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ENVIRONMENTAL ENGINEERING ABSTRACTS

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ENVIRONMENTAL ENGINEERING ABSTRACTS

Prepared for

THE ENVIRONMENTAL TESTING LABORATORY

Organization 7300

By

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Albuquerque, New Mexico

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INTRODUCTION

The intent of this bulletin is to abstract information in the field of environmental engineering. Selection of material, abstracting, subject coding, and editing are the responsibility of the Simulated Environments Information Center. The SEIC is located in the Environmental Test Library, Building 860, Rm. 208, telephone 264-7568. Inquiries should be directed to this Center.

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<u>Major Subject</u>	<u>Code</u>
ACCELERATION	A
ACOUSTIC	B
ATMOSPHERIC	C
CLIMATIC	D
ELECTRICAL	E
GASEOUS	F
GENERAL	G
HYGRO-ENVIRONMENT	H
INDUCED	I
STATIC	J
MEASUREMENT/INSTRUMENTATION	K
NATURAL	L
PRESSURE	M
RADIATION	N
MECHANICAL SHOCK	O
SPACE	P
SPECIFICATIONS	Q
HI-TEMP AND UNSPECIFIED TEMP	R
LOW-TEMP AND TEMP SHOCK	S
RANDOM VIBR AND UNSPECIFIED VIBR	T
SINUSOIDAL	U
BIOLOGICAL	V
MISCELLANEOUS	W
UNRELATED	X
RELIABILITY	Y
ENGINEERING PRACTICES	Z

ACCELERATION ENVIRONMENTS

KRUPOVAGE DJ HOLLOMAN AFB

KRU7001A

WIND-TUNNEL AND FULL-SCALE FORCES ON ROCKET SLEDS
=JL.SPACECRAFT AND ROCKETS VOL.4,P.1346-1351 OCT.1967 23REF
=16FIG 2TABLES

1.EVALUATION 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE 7.SLED-ROCKET,TUNNELS-WIND 8.ENVIRO-MEAS 9.FORCES

QUASI-STEADY-STATE VERTICAL FORCES ON THREE DUAL-RAIL ROCKET SLEDS, WHICH WERE PREDICTED USING WIND-TUNNEL DATA, ARE COMPARED WITH THOSE MEASURED ON THE HOLLOMAN TEST TRACK. FOR FULL-SCALE LOADS BETWEEN 12000 AND 32000 LB, THE DIFFERENCES WERE LESS THAN OR EQUAL TO 3000 LB. AGREEMENT WAS POORER FOR SMALLER LOADS. THE OSCILLATORY FORCES ALSO ARE DISCUSSED. THE FORCES MEASURED DURING THE TRACK TESTS INDICATED THAT THE AERODYNAMIC CONTRIBUTION WAS THE DOMINANT COMPONENT TO THE VERTICAL QUASI-STEADY-STATE FORCE IN THE SUPERSONIC REGIME. WIND-TUNNEL DRAG COEFFICIENTS FOR TWO OF THE ROCKET SLEDS WERE NO MORE THAN 10 PERCENT LESS THAN THE FULL-SCALE DRAG COEFFICIENTS FOR 1.5 LESS THAN OR EQUAL TO MACH NUMBER FREESTREAM CONDITIONS LESS THAN OR EQUAL TO 2.58. AGREEMENT WAS POORER FOR LOWER MACH NUMBERS. PREDICTED TRANSMITTED THRUST FORCES WERE UP TO 25 PERCENT GREATER THAN THOSE MEASURED ON TWO OF THE ROCKET SLEDS.

SPADY AA NASA LANGLEY

SPA7001A

SIMULATING A WALK ON THE MOON
=MECH.ENG VOL.89,P.25-27 JULY 1967 3REF 7FIG

1.XPER-RESULTS 2.EFFECTS,FACILITY 3.PLANETARY 4.NOMINAL
5.SINGLE 7.HUMAN 8.ENVIRO-EFFECTS 9.SUB-GRAVITAL

RESULTS OF A SERIES OF STUDIES CONDUCTED AT THE LANGLEY RESEARCH CENTER USING A LUNAR GRAVITY SIMULATION TECHNIQUE. THE EFFECT OF FACTORS SUCH AS GRAVITY, PRESSURE SUITS, AND THE CARRYING OF LOADS ON MANS SELF-LOCOMOTIVE CAPABILITIES ARE TREATED.

TROUT OF NASA LANGLEY

TRO7001A

WATER IMMERSION SIMULATION OF EXTRAVEHICULAR ACTIVITIES BY ASTRONAUTS
=JL.SPACECRAFT AND ROCKETS VOL.4,P.806-808 JUNE 1967 6REF
=4FIG 1TABLE

1.EVALUATION 2.SIMULATION 3.SPACE 4.NOMINAL 5.SINGLE 7.HUMAN
8.ENVIRO-EFFECTS 9.SUB-GRAVITAL

A COMPARISON IS MADE BETWEEN THE AIR-PRESSURIZED AND WATER-PRESSURIZED UNDERWATER SUIT SYSTEMS IN WATER IMMERSION SIMULATION STUDIES. THIS TECHNIQUE WAS USED TO REEXAMINE THE EXTRAVEHICULAR ACTIVITIES DIFFICULTIES THAT AROSE DURING GEMINI 9 FLIGHT. HOW HYDRODYNAMIC DRAG AND DAMPING FORCES LIMIT THE APPLICABILITY AND VALIDITY OF THE NEUTRAL BUOYANCY WATER TECHNIQUE FOR SIMULATING ZERO-GRAVITY OPERