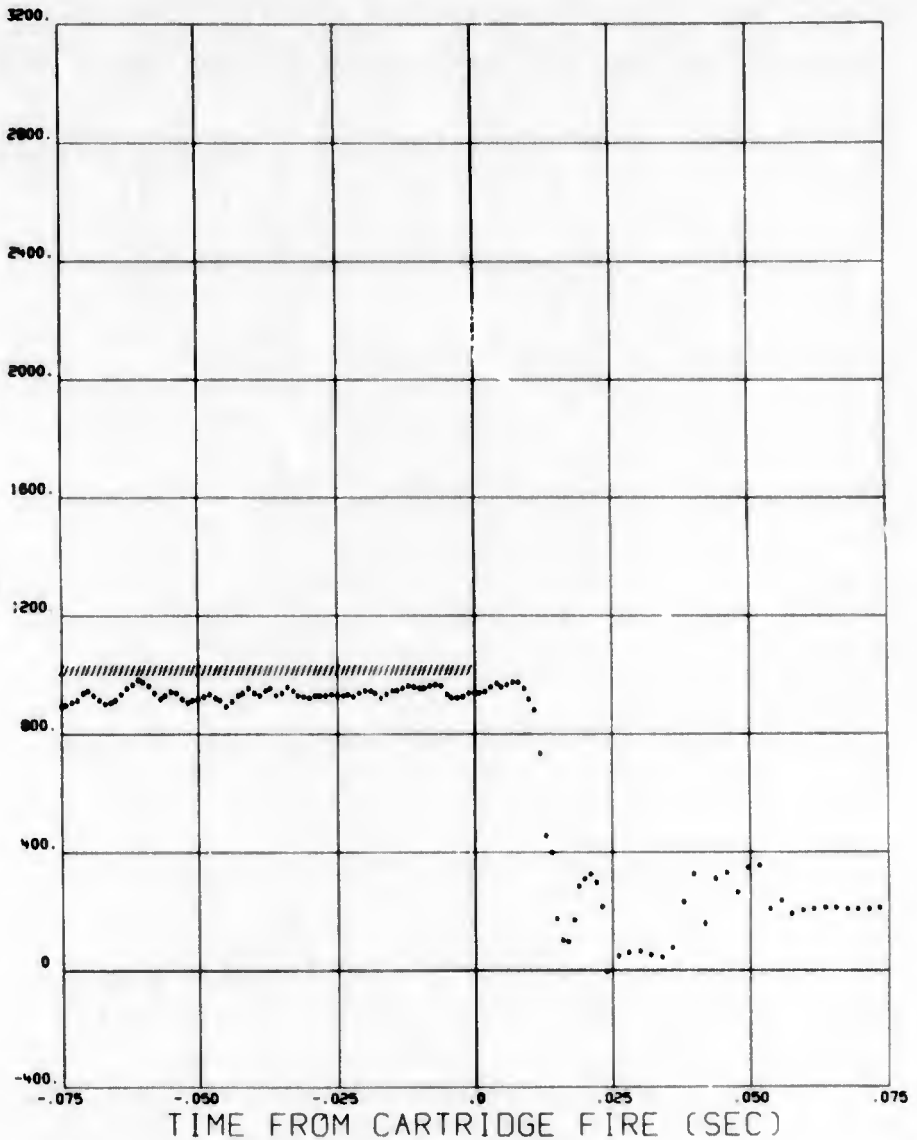
MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE

74.42 DEG F
97.20 DEG F
76.75 DEG F

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

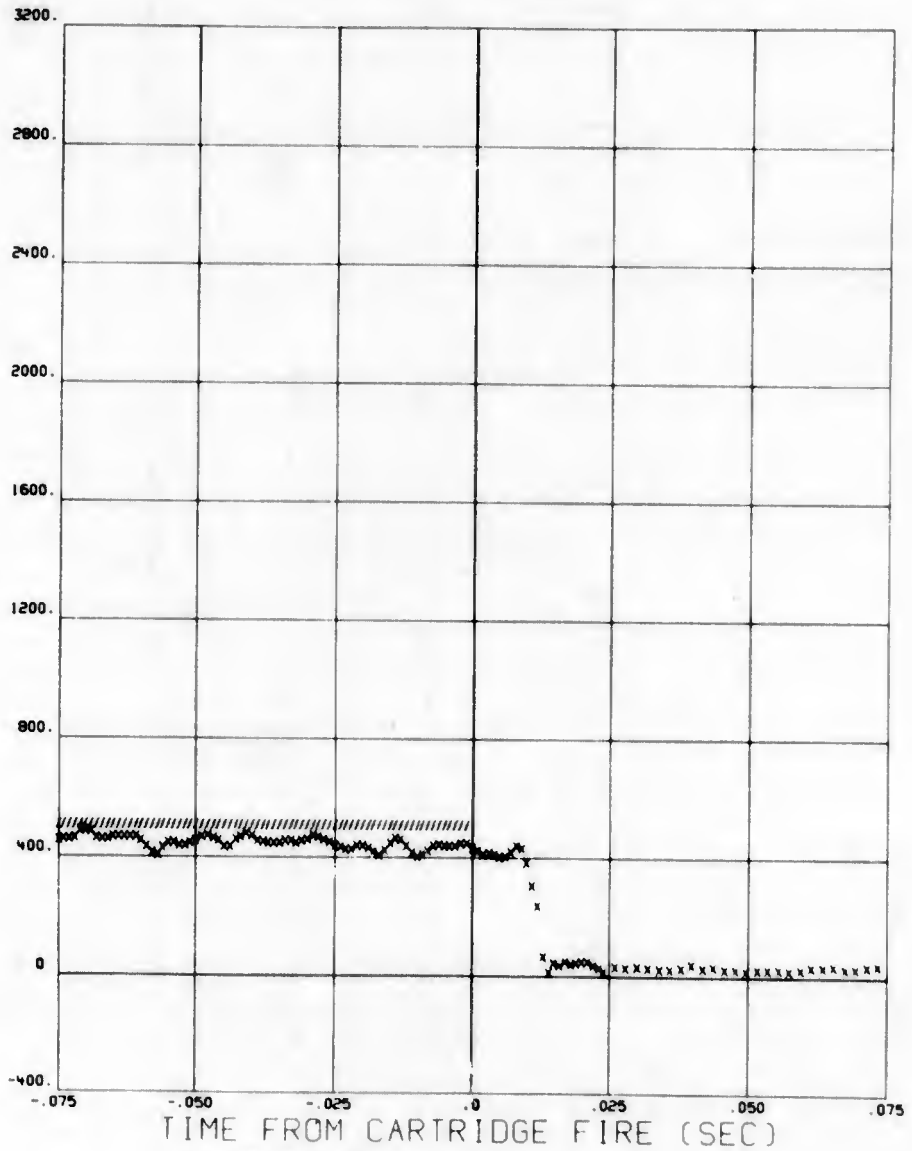
6.7 FT/SEC
7.3 FT/SEC

SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



TIME FROM CARTRIDGE FIRE (SEC)
PLOT PREPARED BY TSX, ADTC

SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT

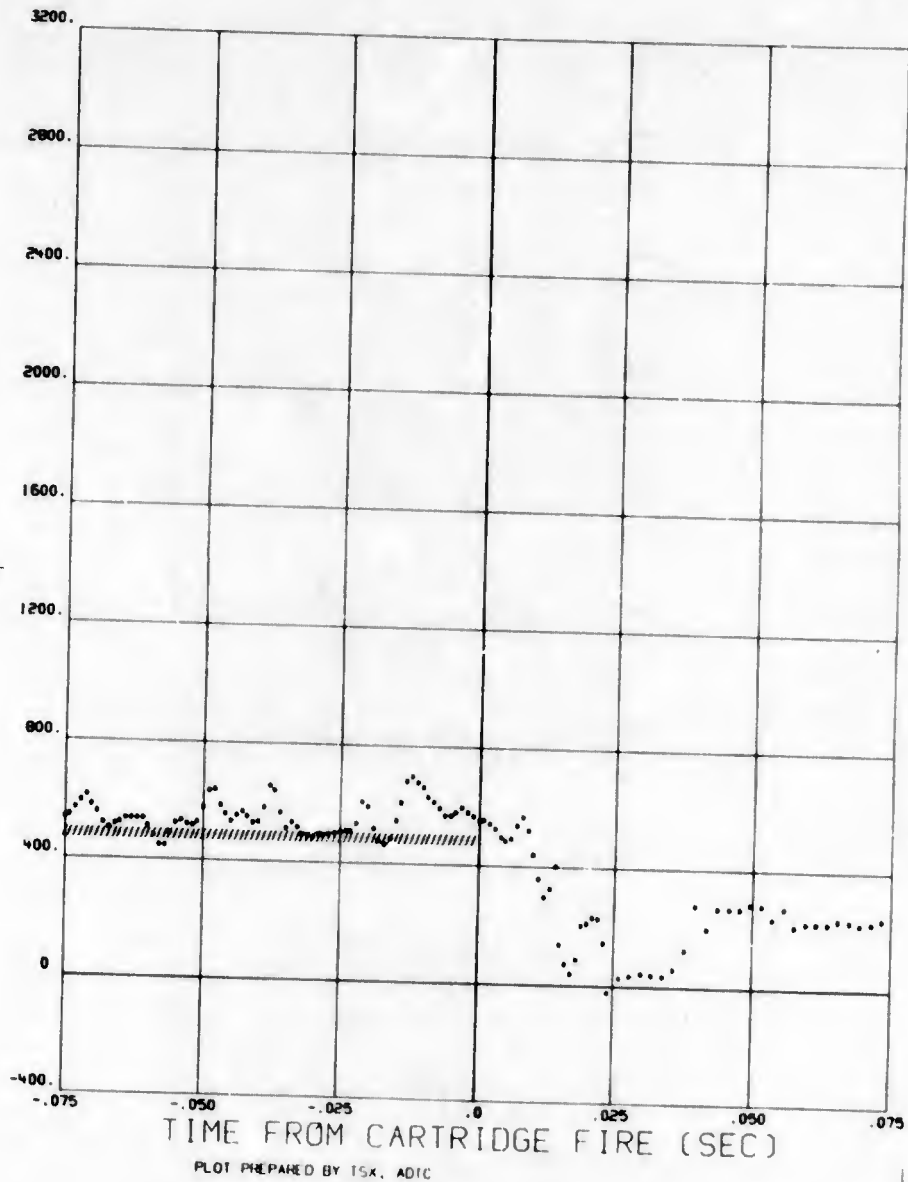


PLO1 PREPARED BY TSX, ADTC

19/04/73 670AG018 25 MAY 72 MSN 110C BOMB 190

R243
130 0 7

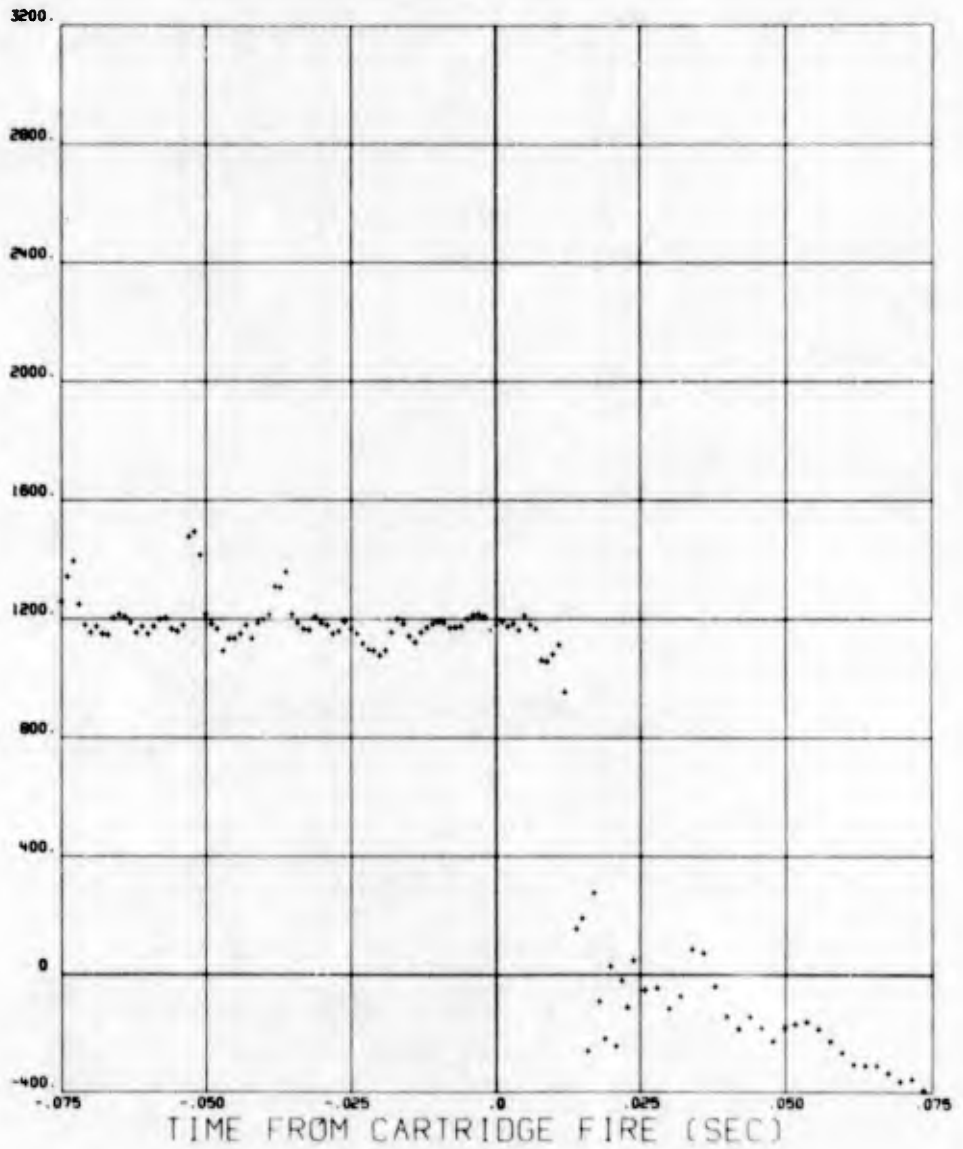
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



19/04/73 670AG018 25 MAY 72 MSN 110C BOMB 190

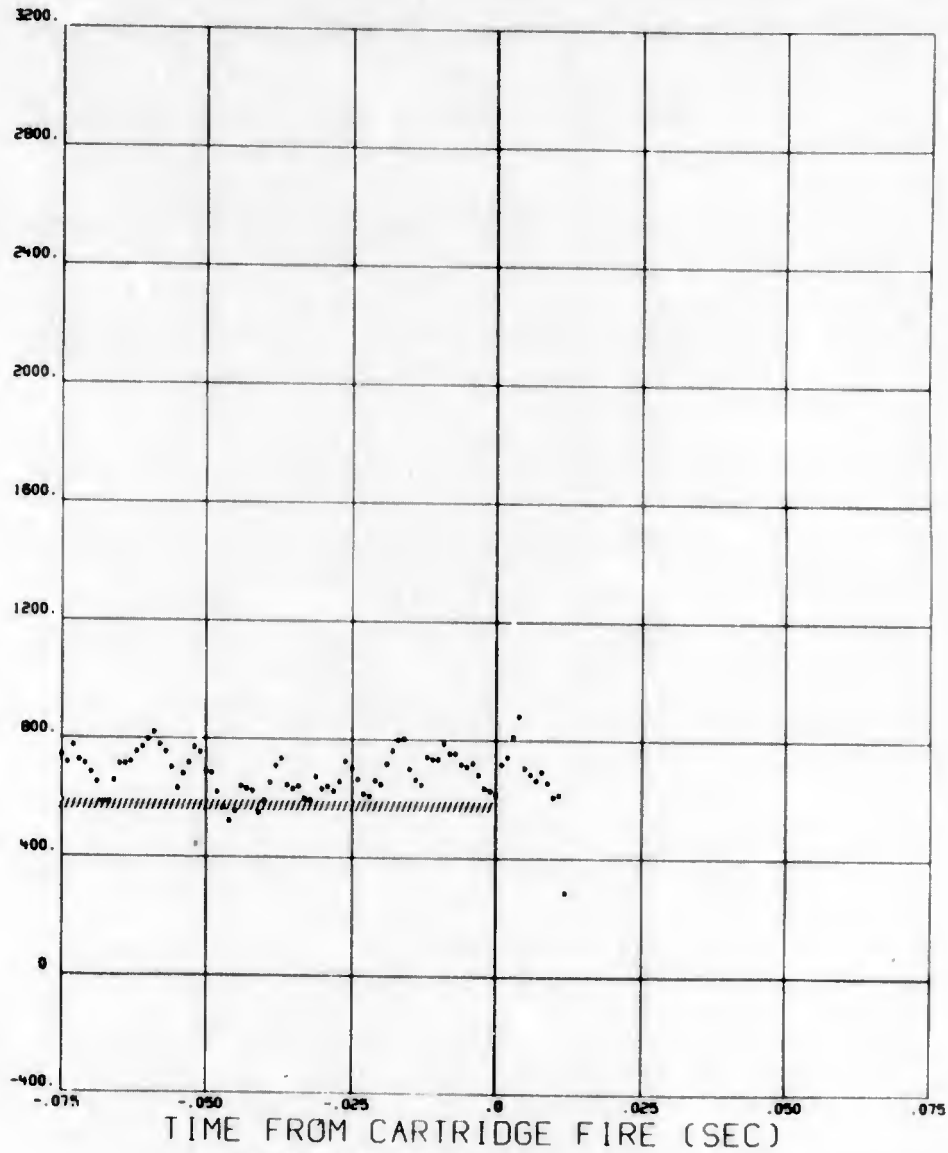
R243
131 0

HOOK
REACTION
(LBS)
+ = FORWARD



PLOT PREPARED BY 15X, ADTC

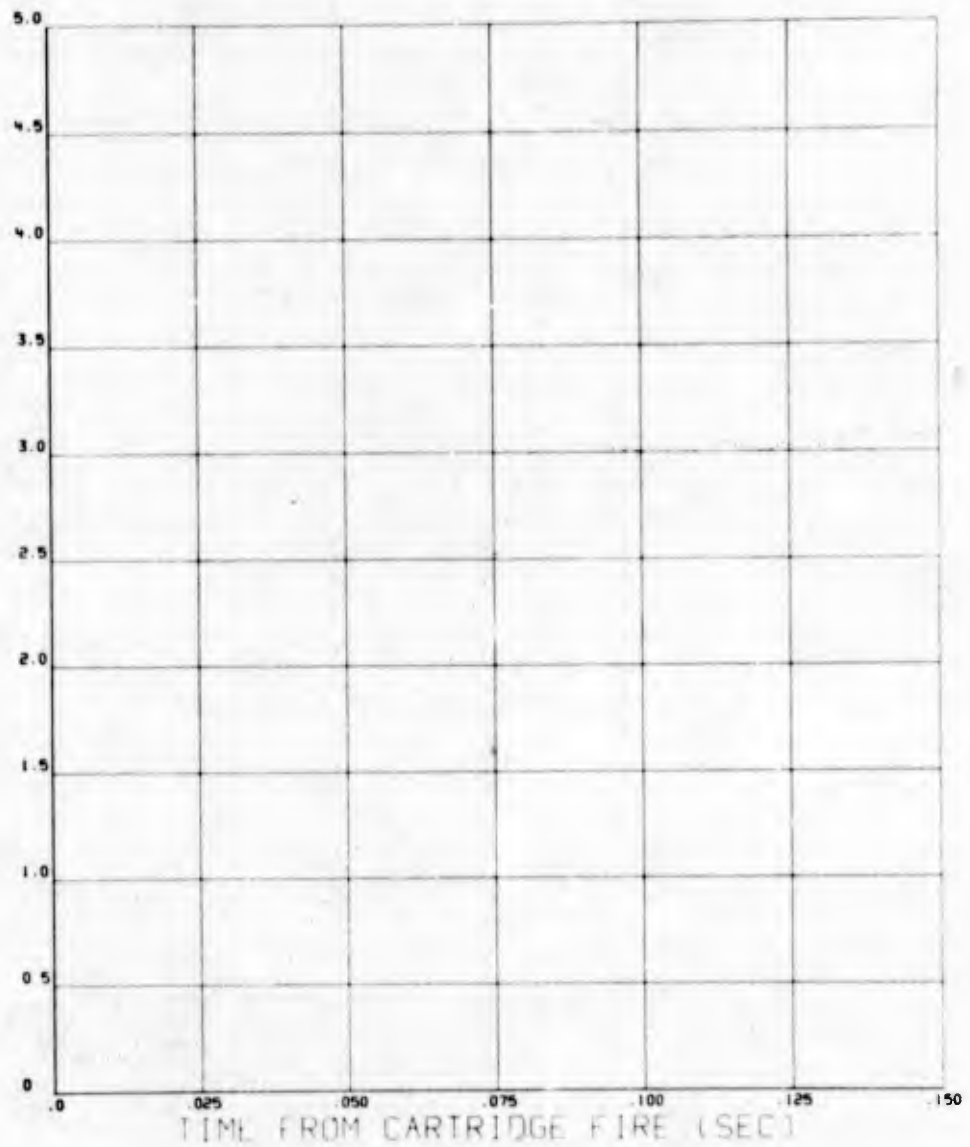
HOOK
REACTION
(LBS)
* = AFT



19.04 670AG018 25 MAY 72 MSN 110C BOMB 190

0243
1.33 07

EJECTOR
FOOT
POSITION
(INCHES)

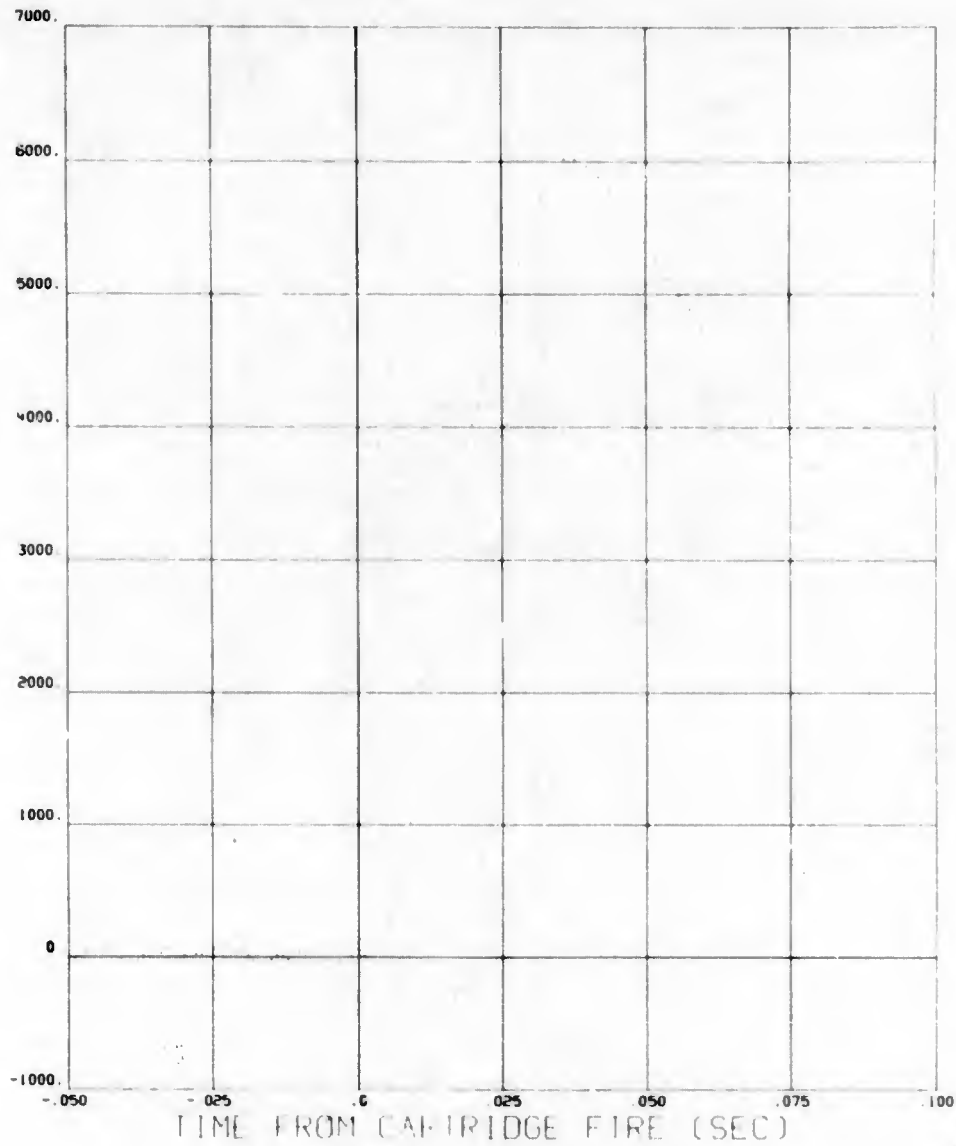


PLOT PREPARED BY TSK, ADTC

670AG018 25 MAY 72 MSN 110C BOMB 190

R243
134 0

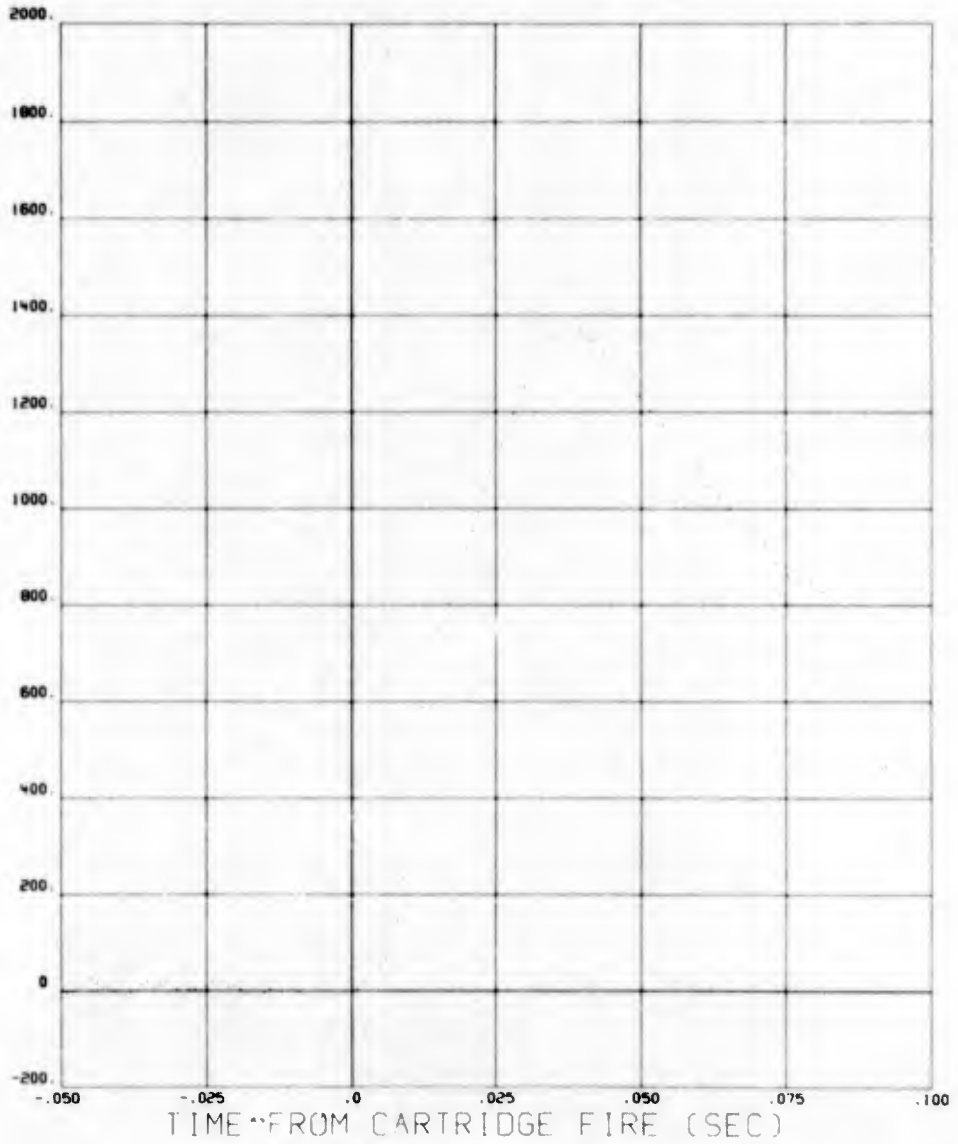
EJECTION
CHAMBER
PRESSURE
(PSI)



19 04/73 670AG018 25 MAY 72 MSN 110C BOMB 190

R243
135 0

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY TSX, ADIC

DATE 25 MAY 72 MISSION 110S 90MB ID 187 BOMB WEIGHT 508.50 LBS

EJECTOR MOMENT ARM
TIME OF EJECTOR STROKE
A/C ANGLE OF ATTACK AT RELEASE
A/C PITCH ANGLE AT RELEASE
A/C ROLL ANGLE AT RELEASE
RACK EJECTION ANGLE

2.625 INCHES
.068 SEC
2.225 DEG
-21.230 DEG
5.880 DEG
-48.000 DEG

IMPACT RANGE DEFLECTION
FEET FEET

RELEASE HISTORY
PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

HR MIN SEC
*** ** *
*** ** *
23 7 11.721
23 7 11.724
23 7 11.721
23 7 11.722
23 7 11.792
23 7 11.723
23 7 11.724

TIME DELAY
MILLISECONDS

0 3 0 1 71 2 3

MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE

74.42 DEG F
97.20 DEG F
69.76 DEG F

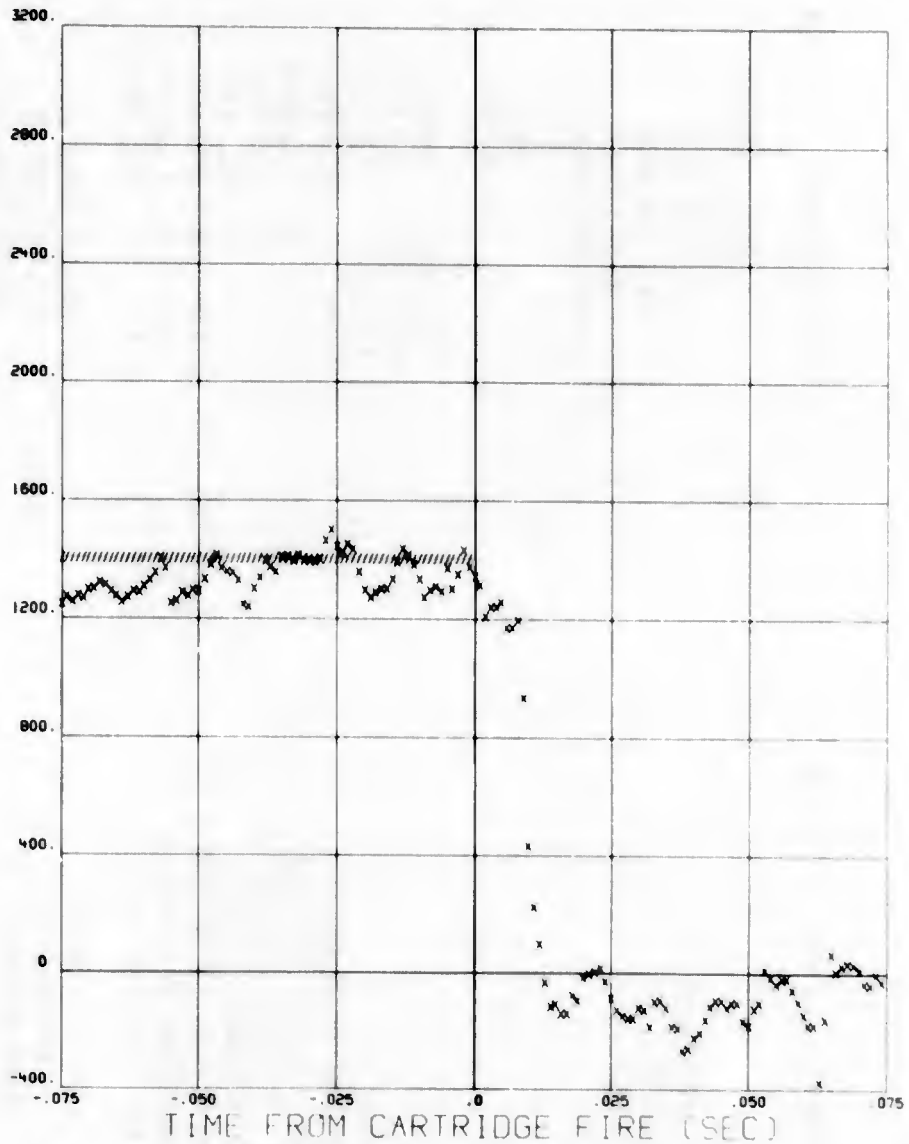
SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

4.5 FT/SEC
6.3 FT/SEC

19.04.73 670AG018 25 MAY 72 MSN 110S BOMB 187

R243
136 0 1

SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD

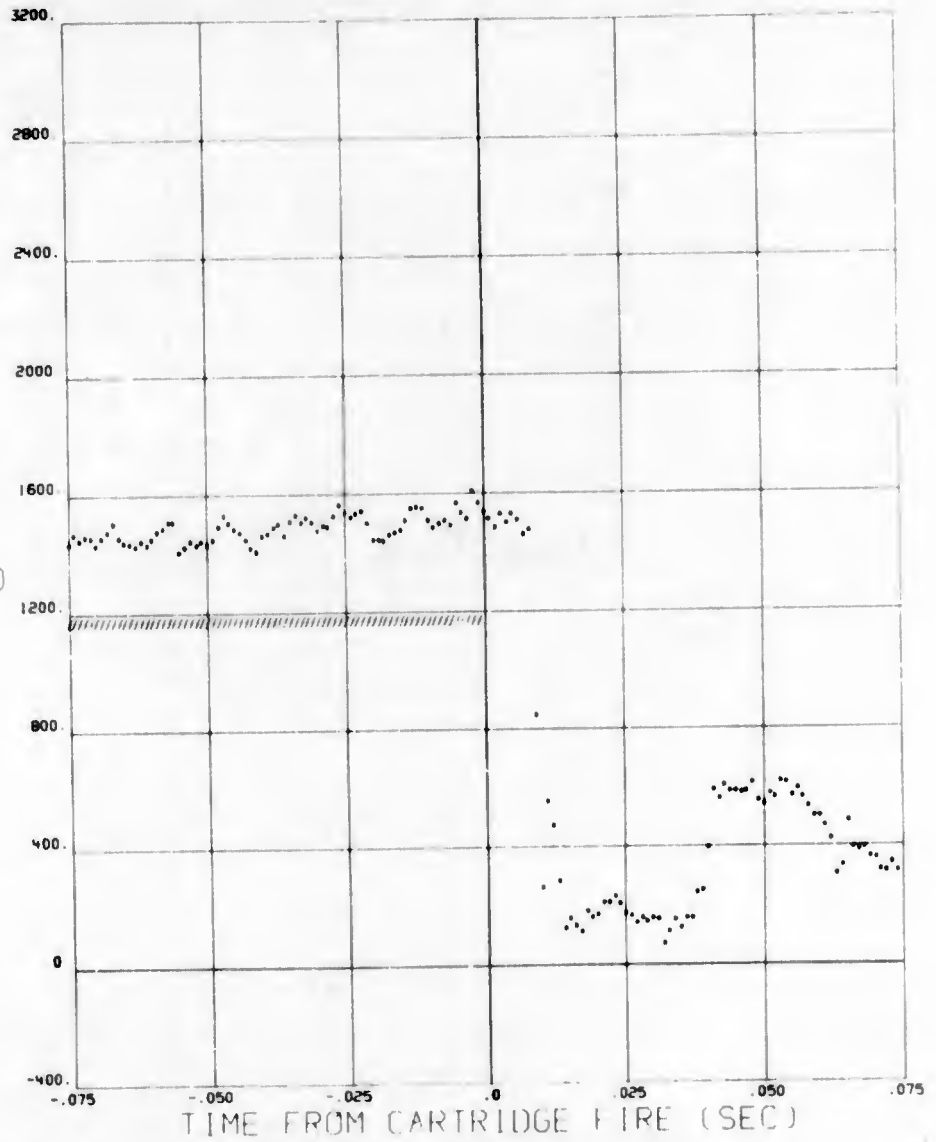


PLOT PREPARED BY TSX, ADIC

19 04 74 67046018 25 MAY 72 MSN 110S BOMB 187

R243
157 0

SWAY
BRACE
STRAIN
(LBS)
• = RIGHT FWD

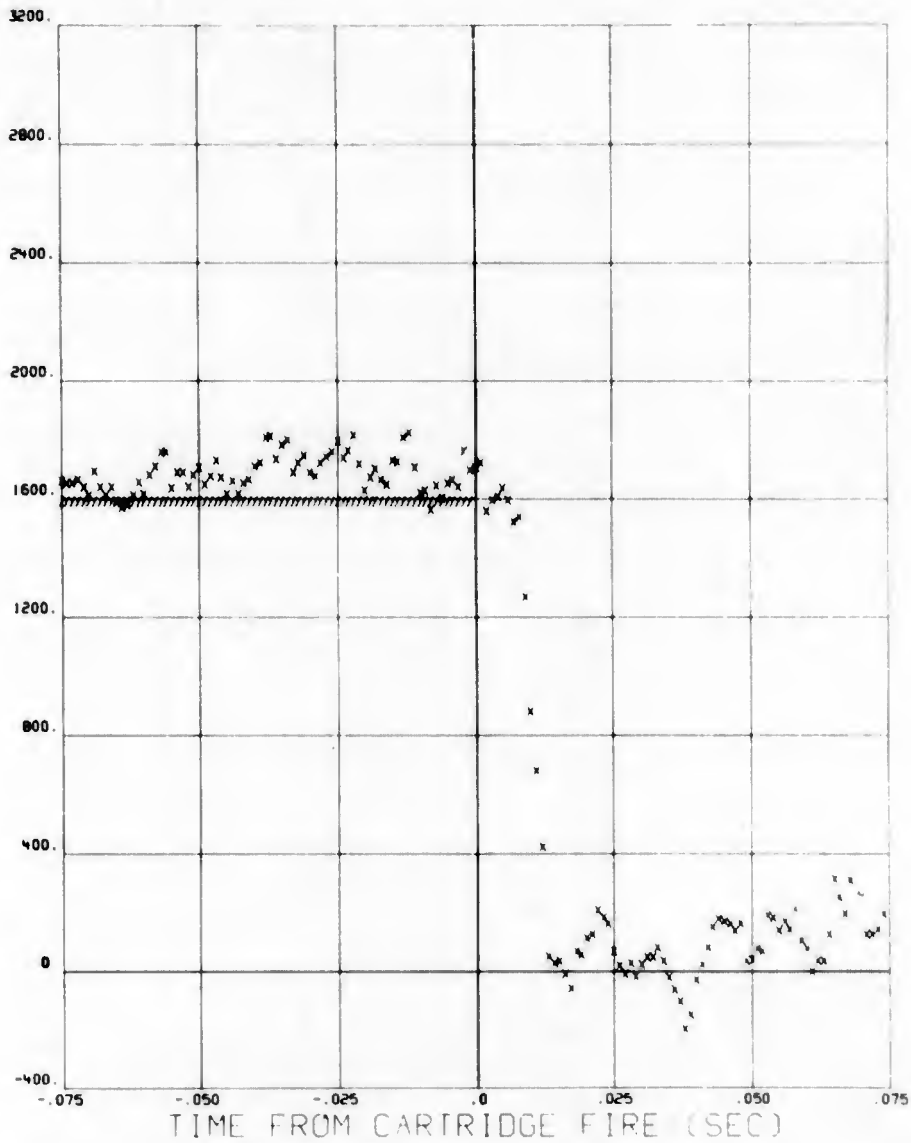


PLOT PREPARED BY TSX, ADIC

070AG018 25 MAY 7. MSN 110S BOMB 187

RUN 3
1 58 0

SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT

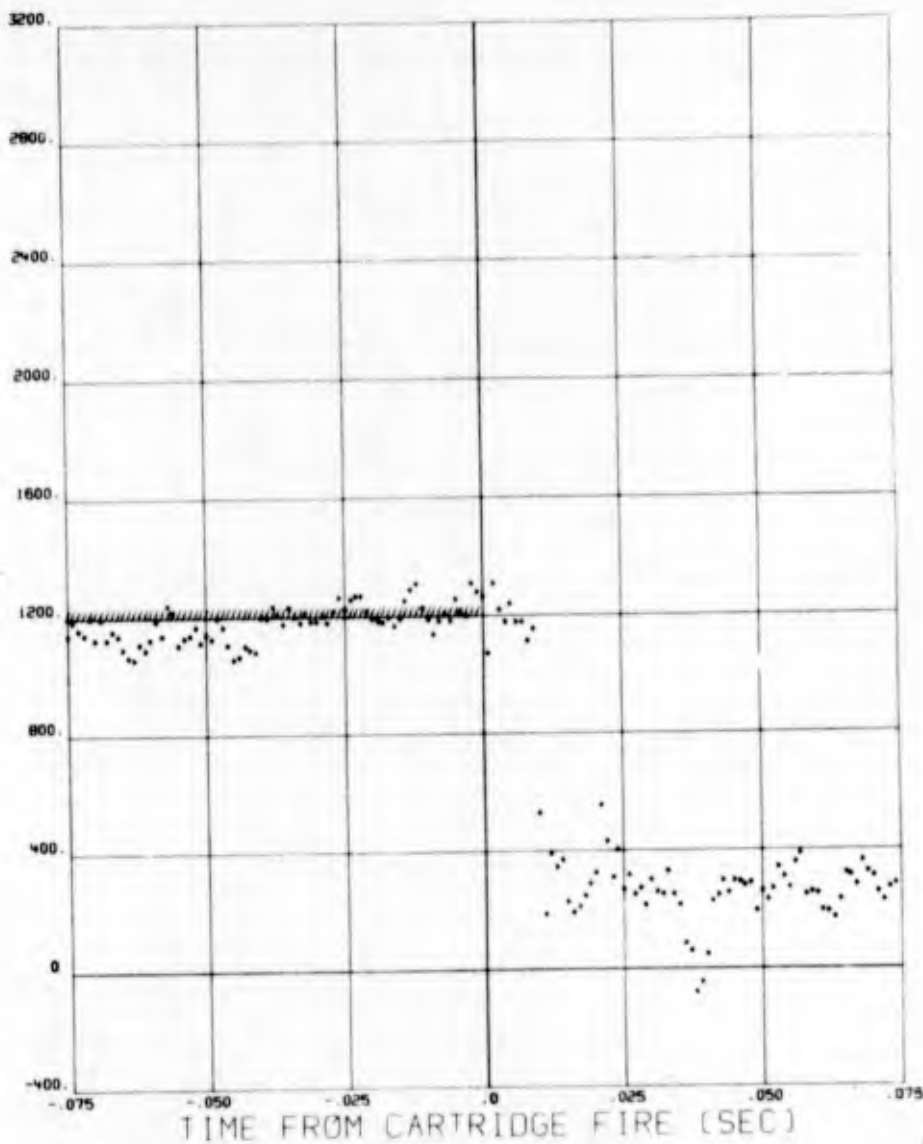


PLOT PREPARED BY 15X, ADIC

67049018 25 MAY 72 MSN 1105 BOMB 187

0203
1.19

SWAY
BRACE
STRAIN
(LBS)
• = RIGHT AFT

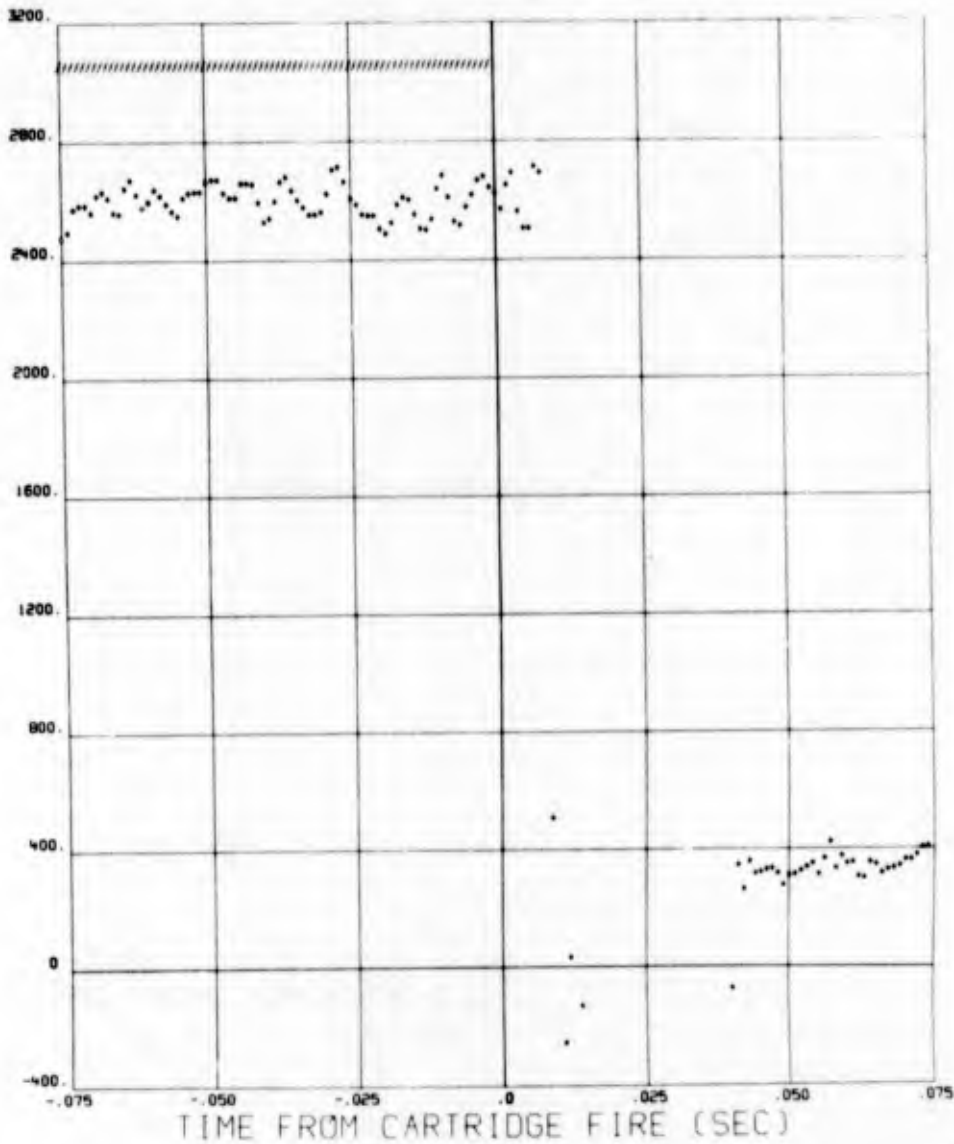


PLOT PREPARED BY TSK. ADTC

03 04 72 870AG018 25 MAY 72 MSN 1105 BOMB 187

R24 1
141 0 7

HOOK
REACTION
(LBS)
* = AFT

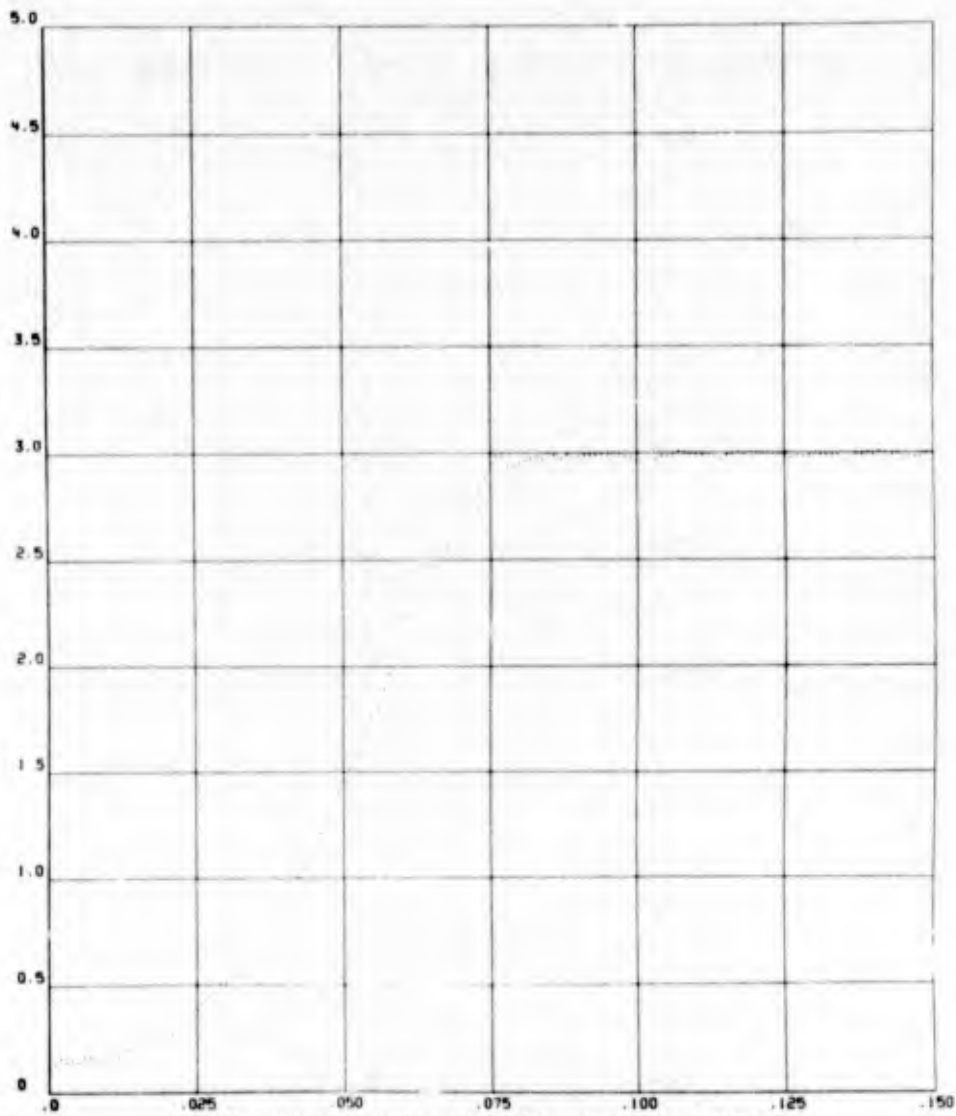


PLOT PREPARED BY TSK, ADTC

19 04 73 670AG018 25 MAY 72 MSN 110S BOMB 187

R243
142 0

EJECTOR
FOOT
POSITION
(INCHES)



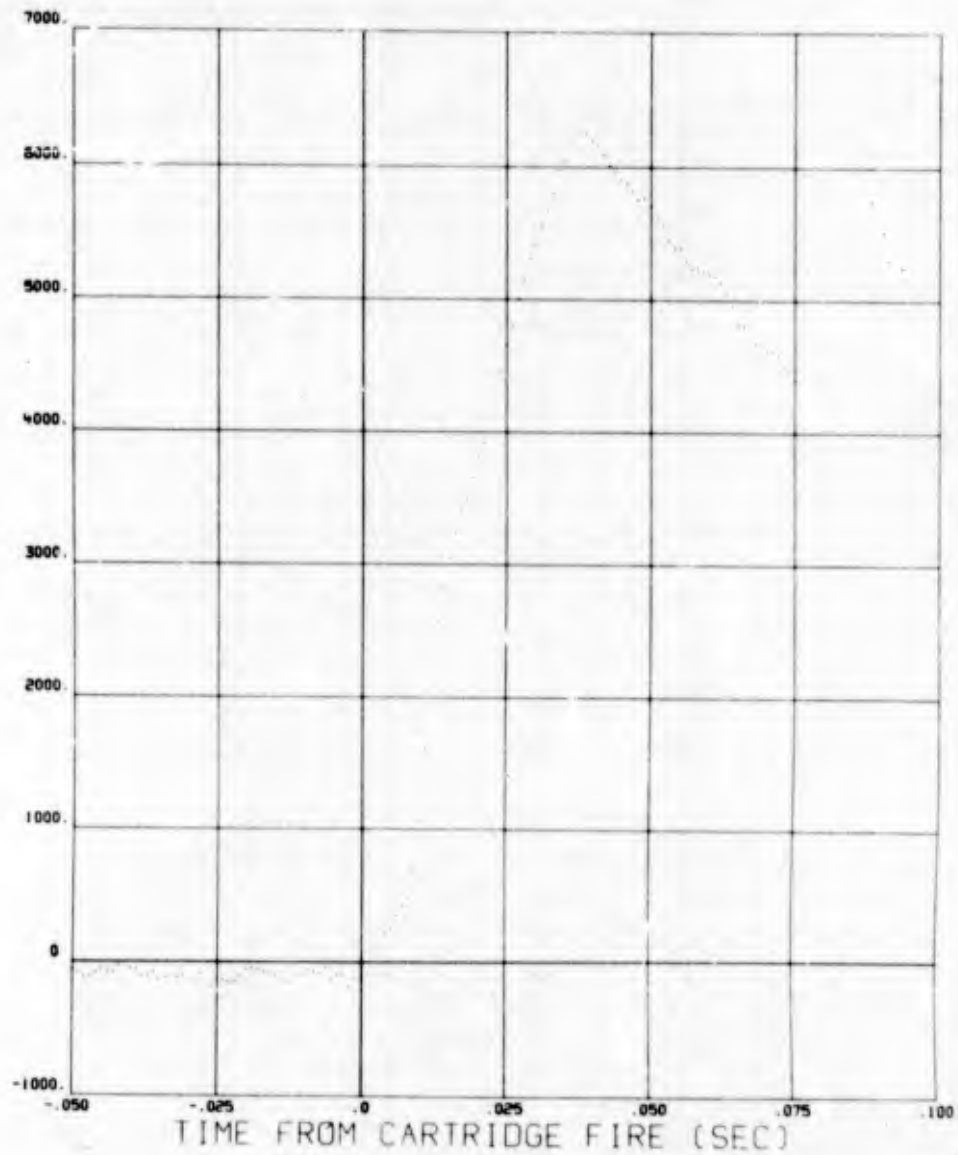
TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADIC

19/04/73 670AG018 25 MAY 72 MSN 110S BOMB 187

REV 1
143 0

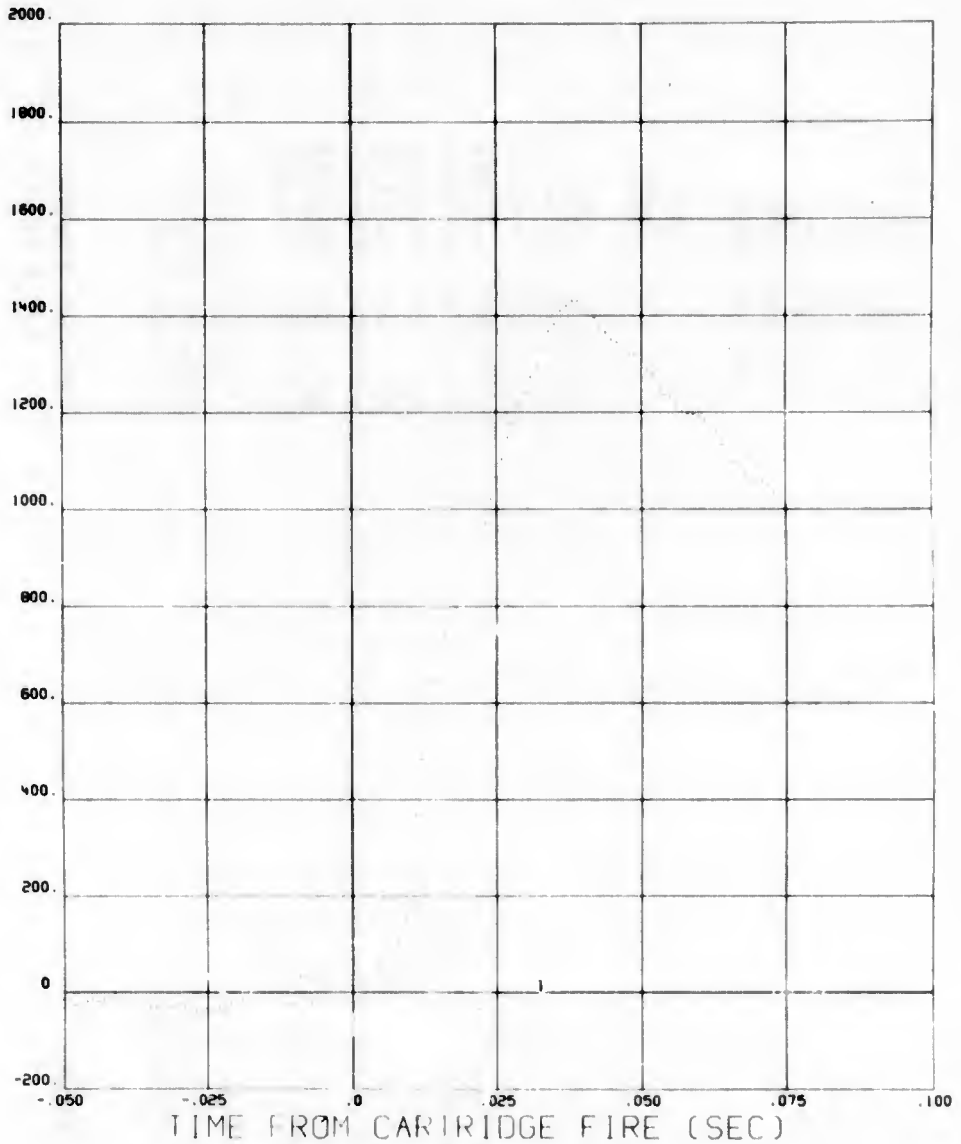
EJECTION
CHAMBER
PRESSURE
(PSI)



19.04.73 670AG018 25 MAY 72 MSN 110S BOMB 187

R243
199 0

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY TSX, ADTC

DATE 25 MAY 72 MISSION 111C BOMB ID 166 BOMB WEIGHT 503.50 LBS

EJECTOR MOMENT ARM
 TIME OF EJECTOR STROKE
 A/C ANGLE OF ATTACK AT RELEASE
 A/C PITCH ANGLE AT RELEASE
 A/C ROLL ANGLE AT RELEASE
 RACK EJECTION ANGLE

IMPACT RANGE DEFLECTION
 FEET FEET

RELEASE HISTORY
 PICKLE TIME
 CARTRIDGE FIRE
 INITIAL LINKAGE MOVEMENT
 EJECTOR FOOT (FIRST MOTION)
 STORE FIRST MOTION (FORWARD)
 STORE FIRST MOTION (AFT)
 EJECTOR FOOT FULL EXTENDED
 HOOK FIRST MOTION (FORWARD)
 HOOK FIRST MOTION (AFT)

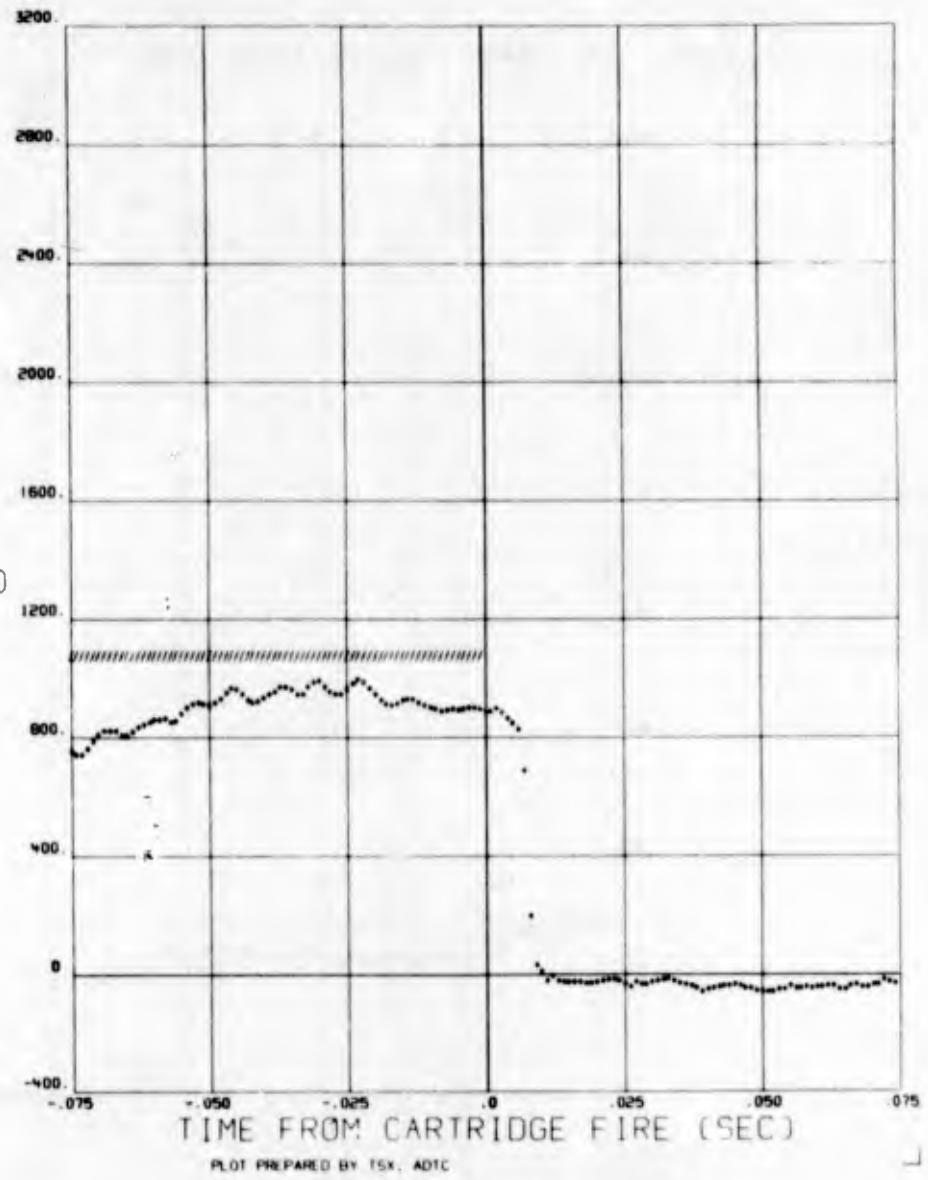
MAXIMUM PRE-FLT GROUND TEMPERATURE
 MAXIMUM POST-FLT GROUND TEMPERATURE
 MAXIMUM BREECH AMBIENT TEMPERATURE

SEPARATION VELOCITY
 DISPLACEMENT METHOD
 PRESSURE METHOD
 FT/SEC FT/SEC

TIME DELAY
 MILLISECONDS
 0
 0
 0
 0
 0

HR MIN SEC
 17 39 54.000
 17 39 54.000
 17 39 54.000
 17 39 54.000
 17 39 54.000

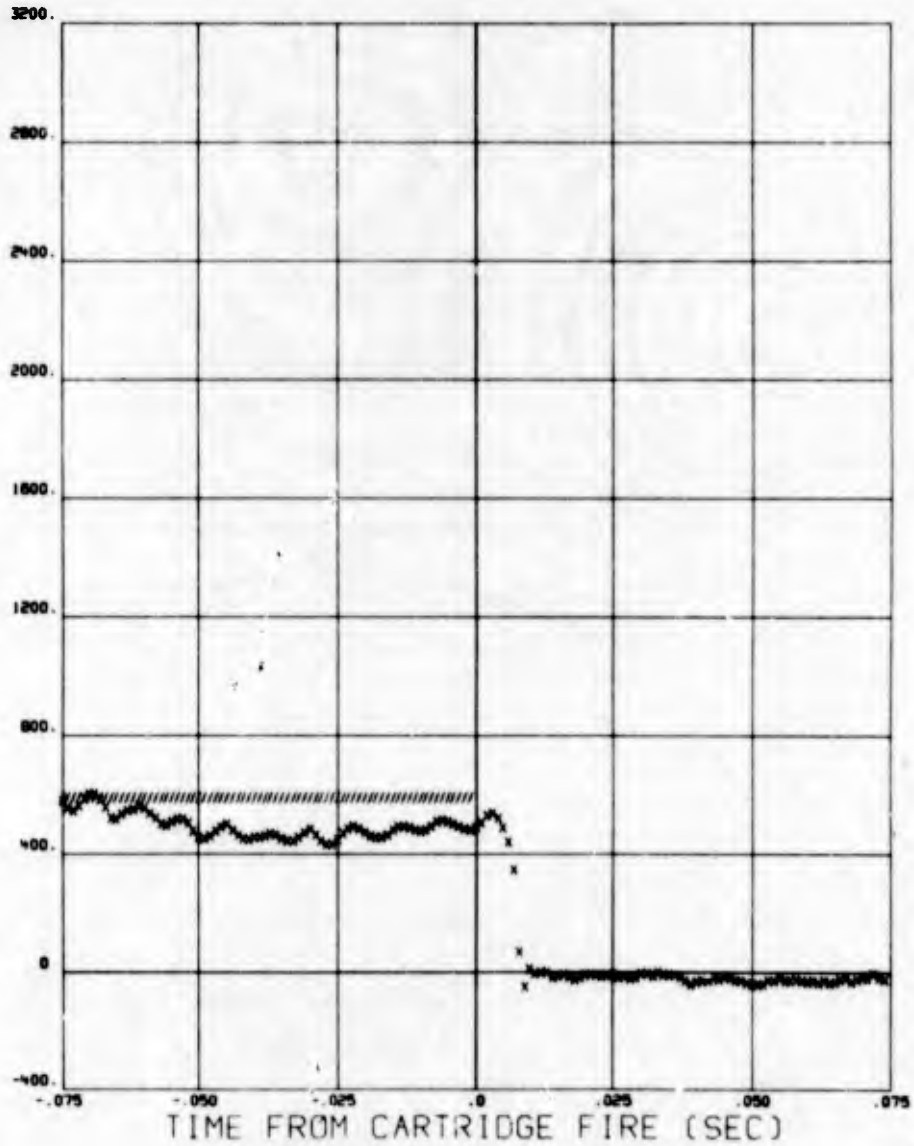
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



19/04/73 670AG018 25 MAY 72 MSN 111C BOMB

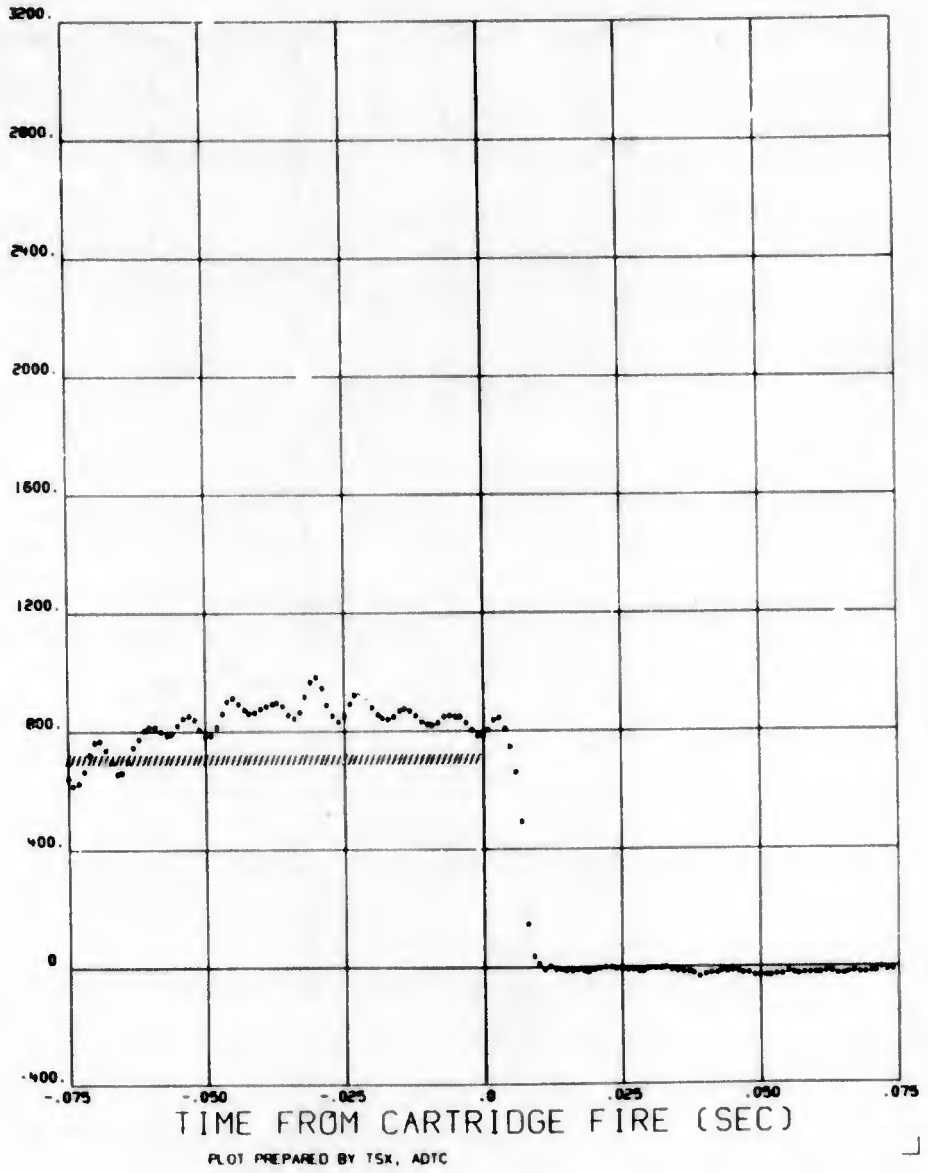
186 ^{R243} 147 0

SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



PLOT PREPARED BY TSX, ADTC

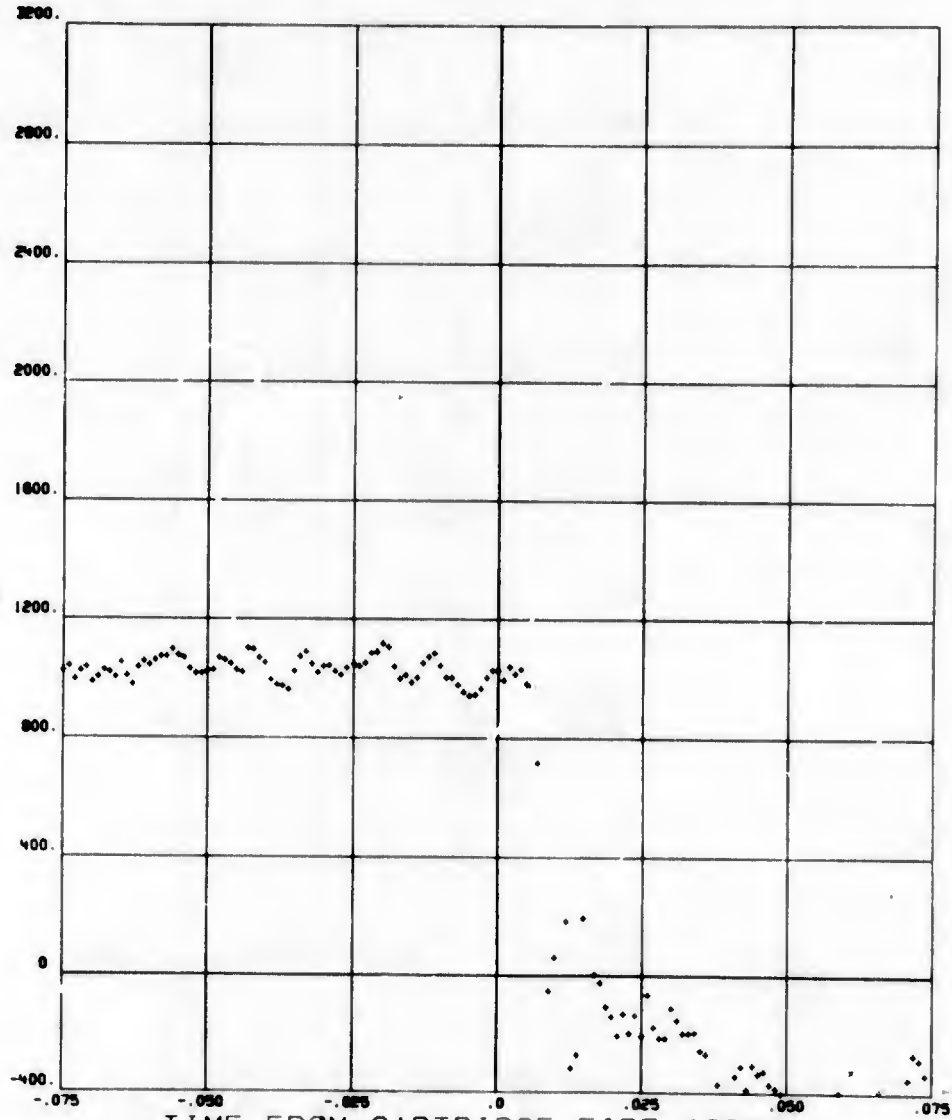
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



19/04/73 670AG018 25 MAY 72 MSN 111C BOMB

186 ^{R243} 149 07

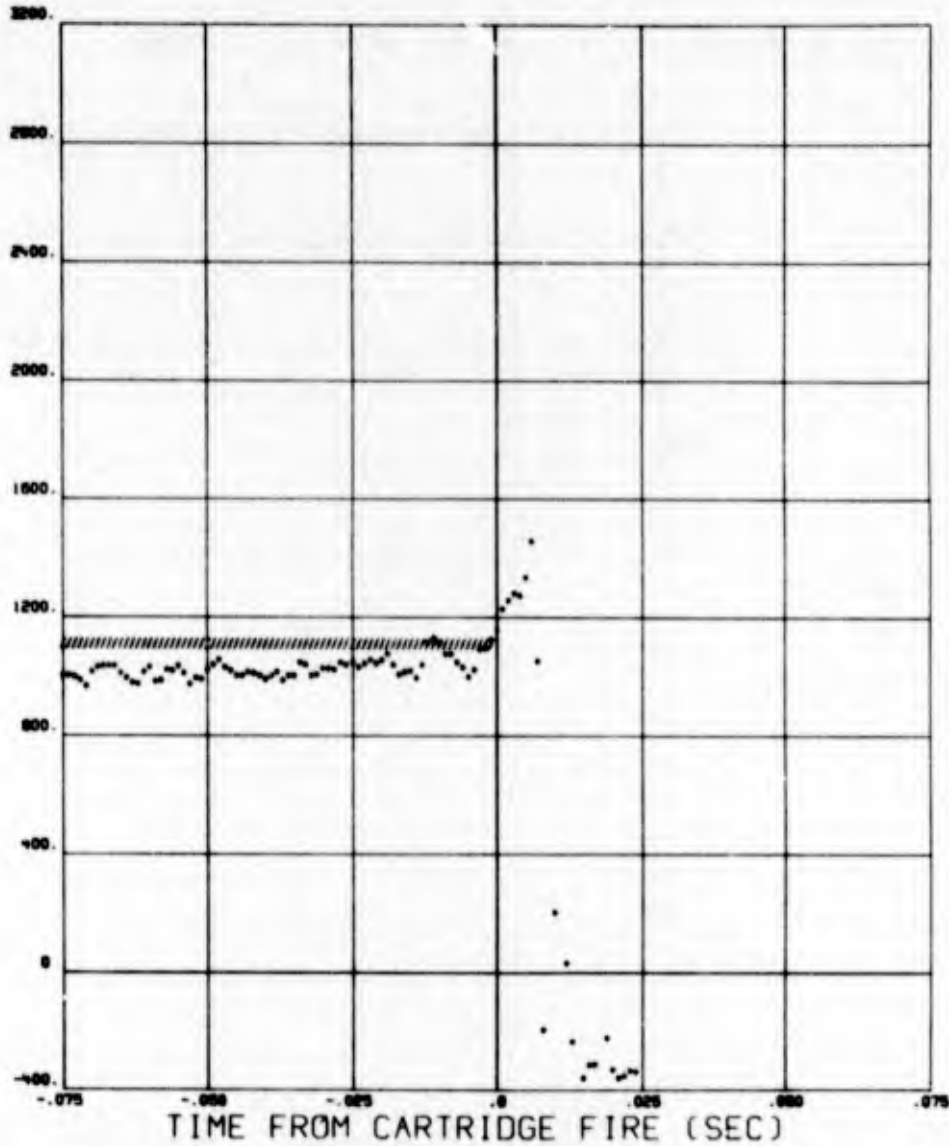
HOOK
REACTION
(LBS)
+ = FORWARD



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

HOOK
REACTION
(LBS)
* = AFT

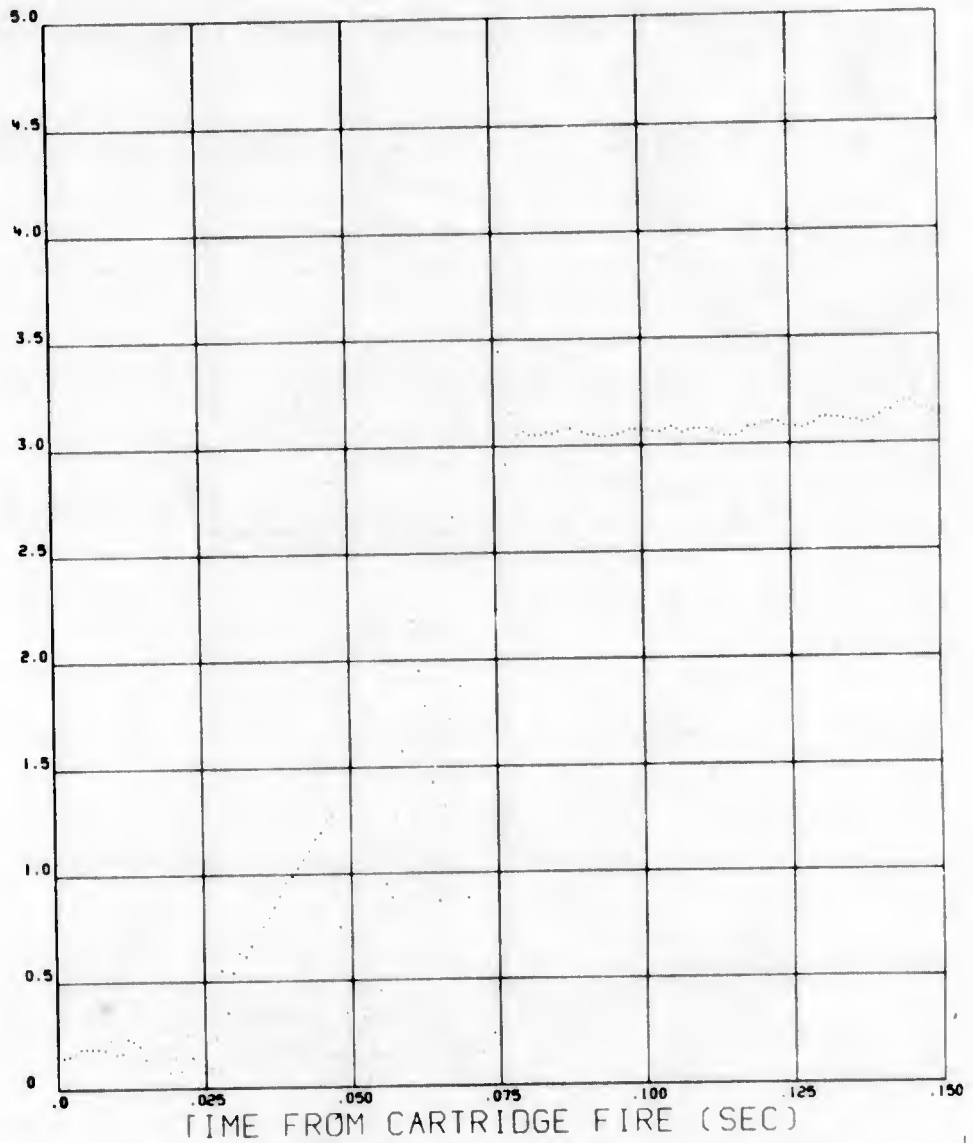


PLOT PREPARED BY TSX, ADTC

19/04/73 670AG018 25 MAY 72 MSN 111C BOMB

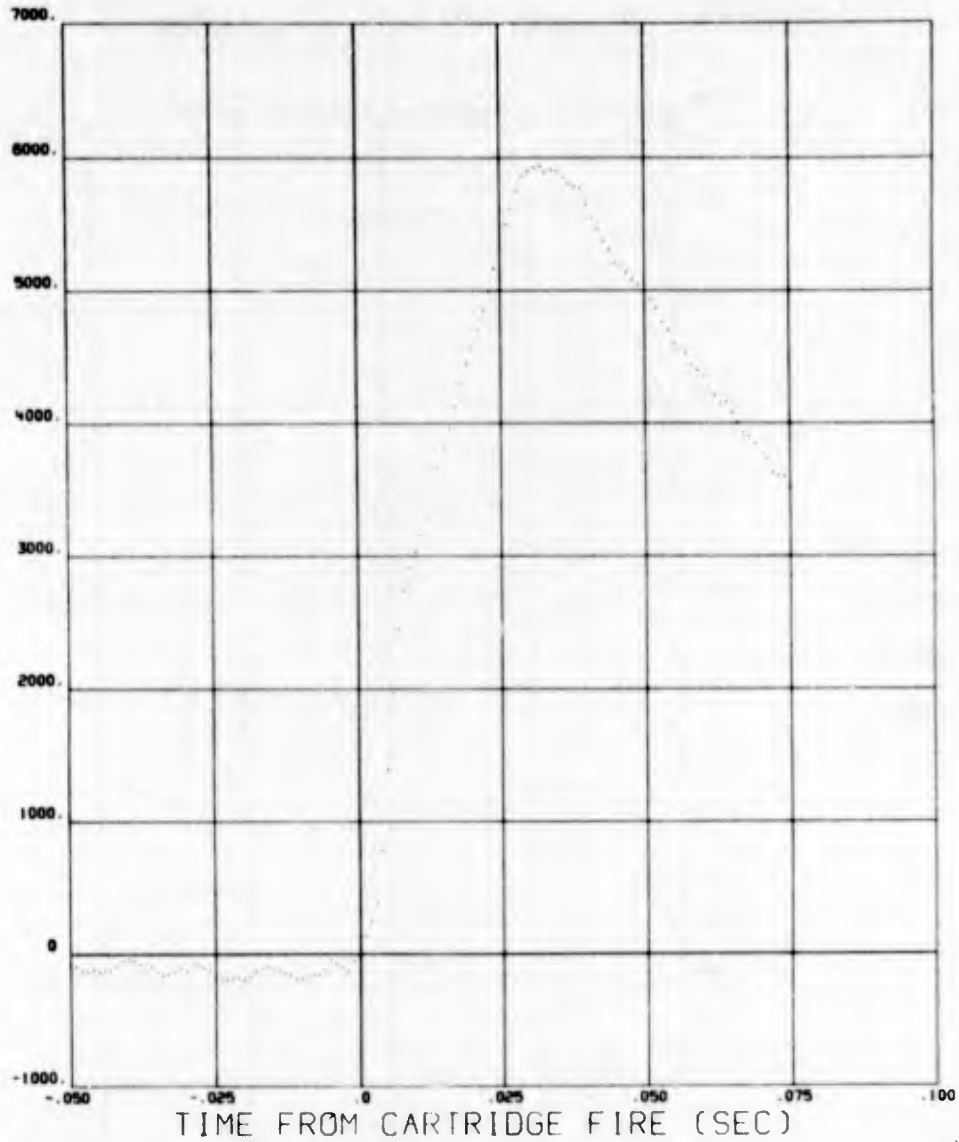
186^{R243}₁₅₁ 0

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY 1SX, ADTC

EJECTION
CHAMBER
PRESSURE
(PSI)

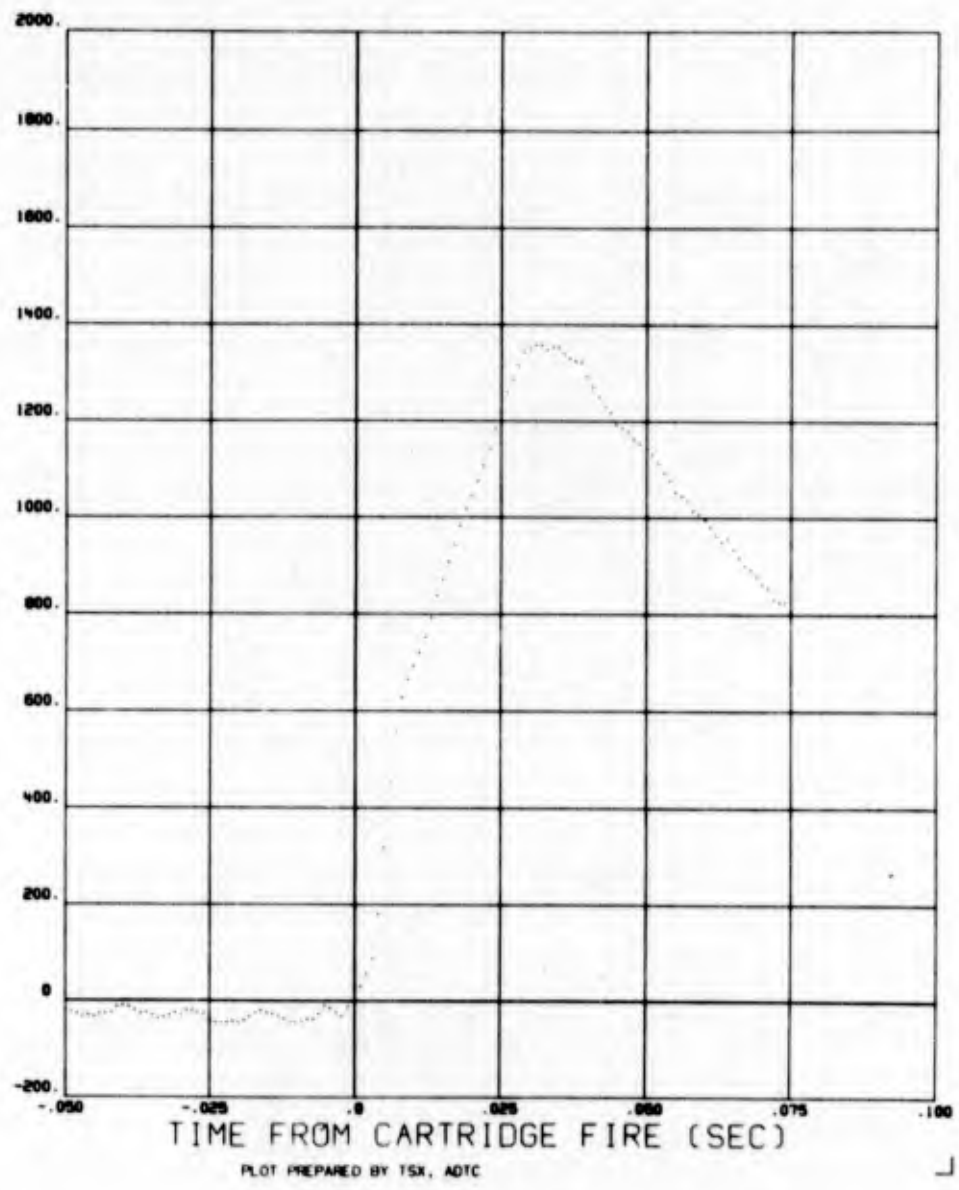


PL01 PREPARED BY 15x, ADIC

19/04/73 670AG018 25 MAY 72 MSN 111C BOMB

186^{R243}₁₅₃ 0

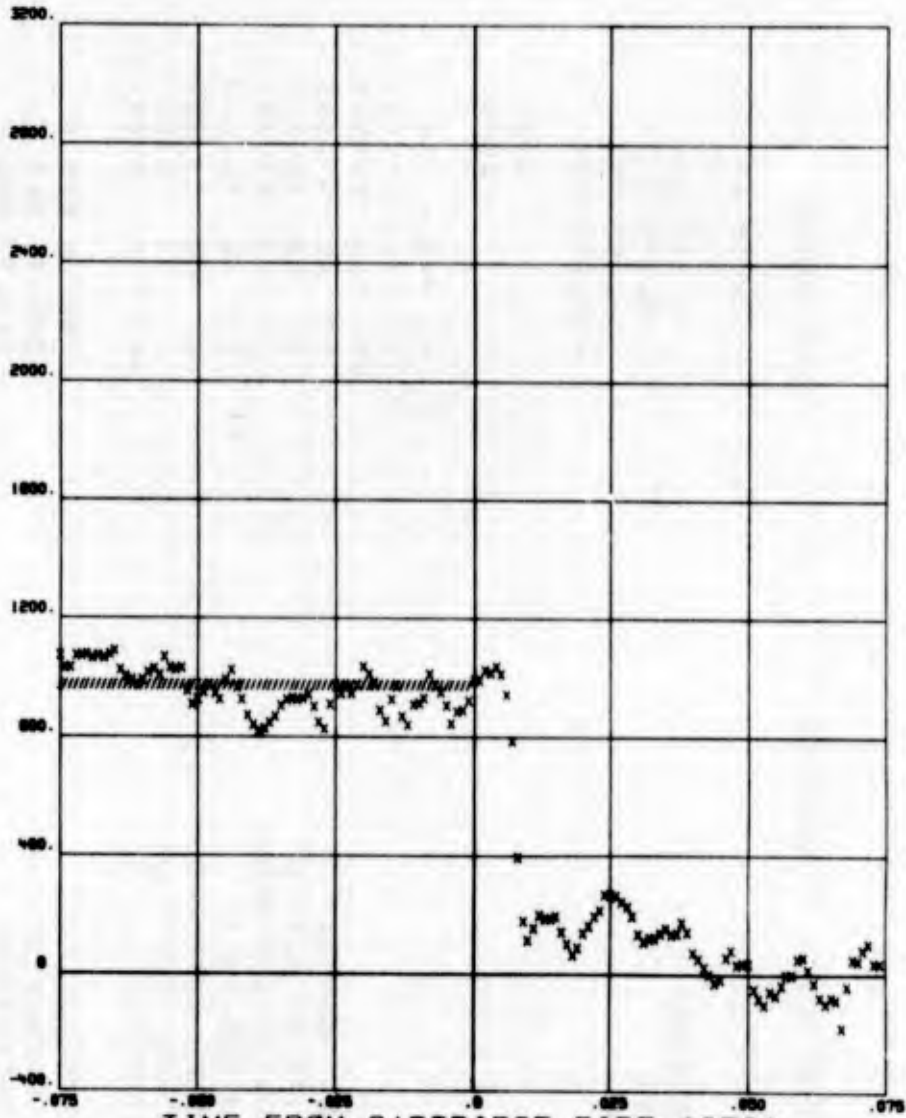
EJECTOR
FOOT
FORCE
(LBS)



19/04/73 670AG018 25 MAY 72 MSN 111S BOMB

195^{R243} 154 07

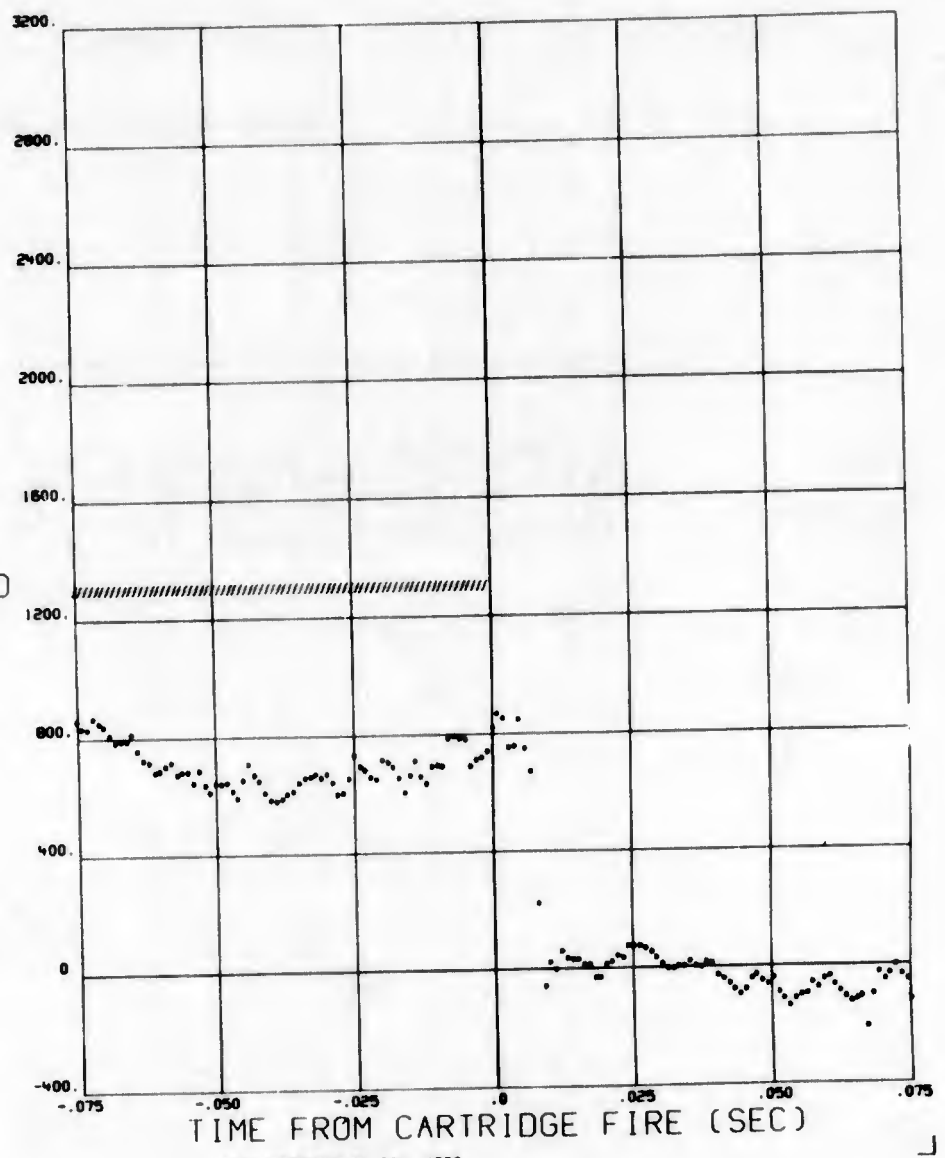
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



TIME FROM CARTRIDGE FIRE (SEC)

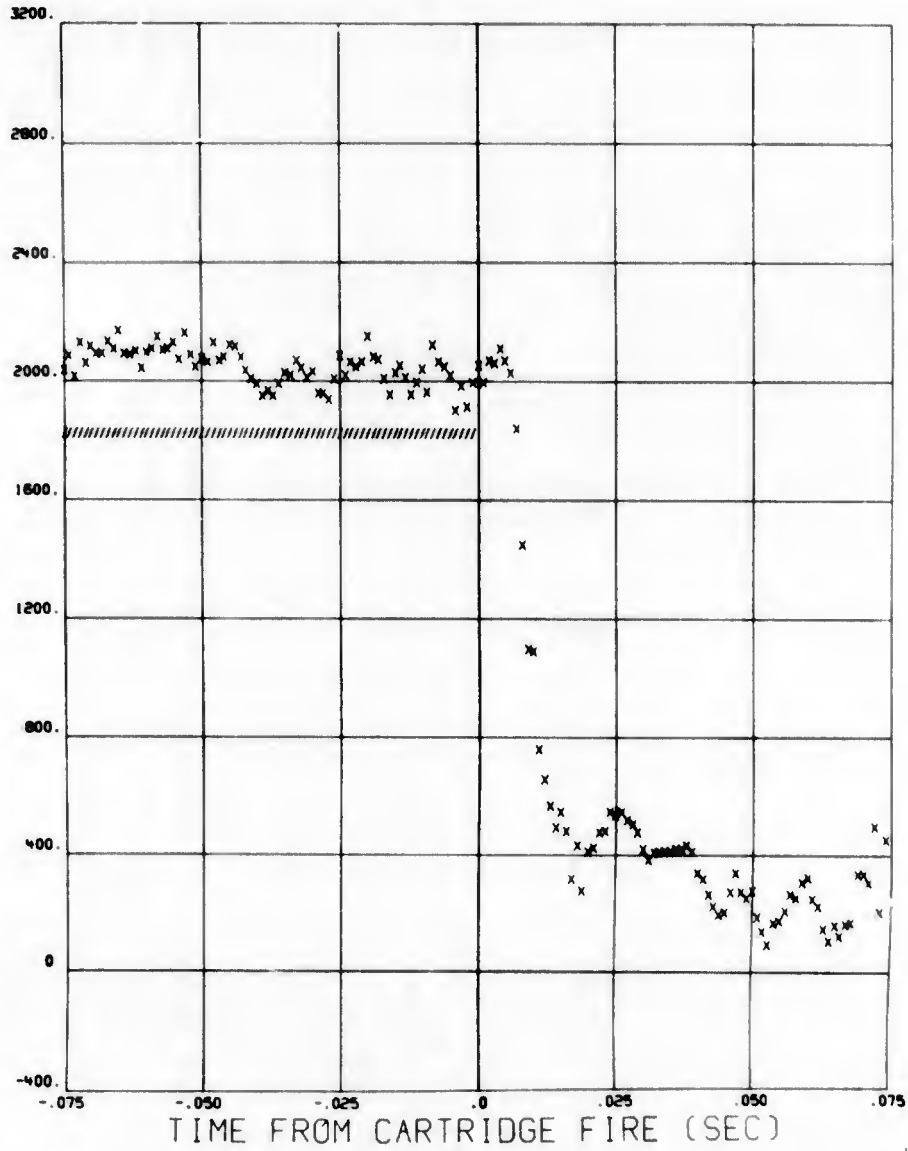
PLOT PREPARED BY TSX, ADTC

SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



PLOT PREPARED BY TSX, ADTC

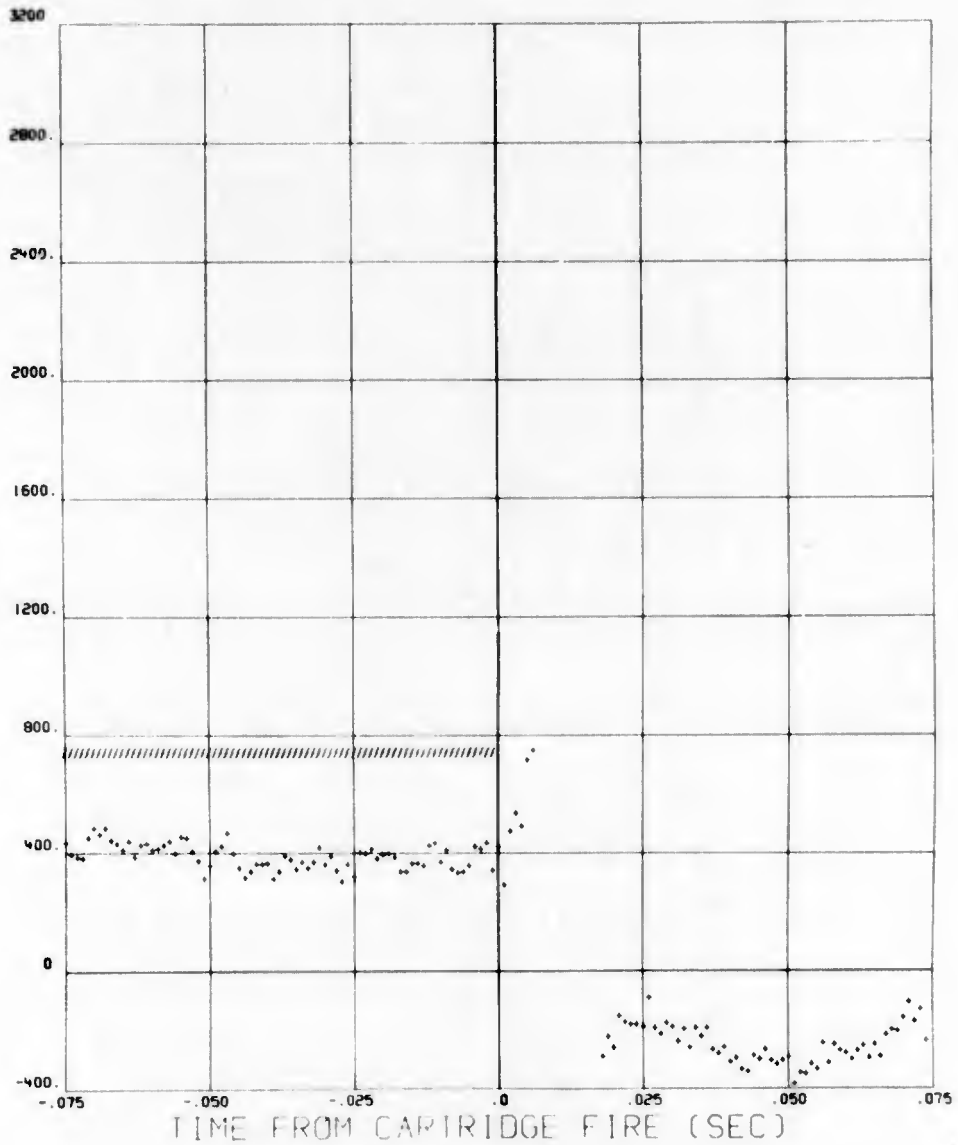
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

HOOK
REACTION
(LBS)
* = FORWARD

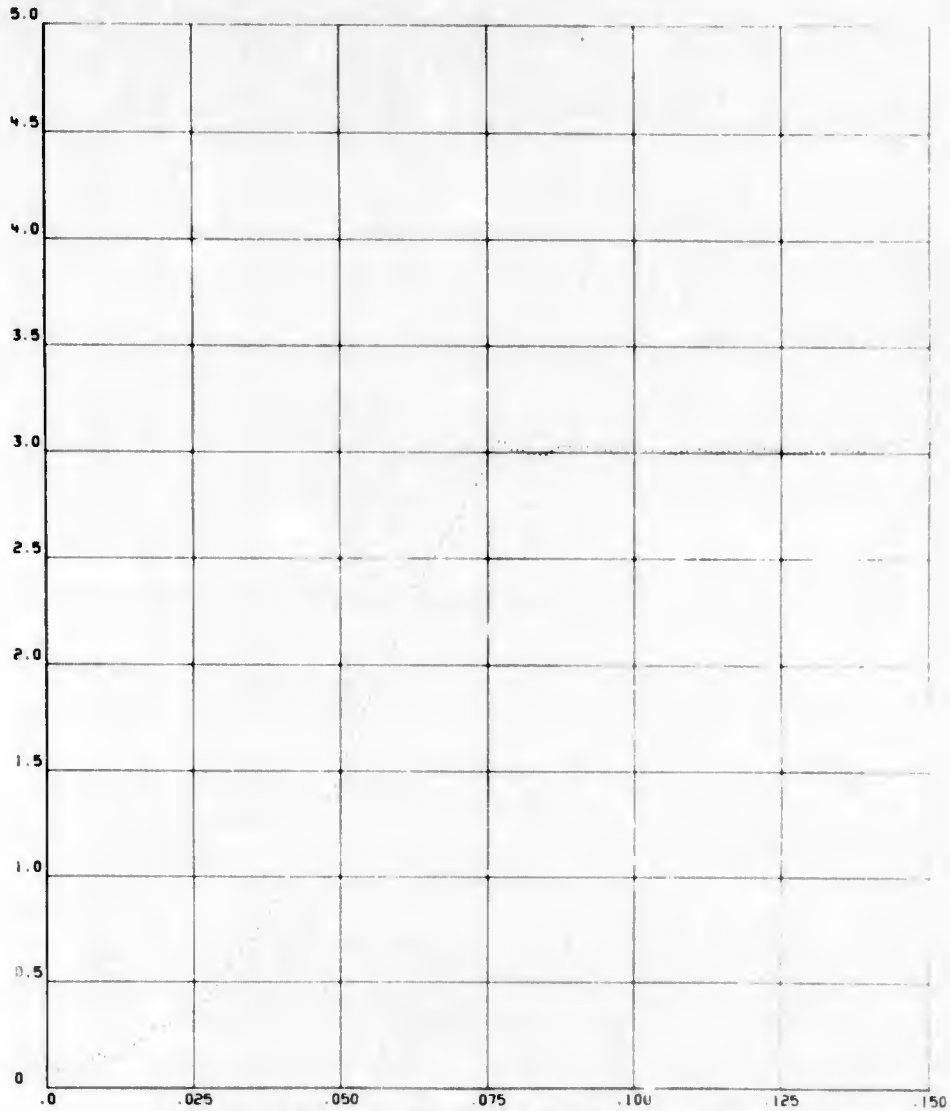


PLUT PREPARED BY TSA, ADTC

670AG018 25 MAY 72 MSN 1115 BOMB

195 ^{R2142} 160 0

EJECTOR
FOOT
POSITION
(INCHES)



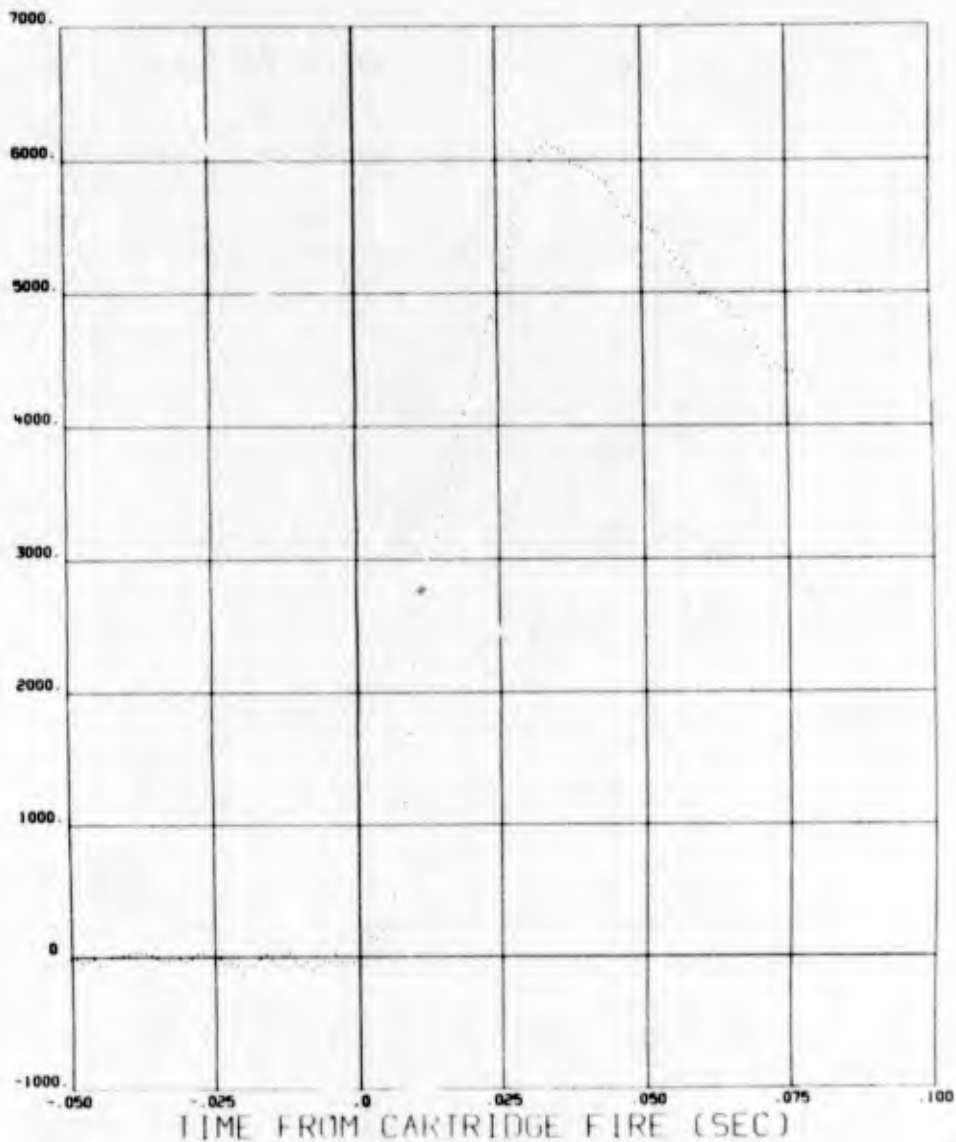
TIME FROM CARTRIDGE FIRE (SECT)

PLOT PREPARED BY USA, ADIC

19.04 13 670AG018 25 MAY 72 MSN 1115 BOMB

195^{R243} 161 0 7

EJECTION
CHAMBER
PRESSURE
(PSI)

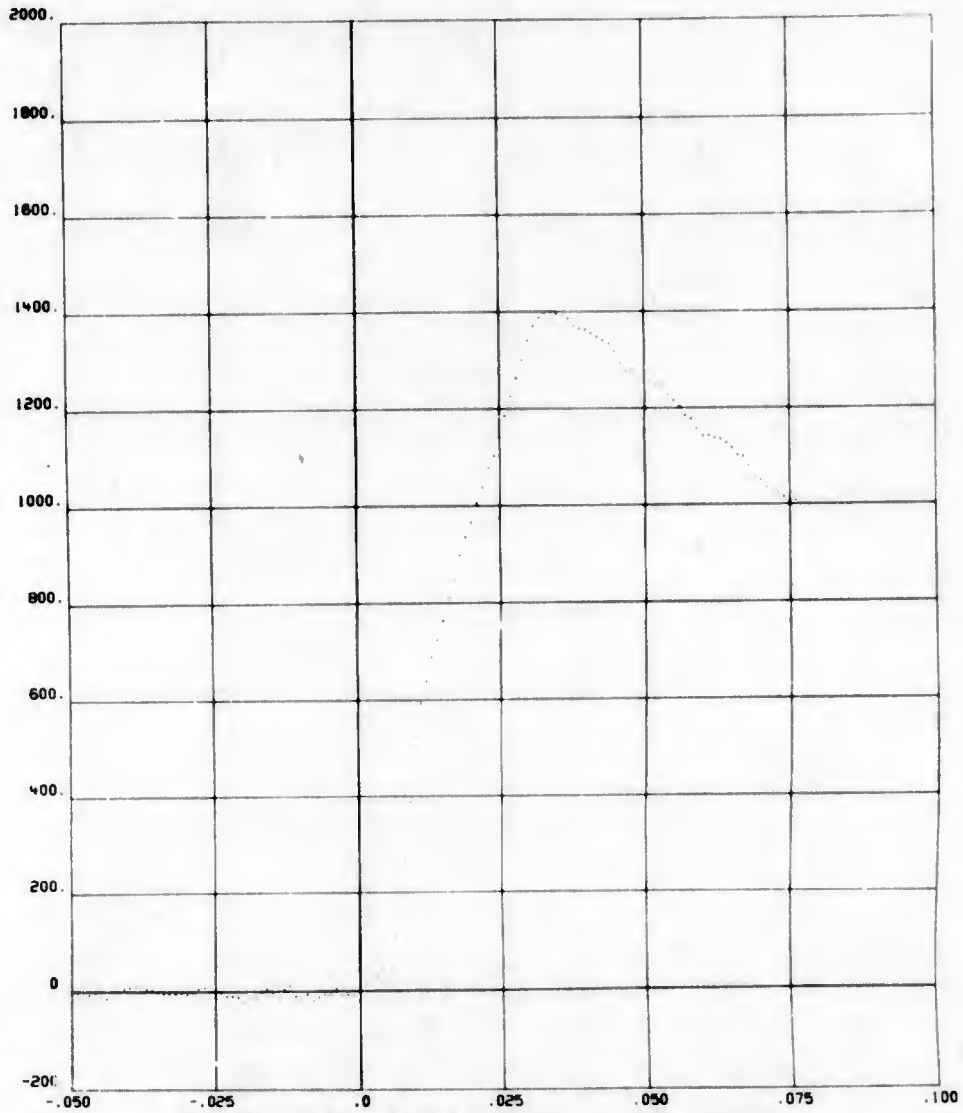


PLOT PREPARED BY 15X, ADTC

19/04/73 670AG018 25 MAY 72 MSN 111S BOMB

195 R243 162 0 7

EJECTOR
FOOT
FORCE
(LBS)



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

DATE 26 MAY 72 MISSION 112C BOMB ID 146 BOMB WEIGHT 500.00 LBS

EJECTOR MOMENT ARM
TIME OF EJECTOR STROKE
A/C ANGLE OF ATTACK AT RELEASE
A/C PITCH ANGLE AT RELEASE
A/C ROLL ANGLE AT RELEASE
RACK EJECTION ANGLE

2.938 INCHES
.066 SEC
3.948 DEG
2.060 DEG
-.360 DEG
0.000 DEG

IMPACT RANGE DEFLECTION

FEET FEET

RELEASE HISTORY

PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

HR MIN SEC
*** **
2 52 13.110
2 52 13.115
2 52 13.118
2 52 13.116
2 52 13.116
2 52 13.184
2 52 13.116
2 52 13.117

TIME DELAY
MILLISECONDS

0 5 8 6 6 74 6 7

MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREECH AMBIENT TEMPERATURE

57.42 DEG F
18.73 DEG F
15.81 DEG F

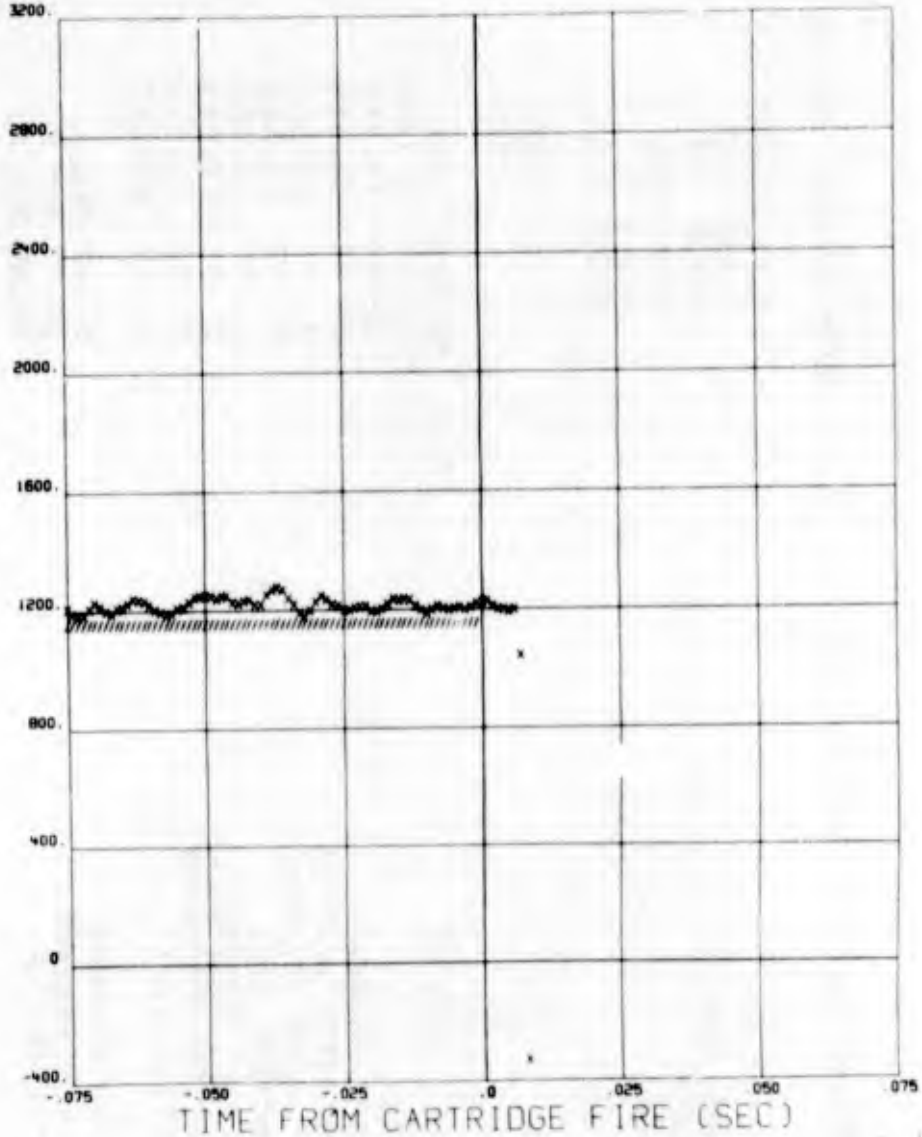
SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

7.8 FT/SEC
7.5 FT/SEC

14 04 13 670AG018 26 MAY 72 MSN 1120 BOMB 148

R243
163 0 1

SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD

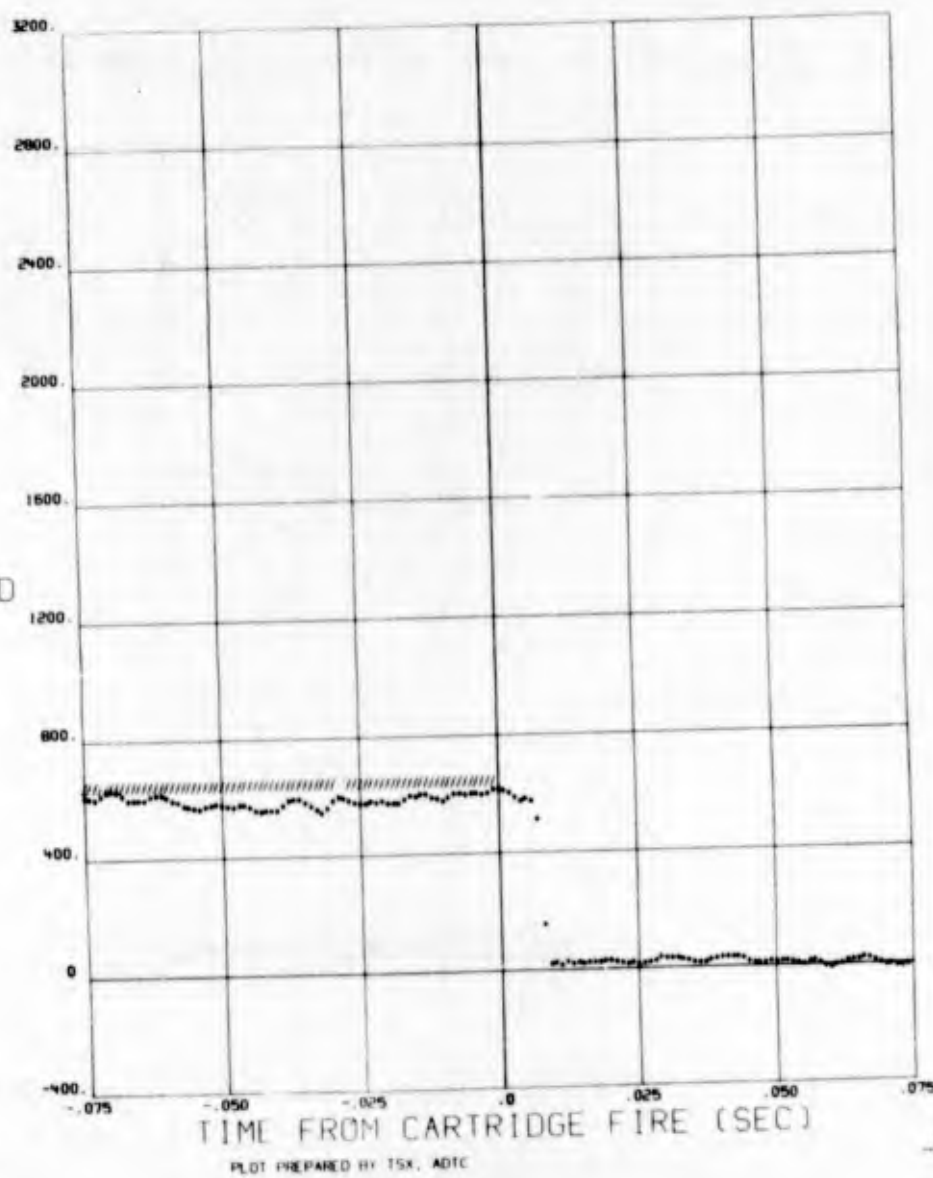


PLOT PREPARED BY TSA, ADIC

19 00 00 00046018 26 MAY 72 MSN 112C BOMB 148

R243
164 0 7

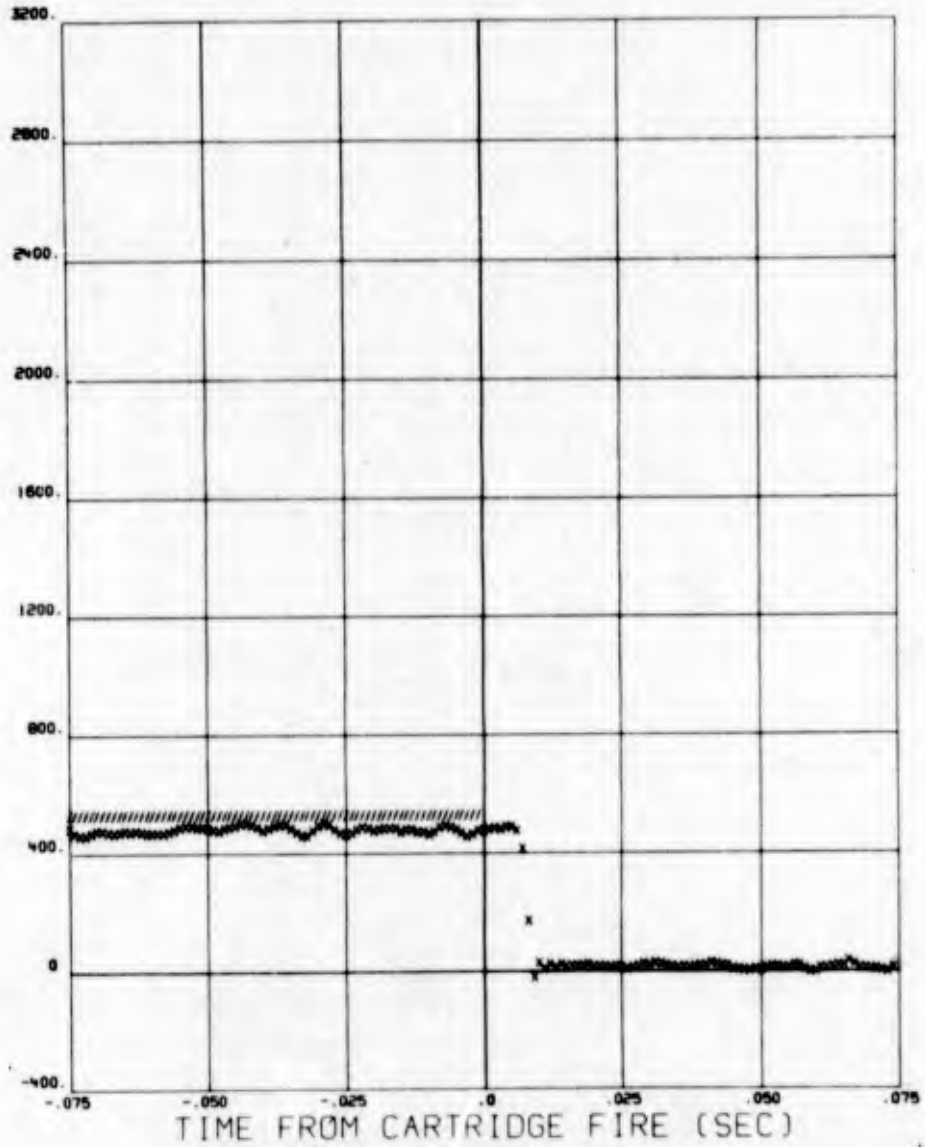
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



19/04/73 670AG018 26 MAY 72 MSN 112C BOMB 148

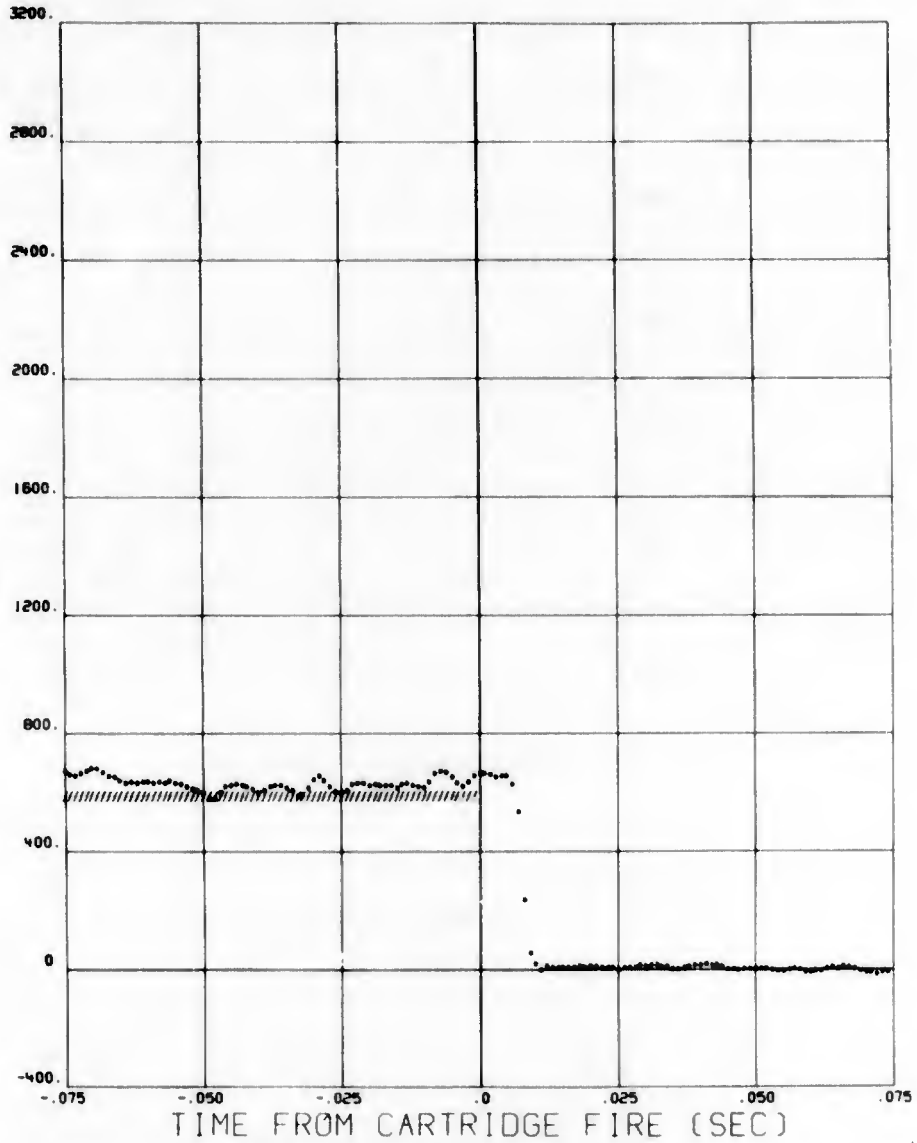
R243
165 0

SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



TIME FROM CARTRIDGE FIRE (SEC)
PLOT PREPARED BY TSK, ADTC

SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT

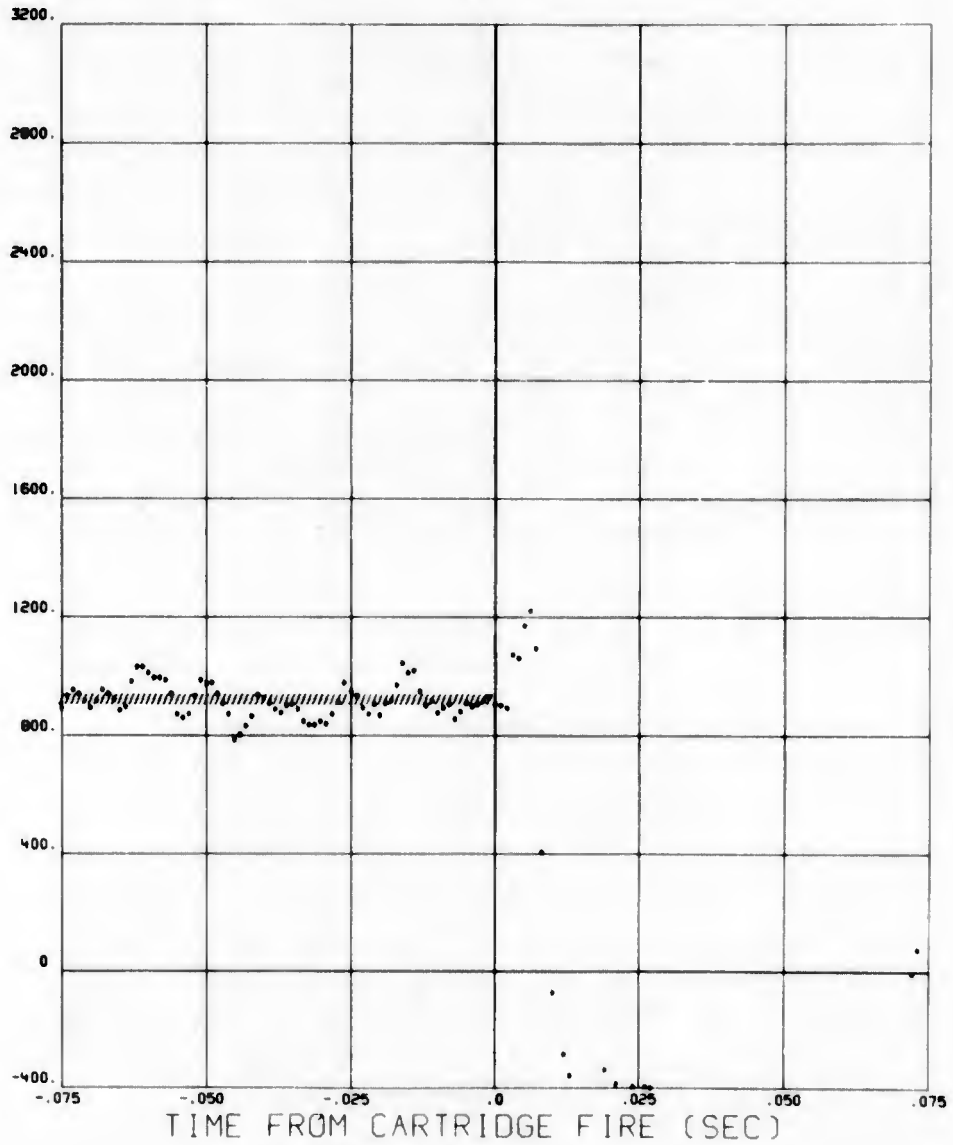


PLOT PREPARED BY 15X, ADTC

19/04/73 670AG018 26 MAY 72 MSN 112C BOMB 148

R243
168 0

HOOK
REACTION
(LBS)
* = AFT

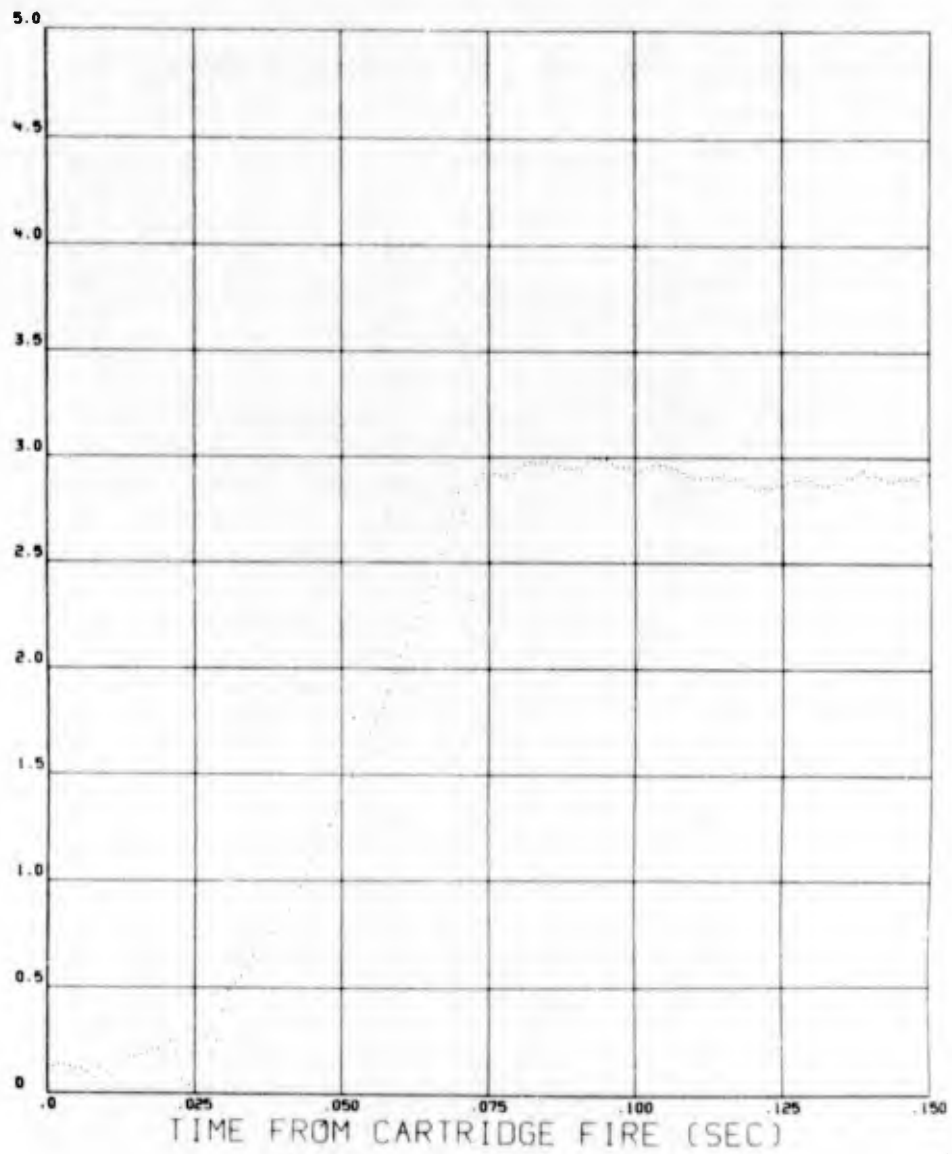


PLOT PREPARED BY TSX, ADTC

19 04 73 670AG018 26 MAY 72 MSN 112C BOMB 148

R243
169 0 7

EJECTOR
FOOT
POSITION
(INCHES)

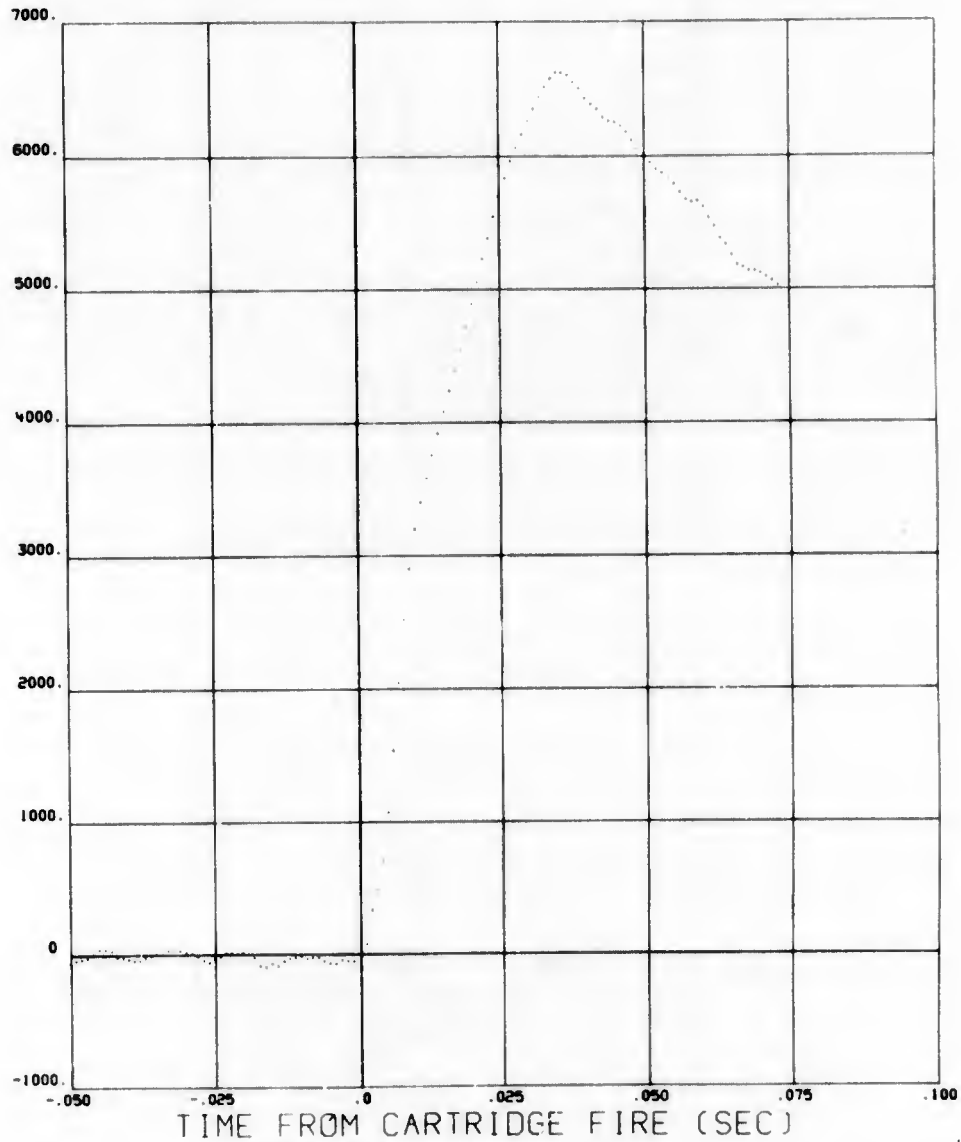


PLOT PREPARED BY TSX, ADTC

19/04/73 670AG018 26 MAY 72 MSN 112C BOMB 148

R243
170 0

EJECTION
CHAMBER
PRESSURE
(PSI)

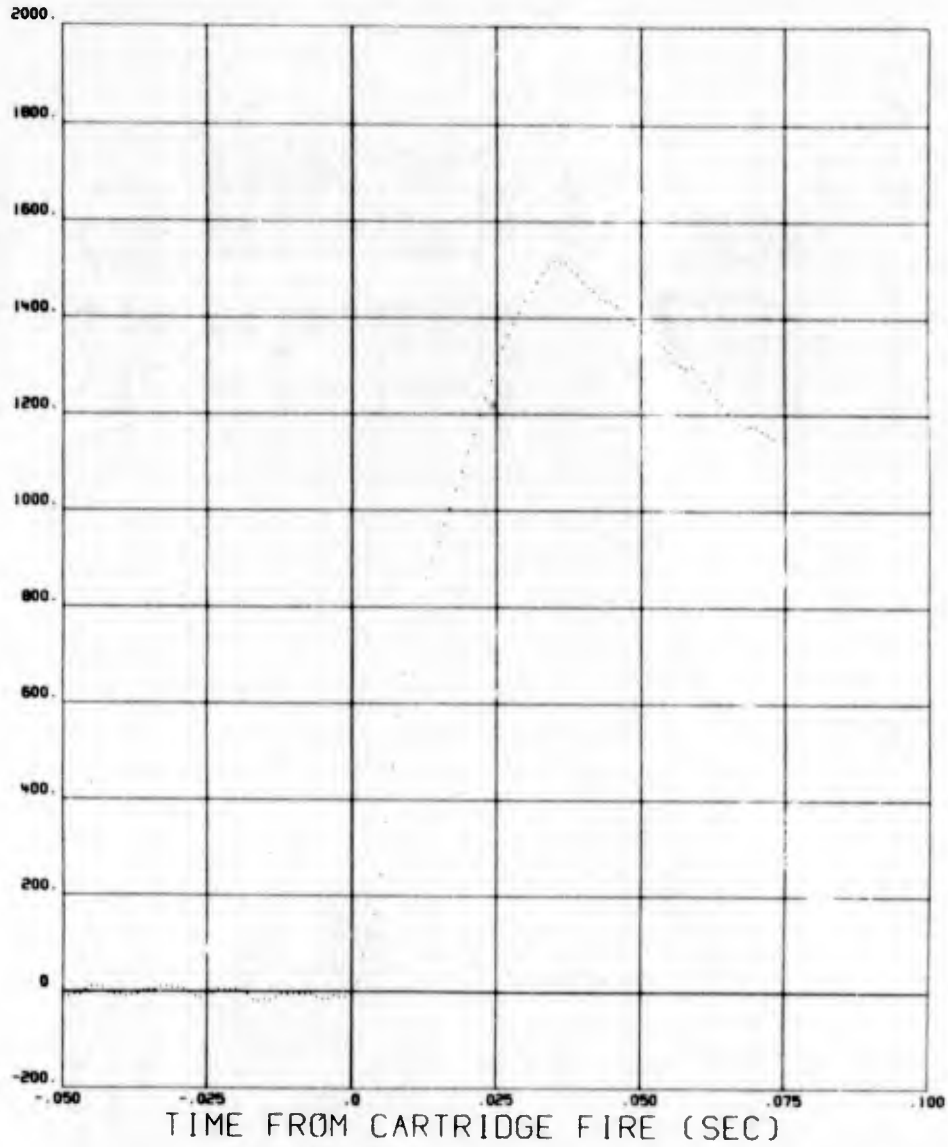


PLOT PREPARED BY 15X, ADIC

19/04/73 670AG018 26 MAY 72 MSN 112C BOMB 148

R243
171 0

EJECTOR
FOOT
FORCE
(LBS)



PLT PREPARED BY TSX, ADTC

DATE 25 MAY 72 MISSION 1120 BOMB ID 166 BOMB WEIGHT 510.50 LBS

EJECTOR MOMENT ARM
TIME OF EJECTOR STROKE
A/C ANGLE OF ATTACK AT RELEASE
A/C PITCH ANGLE AT RELEASE
A/C ROLL ANGLE AT RELEASE
RACK EJECTION ANGLE

2.625 INCHES
***** SEC
3.375 DEG
1.820 DEG
.720 DEG
0.000 DEG

IMPACT RANGE DEFLECTION

FEET FEET

RELEASE HISTORY
PICKLE TIME
CARTRIDGE FIRE
INITIAL LINKAGE MOVEMENT
EJECTOR FOOT (FIRST MOTION)
STORE FIRST MOTION (FORWARD)
STORE FIRST MOTION (AFT)
EJECTOR FOOT FULL EXTENDED
HOOK FIRST MOTION (FORWARD)
HOOK FIRST MOTION (AFT)

HR MIN SEC
*** *** *****
2 45 33.840
2 45 33.852
*** *** *****
2 45 33.854
2 45 33.854
*** *** *****
2 45 33.854
2 45 33.854

TIME DELAY
MILLISECONDS
0
12

14
14

14
14

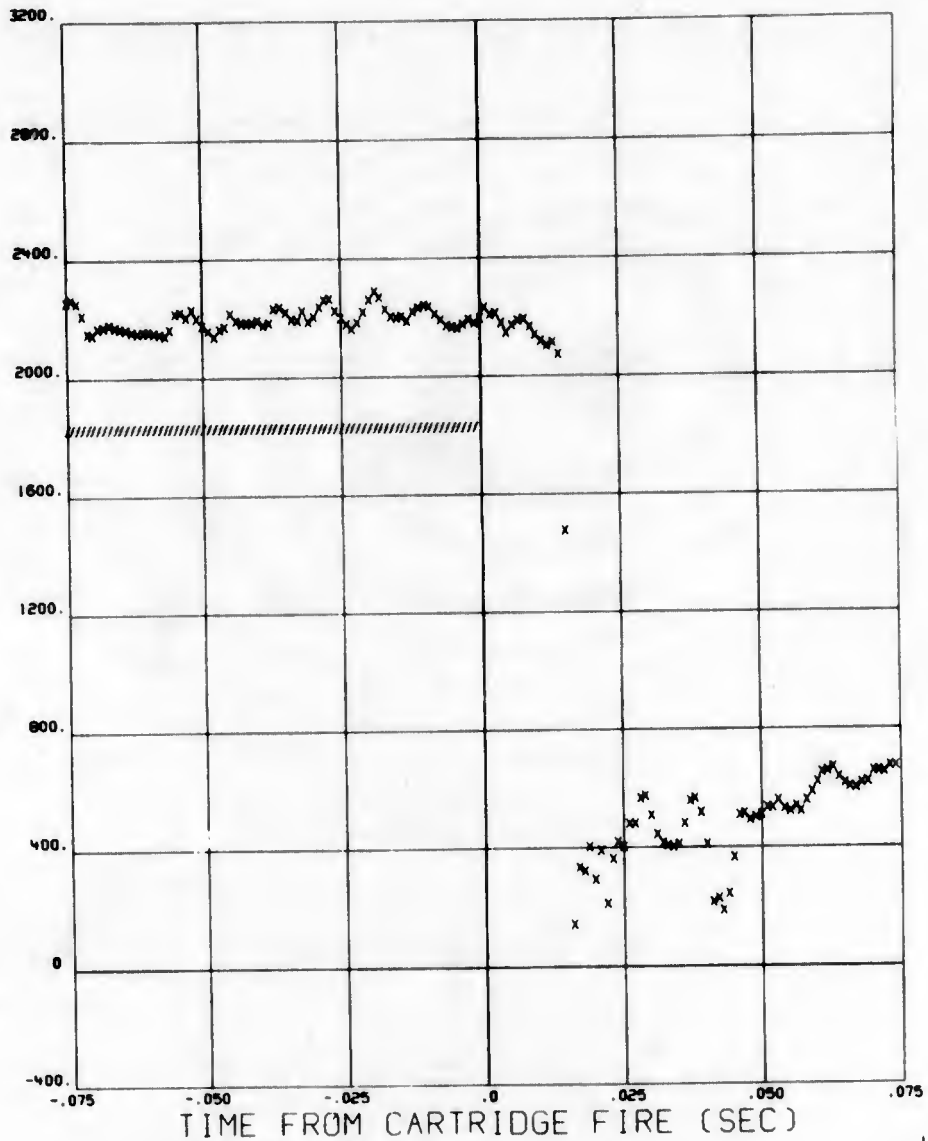
MAXIMUM PRE-FLT GROUND TEMPERATURE
MAXIMUM POST-FLT GROUND TEMPERATURE
MAXIMUM BREACH AMBIENT TEMPERATURE

88.95 DEG F
***** DEG F
25.88 DEG F

SEPARATION VELOCITY
DISPLACEMENT METHOD
PRESSURE METHOD

***** FT/SEC
8.1 FT/SEC

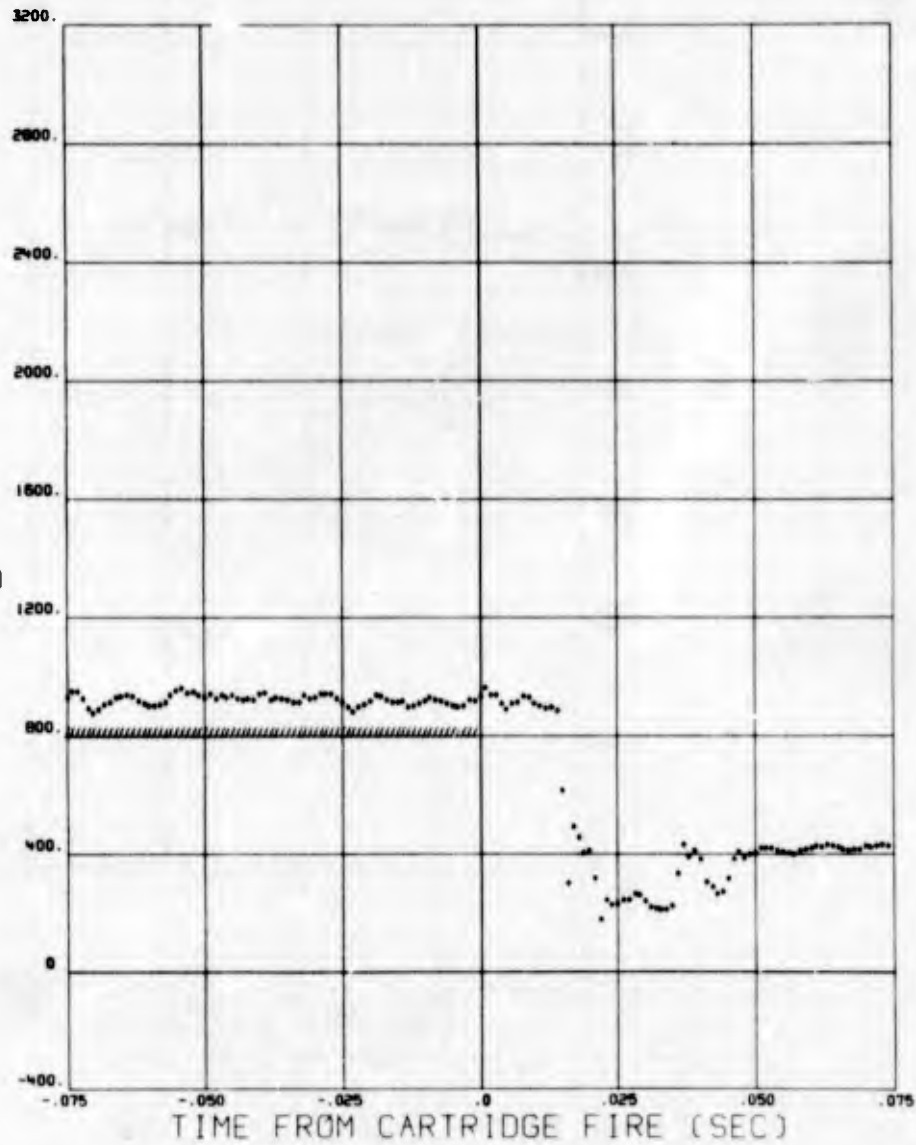
SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD



19/04/73 670AG018 26 MAY 72 MSN 113C BOMB 166

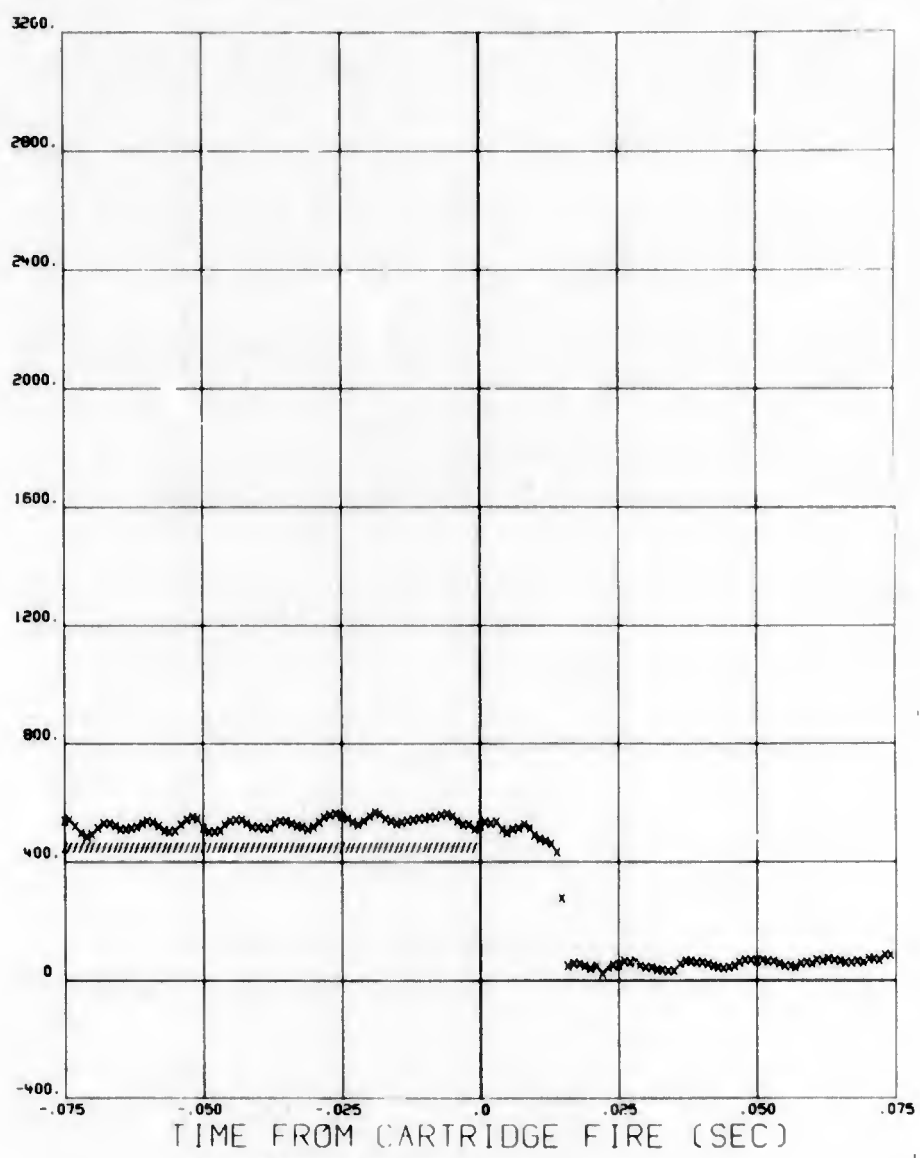
R243
173 0

SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



PLOT PREPARED BY 1SX, ADTC

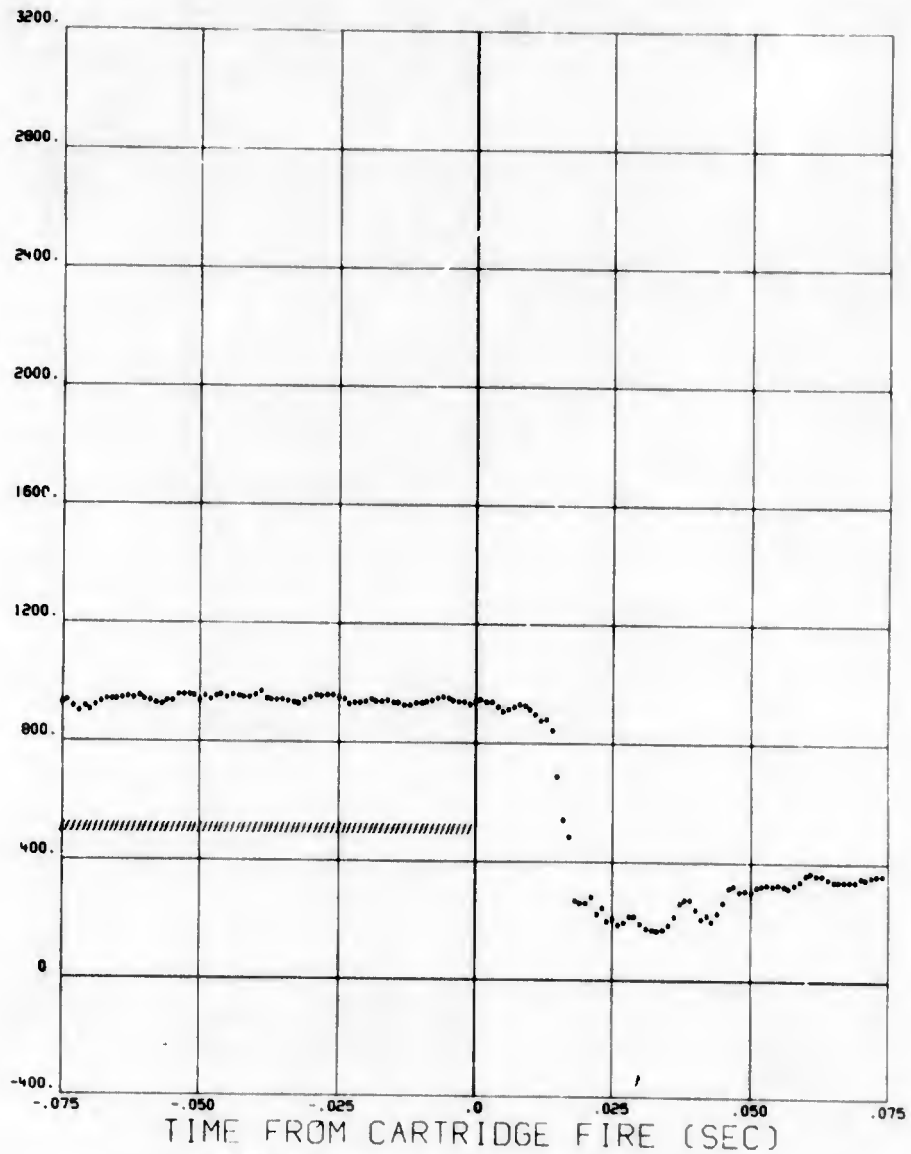
SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



19 04 73 670AG018 26 MAY 72 MSN 113C BOMB 166

R243
175 0

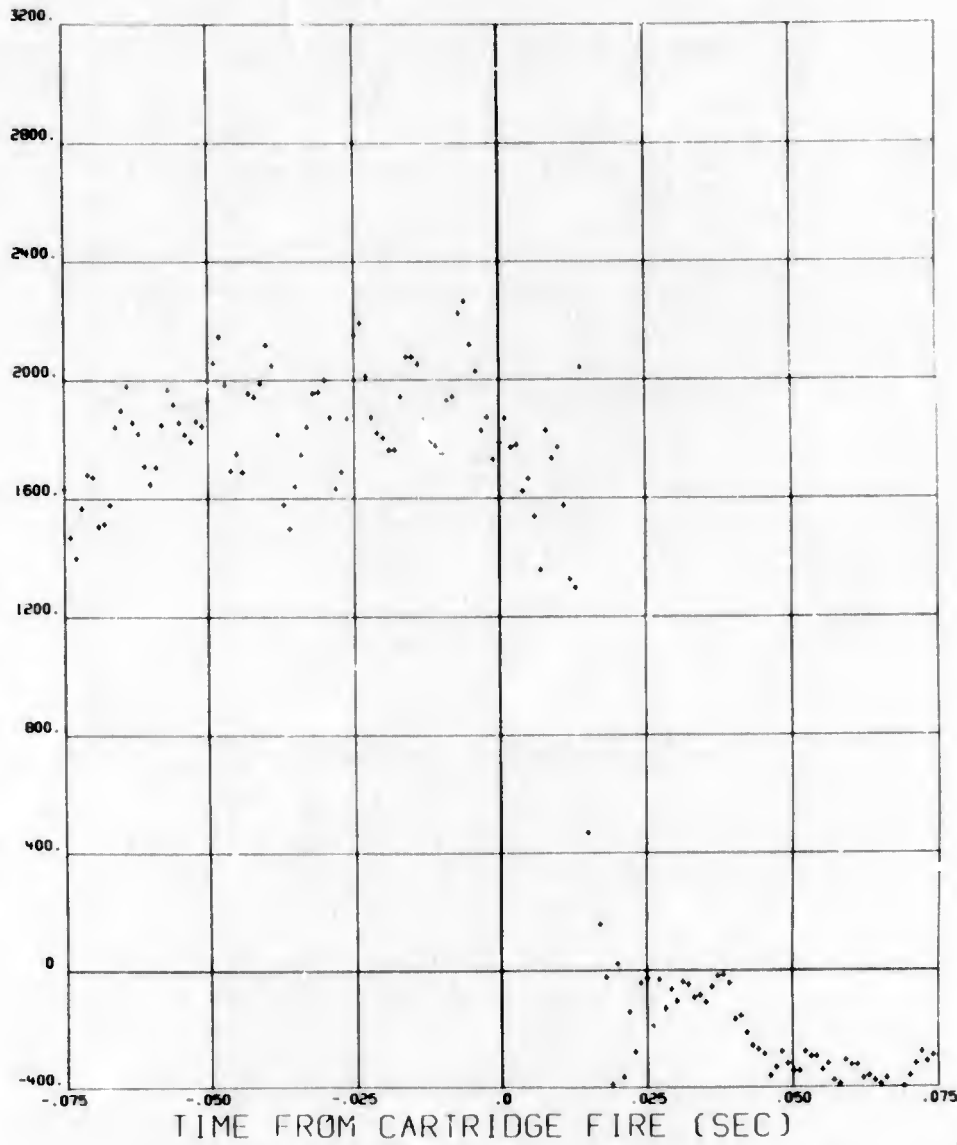
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT



19 04 73 670AG018 26 MAY 72 MSN 1130 BOMB 166

REN 3
176 0 1

HOOK
REACTION
(LBS)
+ = FORWARD

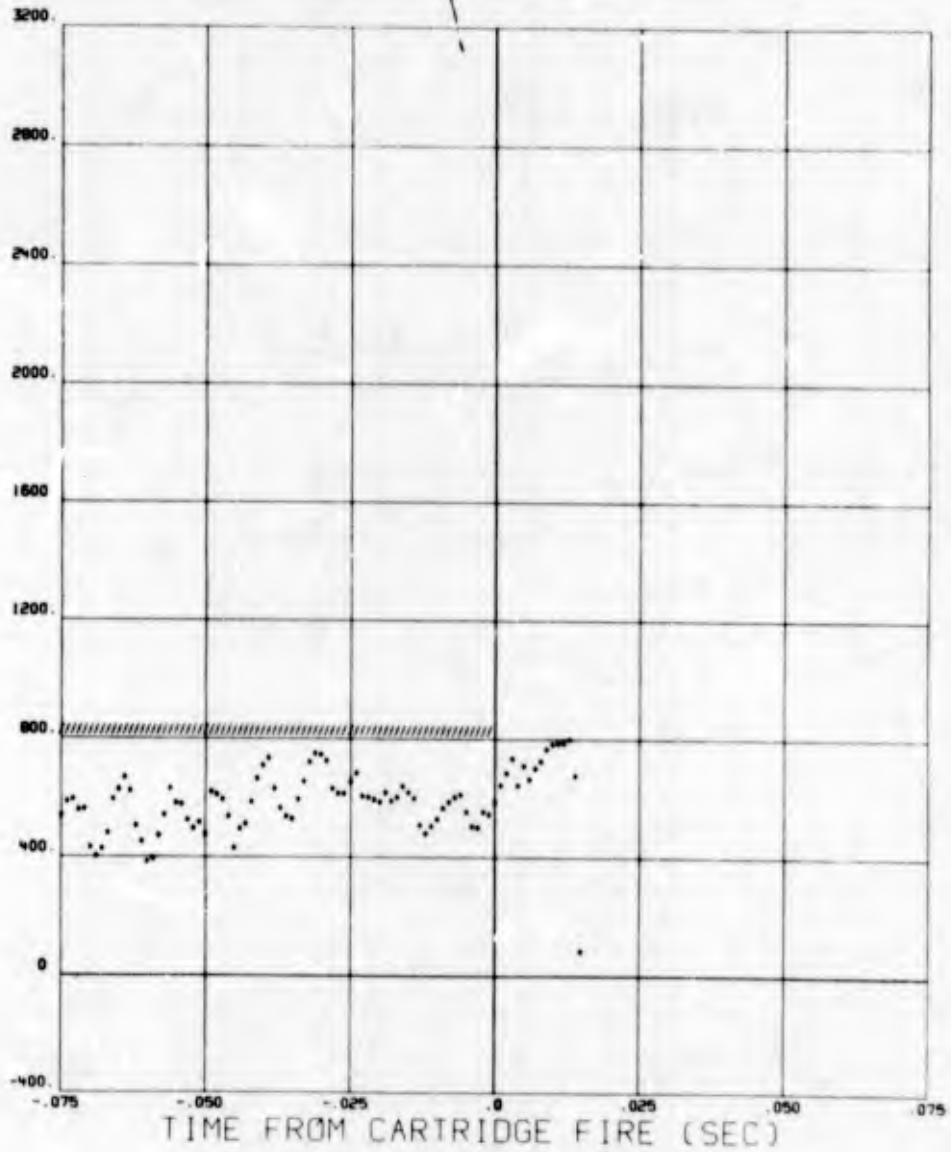


PLOT PREPARED BY TSX, ADIC

19 04 73 670AG018 26 MAY 72 MSN 113C BOMB 166

R243 177 0

HOOK
REACTION
(LBS)
* = AFT

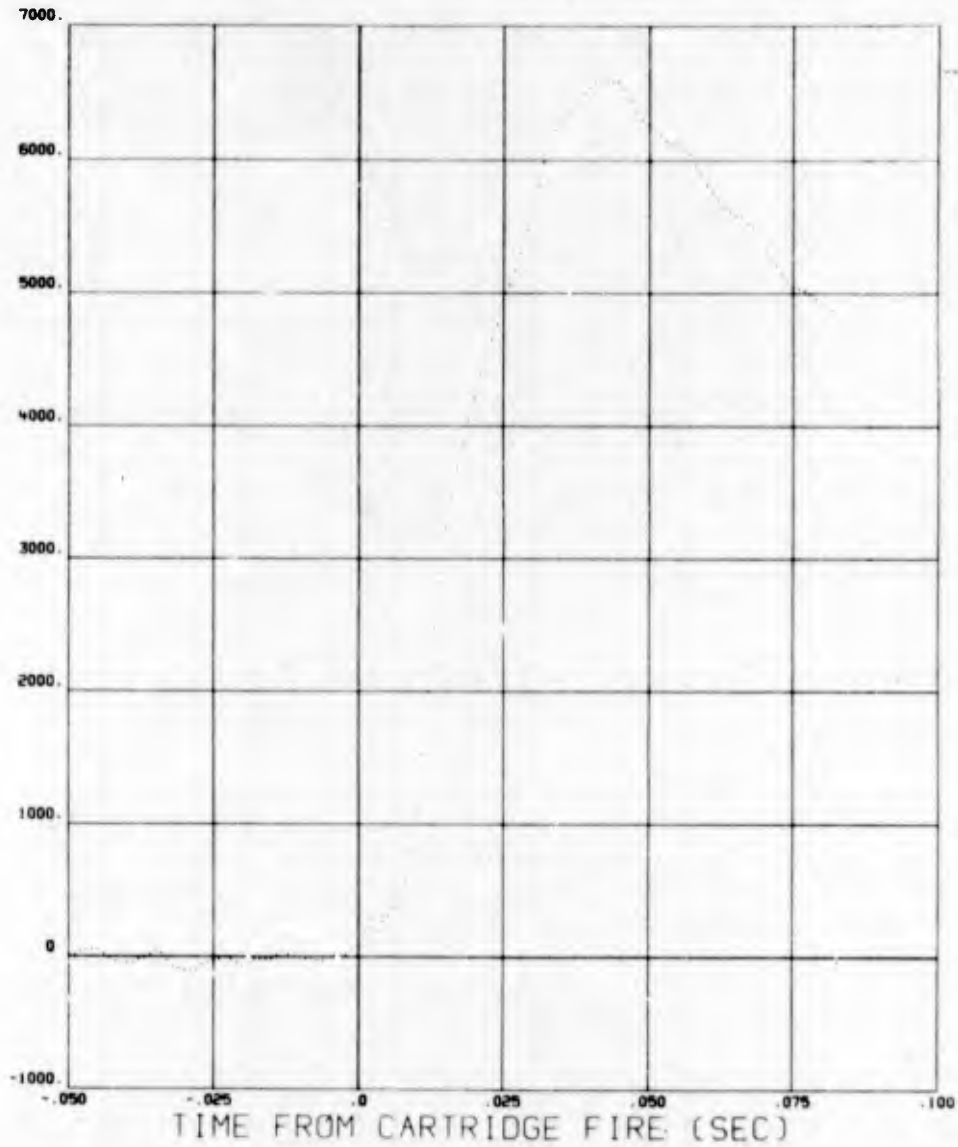


PLOT PREPARED BY TSX, ADTC

19 04 74 E70AG018 26 MAY 72 MSN 113C BOMB 166

R244
17 0

EJECTION
CHAMBER
PRESSURE
(PSI)

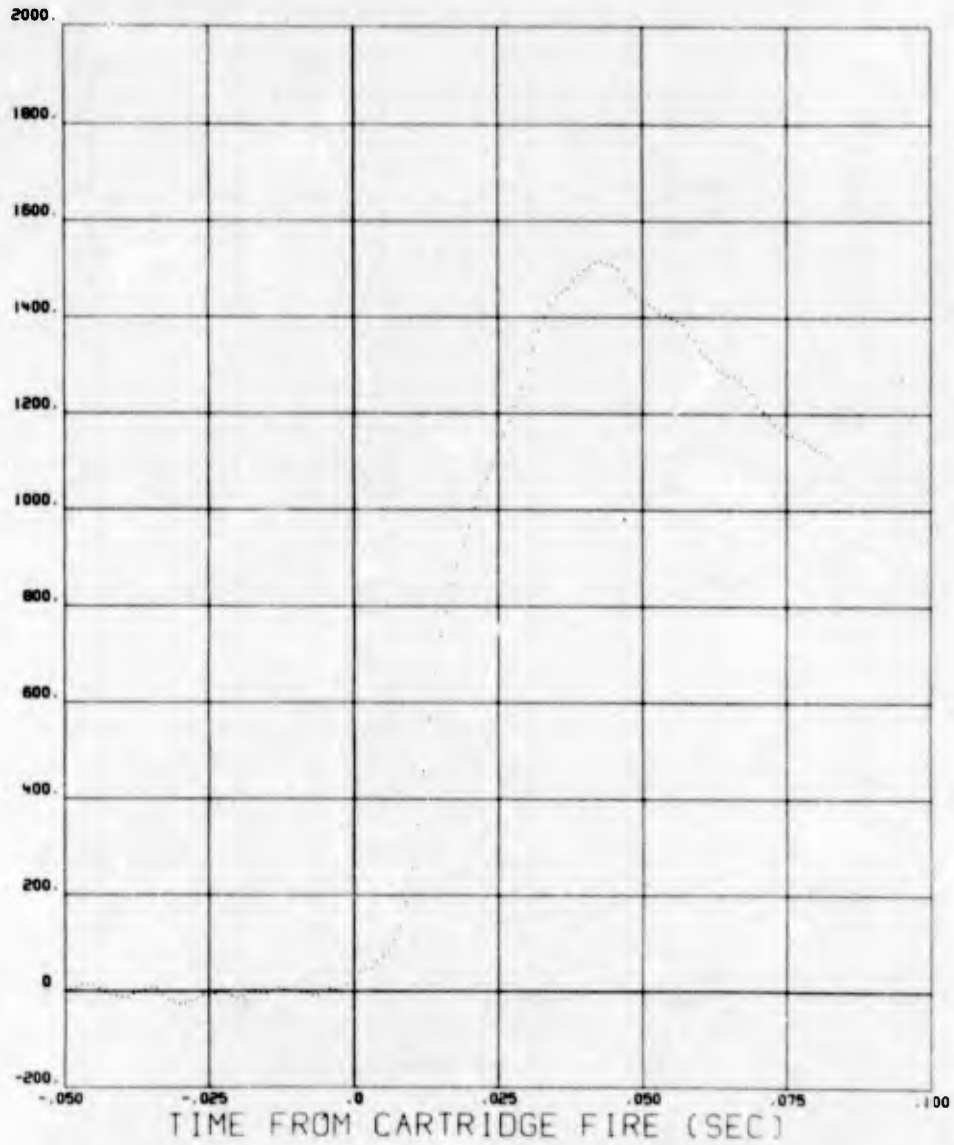


PLOT PREPARED BY ISX, ADTC

BT0AG018 26 MAY 72 MSN 113C BOMB 166

R244
18 0 7

EJECTOR
FOOT
FORCE
(LBS)



PLOT PREPARED BY TSX, ADTC

DATE 26 MAY 72 MISSION 1133 BOMB ID 171D BOMB WEIGHT 513.50 LBS

EJECTOR MOMENT ARM 2.750 INCHES
 TIME OF EJECTOR STROKE .072 SEC
 A/C ANGLE OF ATTACK AT RELEASE 3.316 DEG
 A/C PITCH ANGLE AT RELEASE 1.140 DEG
 A/C ROLL ANGLE AT RELEASE -1.440 DEG
 RACK EJECTION ANGLE -48.000 DEG

IMPACT RANGE FEET
 DEFLECTION FEET

RELEASE HISTORY
 PICKLE TIME
 CARTRIDGE FIRE
 INITIAL LINKAGE MOVEMENT
 EJECTOR FOOT (FIRST MOTION)
 STORE FIRST MOTION (FORWARD)
 STORE FIRST MOTION (AFT)
 EJECTOR FOOT FULL EXTENDED
 HOOK FIRST MOTION (FORWARD)
 HOOK FIRST MOTION (AFT)

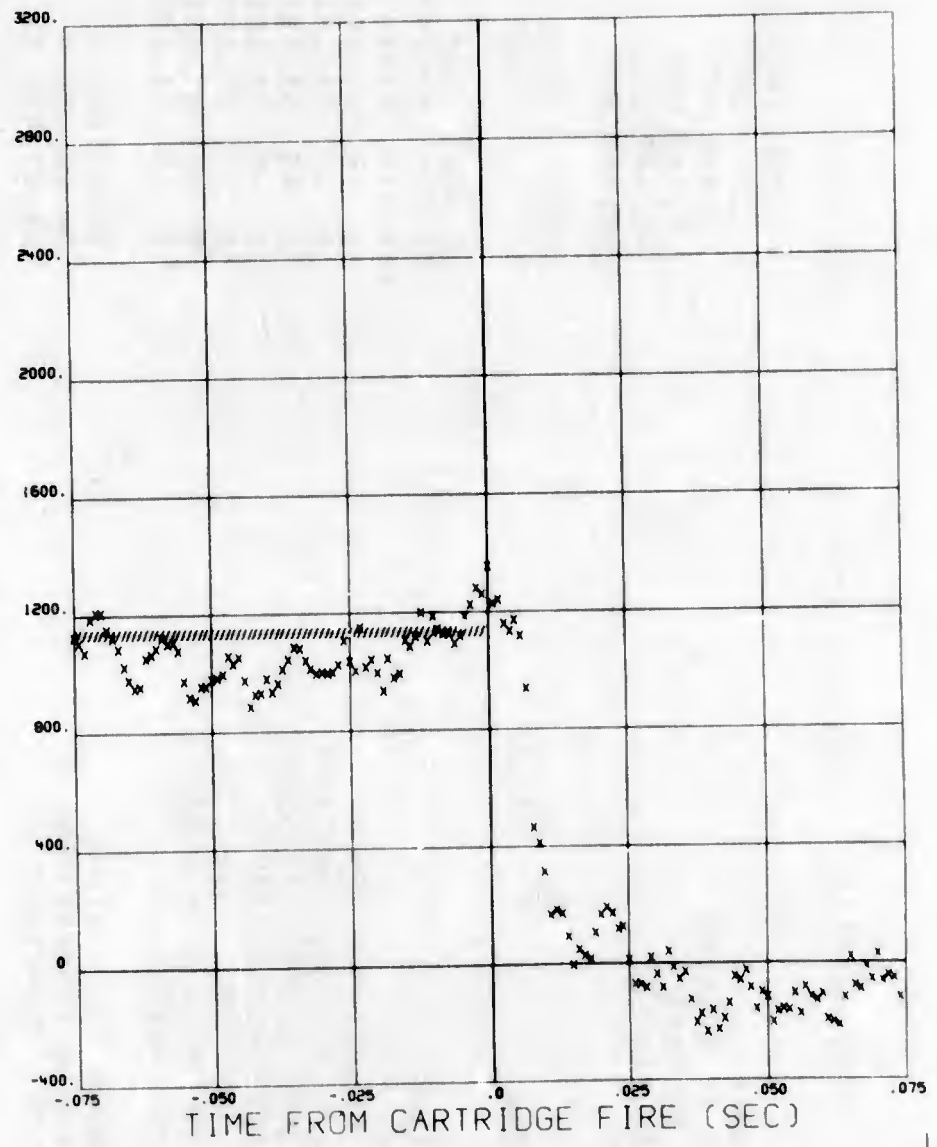
HR MIN SEC
 *** *** *****
 *** *** *****
 2 45 51.181
 2 45 51.186
 2 45 51.181
 2 45 51.181
 2 45 51.258
 2 45 51.181
 2 45 51.181
 88.95 DEG F
 94.86 DEG F
 24.57 DEG F

SEPARATION VELOCITY
 DISPLACEMENT METHOD
 PRESSURE METHOD
 3.4 FT/SEC
 6.1 FT/SEC

TIME DELAY
 MILLISECONDS

 0
 5
 0
 0
 77
 0
 0

SWAY
BRACE
STRAIN
(LBS)
X = LEFT FWD

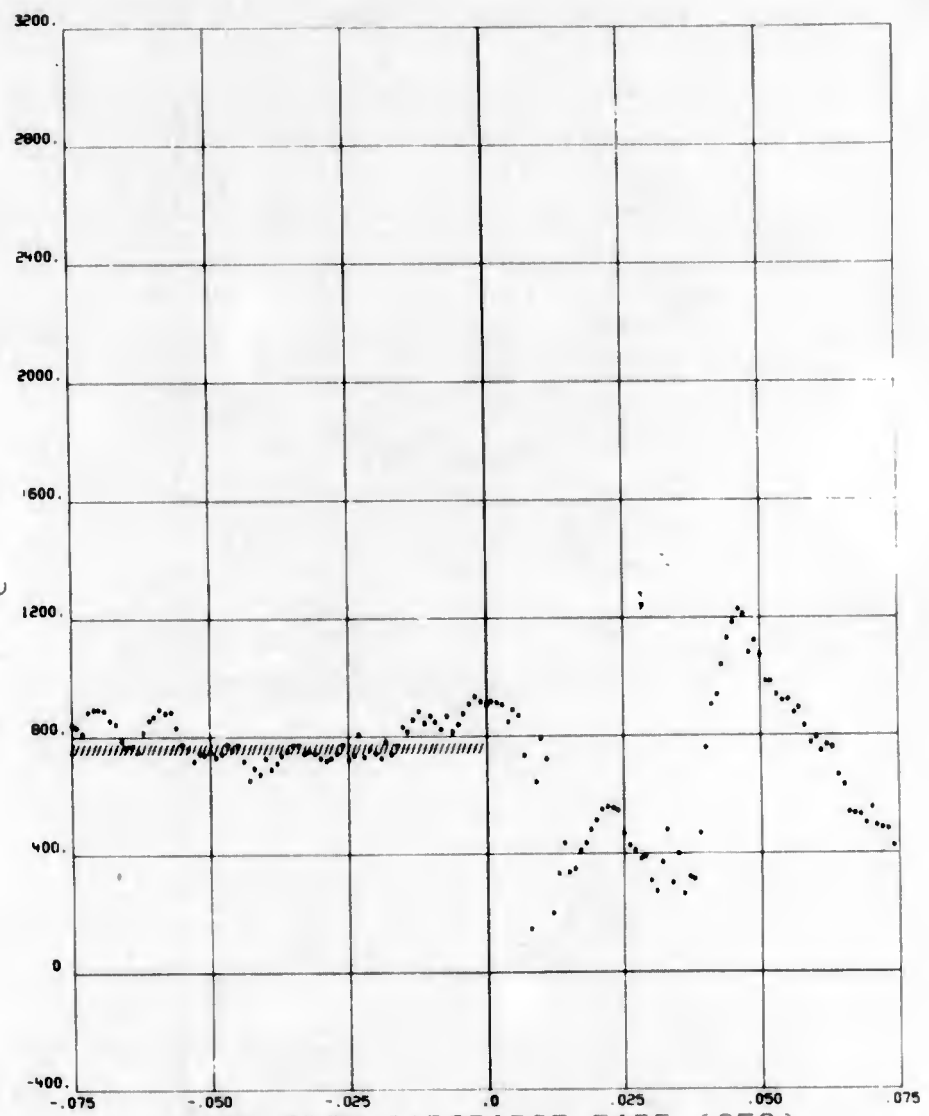


PLOT PREPARED BY 15X, ADTC

... ABC18 26 MAY 72 MSN 113S BOMB 1710

R243
182 0 7

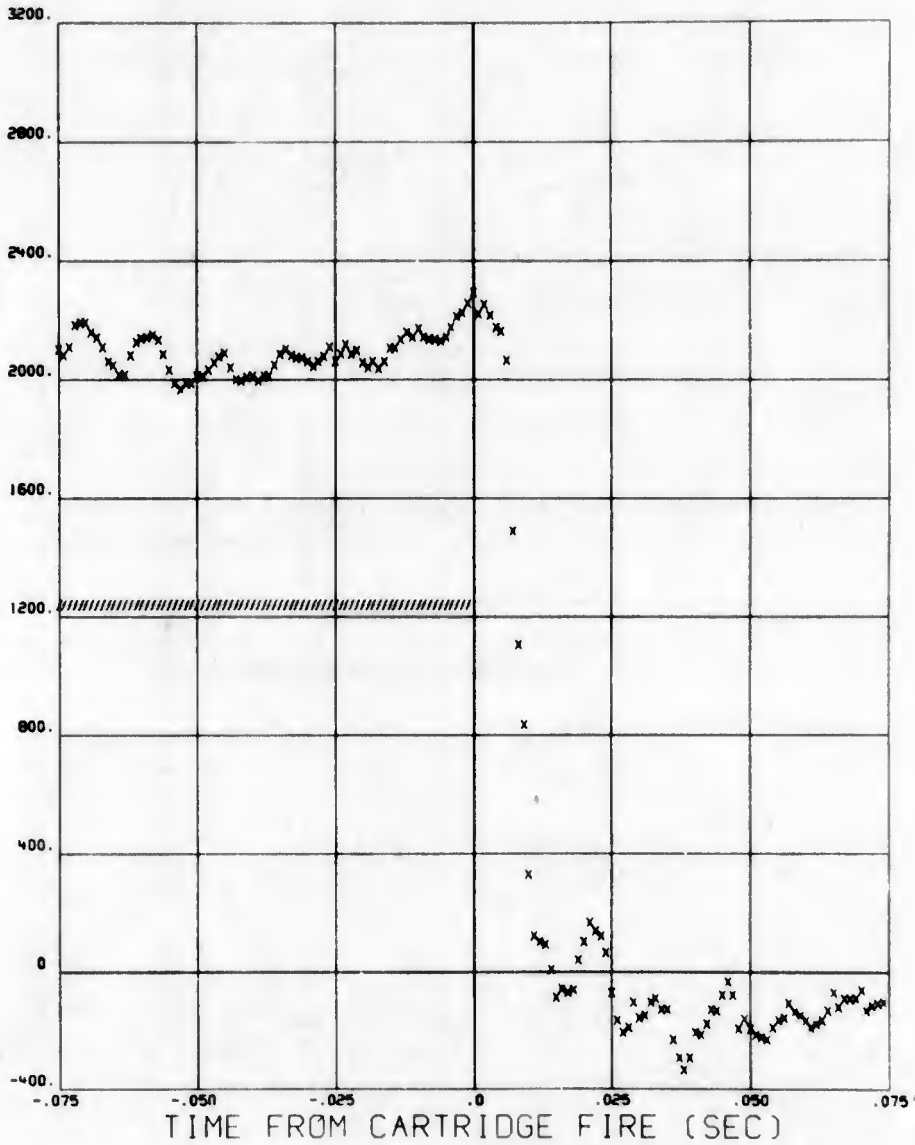
SWAY
BRACE
STRAIN
(LBS)
* = RIGHT FWD



TIME FROM CARTRIDGE FIRE (SEC)

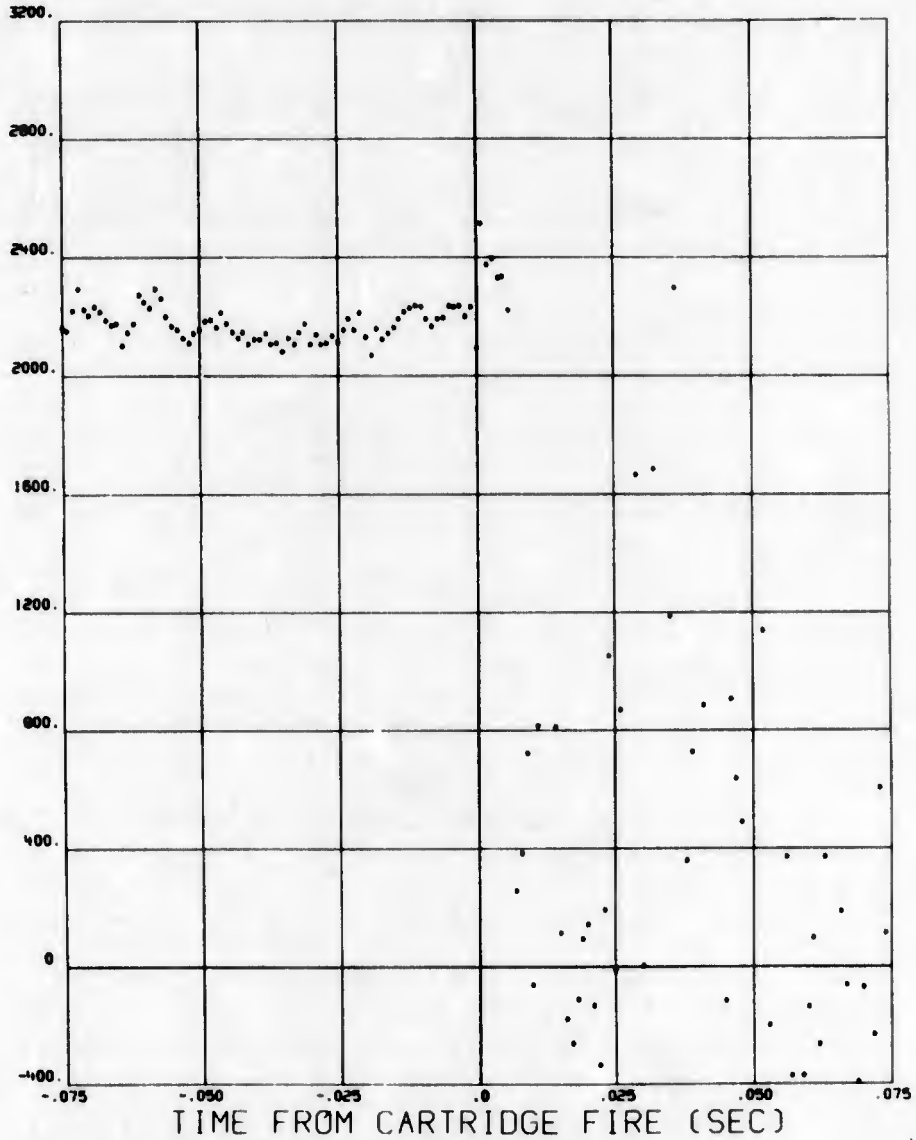
PLOT PREPARED BY 15X, ADTC

SWAY
BRACE
STRAIN
(LBS)
X = LEFT AFT



PLOT PREPARED BY TSX, ADTC

SWAY
BRACE
STRAIN
(LBS)
* = RIGHT AFT

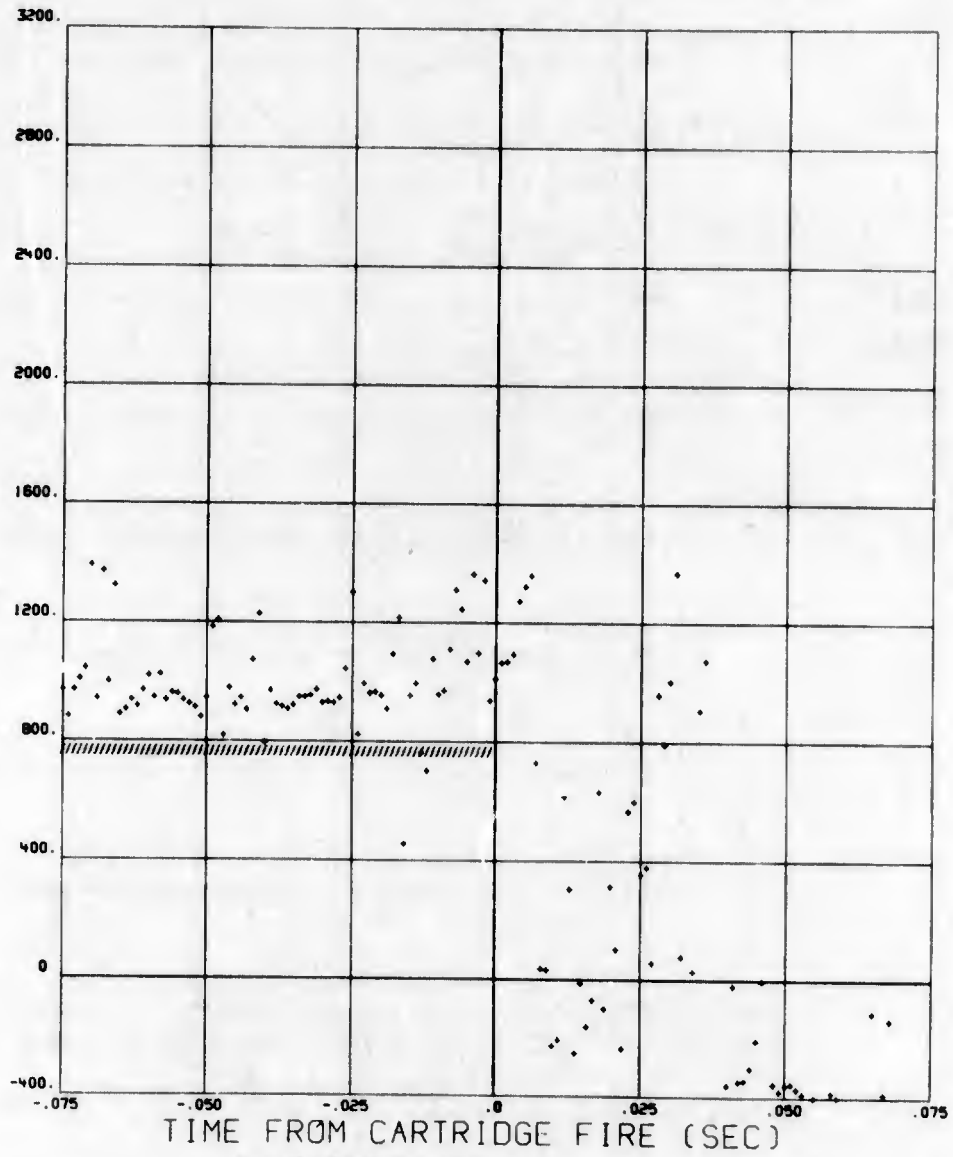


PLOT PREPARED BY TSX, ADTC

19/04/73 670AG018 26 MAY 72 MSN 113S BOMB 1710

R243
185 0

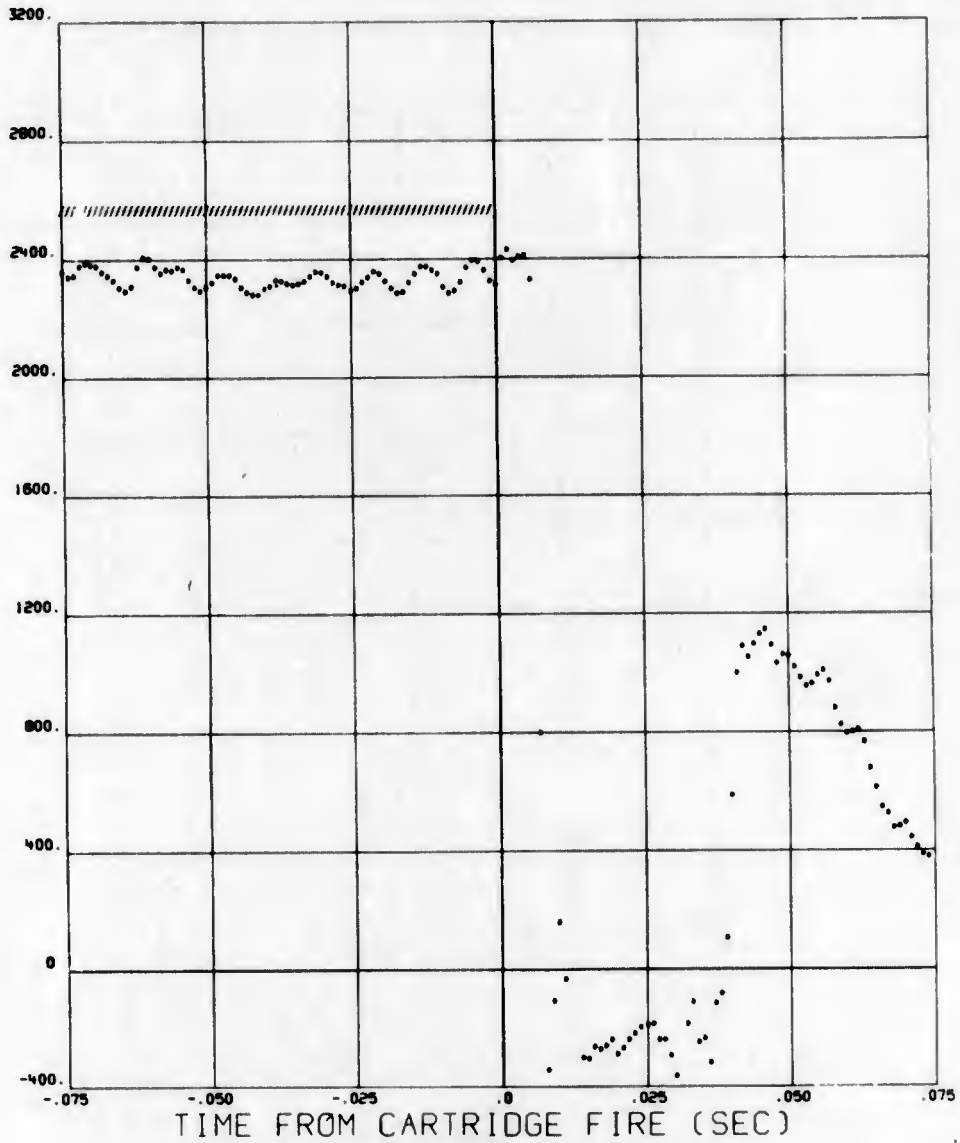
H00K
REACTION
(LBS)
+ = FORWARD



TIME FROM CARTRIDGE FIRE (SEC)

PLOT PREPARED BY TSX, ADTC

HOOK
REACTION
(LBS)
* = AFT

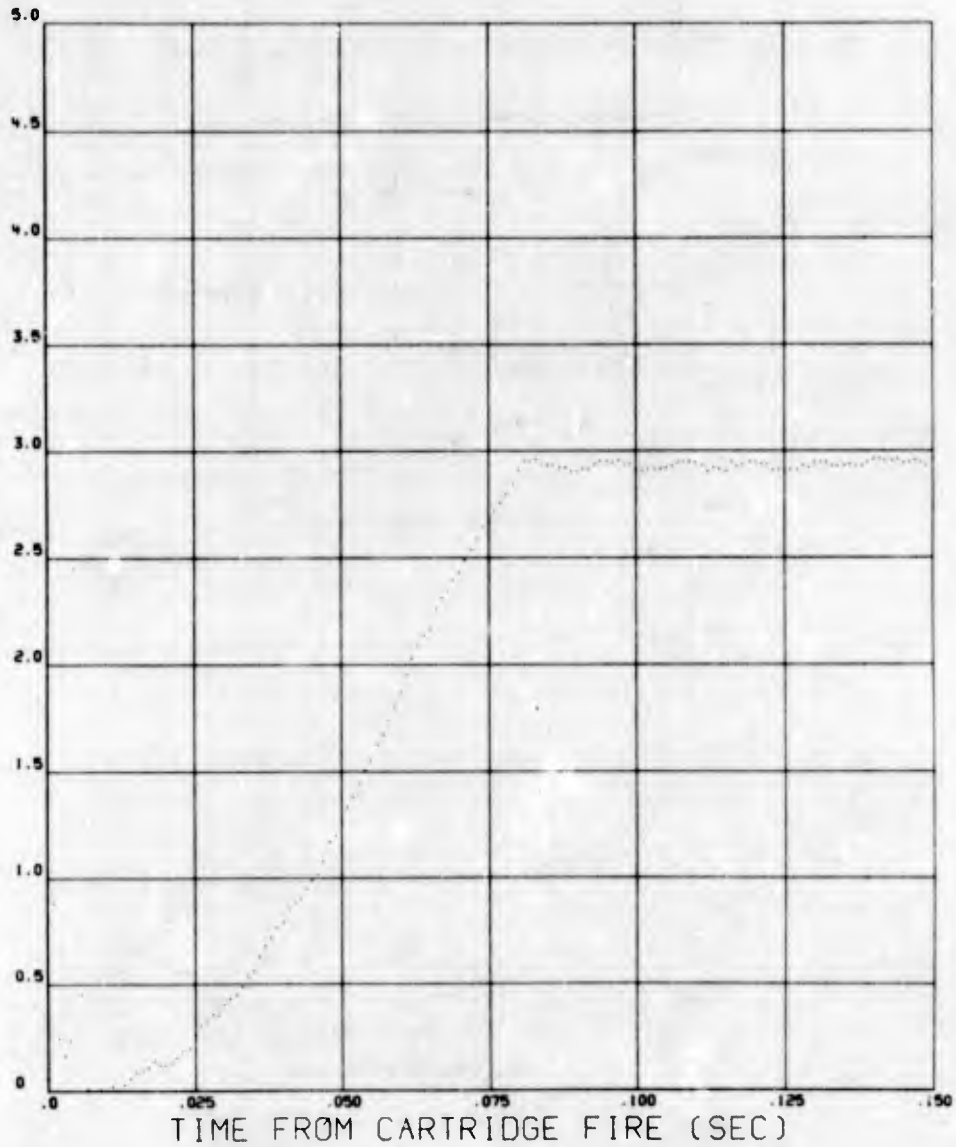


PLOT PREPARED BY TSX, ADTC

19/04/73 670AG018 26 MAY 72 MSN 113S BOMB 171D

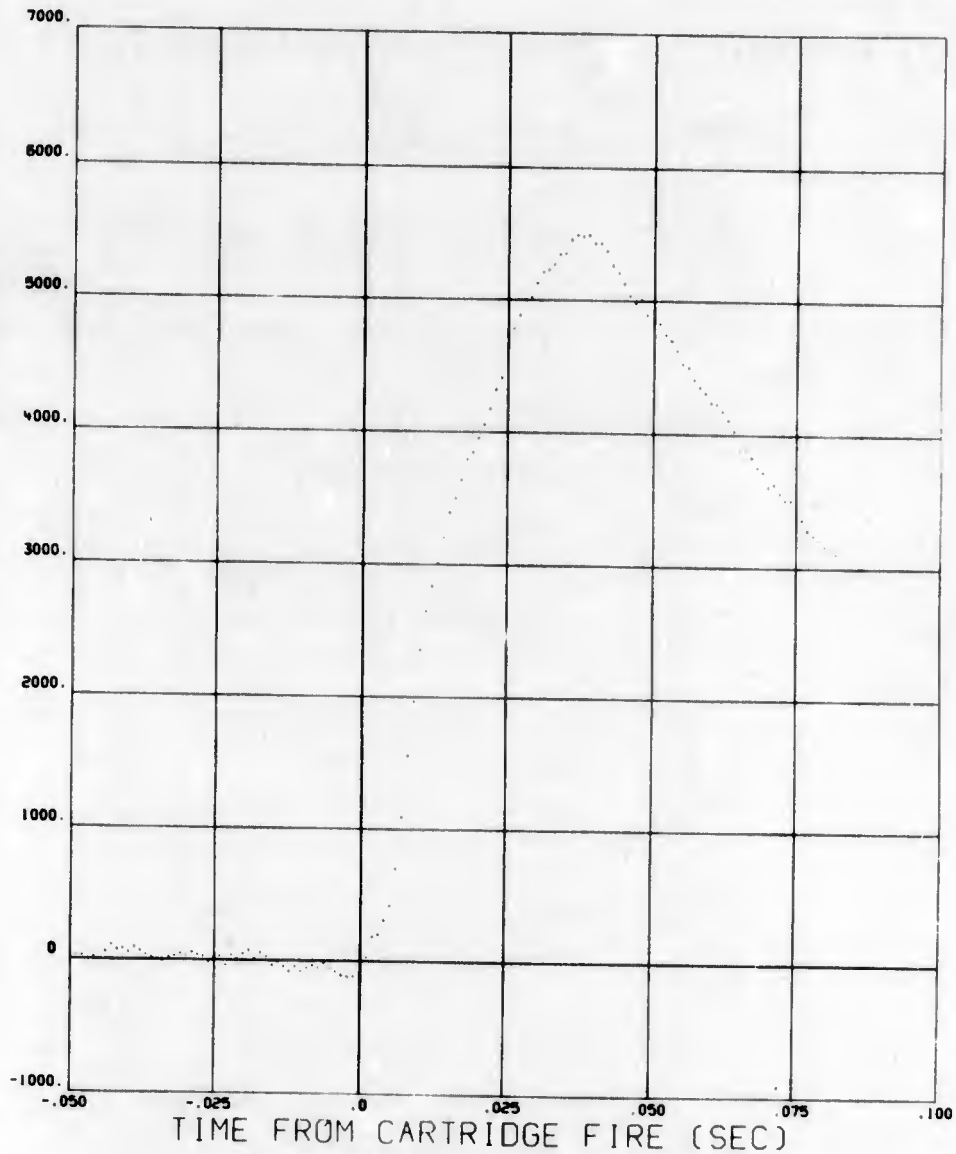
R243
187 0

EJECTOR
FOOT
POSITION
(INCHES)



PLOT PREPARED BY 15X, ADTC

EJECTION
CHAMBER
PRESSURE
(PSI)

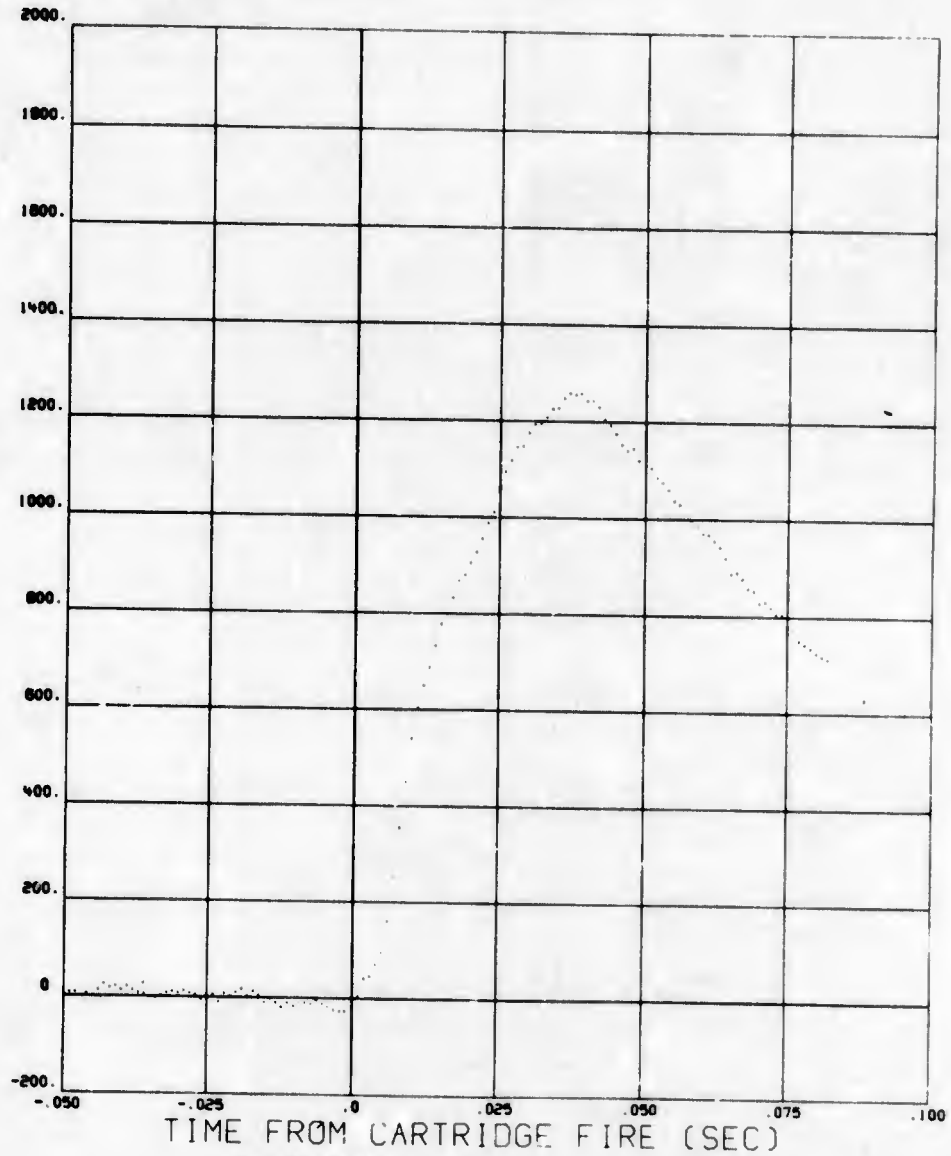


PLOT PREPARED BY TSX, ADTC

14/02/73 670AG018 26 MAY 72 MSN 113S BOMB 171D

R244 99 0 7

EJECTOR
FOOT
FORCE
(LBS)



LOT PREPARED BY 15X, ADTC

INITIAL DISTRIBUTION

USAF (RDQRM)	1
USAF (RDPN)	1
ASD (ENYS)	1
ASD (XRHI)	1
ASD (ENVWA)	1
ASD (SDXE)	1
AFAL (NV/698DF)	4
AFAL (NVA)	1
AUL (AUL/LSE-70-239)	1
USAFTFWC (TE)	1
DDC	2
USNWC (Code 4063)	1
USNWC (Code 4073)	1
USNWL (Code KBB)	2
AFAL (NVT-3)	2
SAMSO (RSSG/Capt Boardman)	1
AF (SAGF/Capt Crabtree)	1
6585 Test Gp (GDAS/Capt Birnbaum)	1
NORAIR (J Gibson)	1
USNOL (Mr. Schimdel)	1
EOD Corp. (G. Lombardi)	1
Aerospace Cor. (L. Westphal)	1
Sandia Lab (Aeroballistics G. Stone)	1
IDA Systems Eval Div (R. Mathews)	1
McDonnell Douglas Corp (R Kyle)	1
Litton Systems, Inc. (Dr Ausman)	4
Analytical Sciences Corp (Dr Sutherland)	1
USNATC (Code WST-35)	1
AFATL (DL)	1
AFATL (DLOSL)	4
AFATL (DLX)	1
AFATL (DLG)	2
AFATL (DLYE)	30
AFATL (DLJC)	2
ADTC (TSG)	1
ADTC (TSGAS)	2
ADTC (TSGP)	1
TRADOC (ADTC/DO)	1

SUPPLEMENTARY

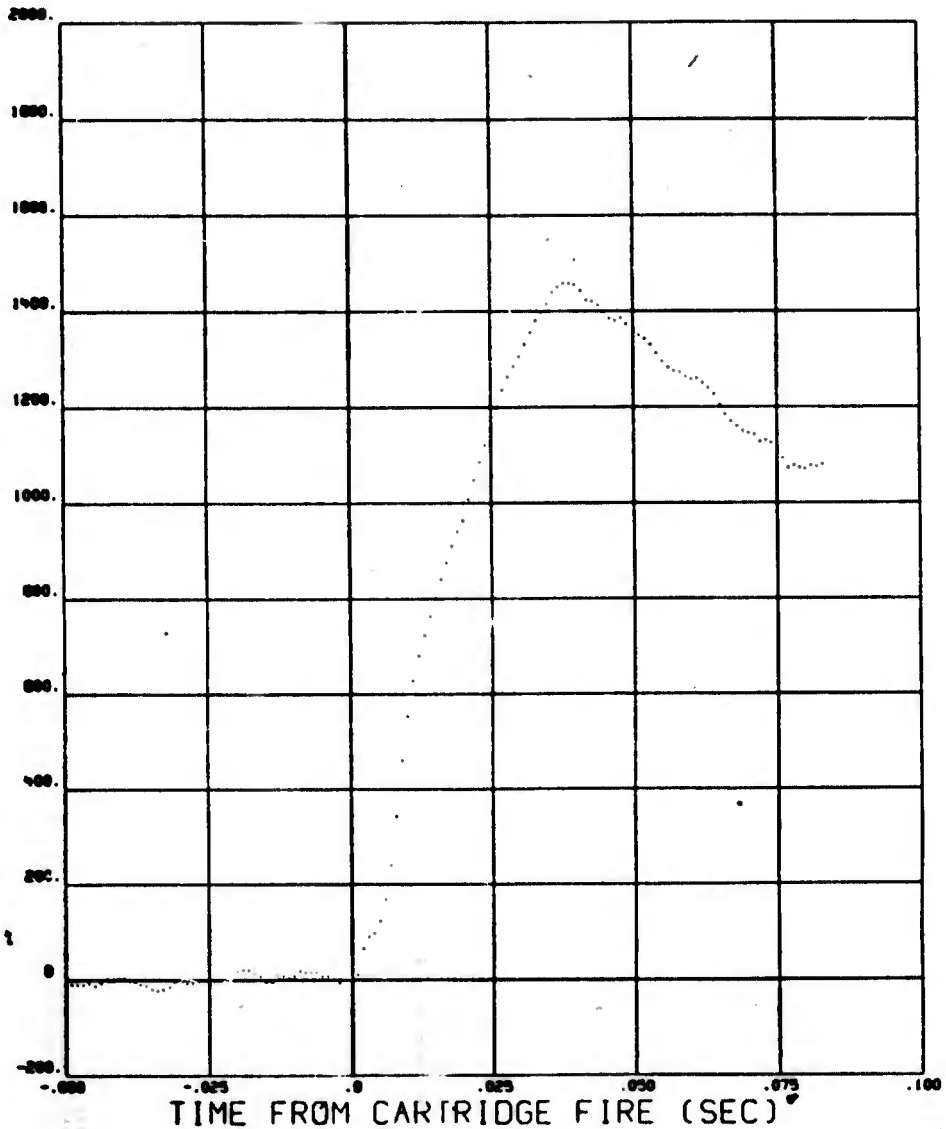
INFORMATION

AD-913263L

19/02/73 670AG018 24 MAY 72 MSN 109C BOMB

172⁰⁰³₁₁₇ 0.7

EJECTOR
FOOT
FORCE
(LBS)



PLT PREPARED BY 154 ADIC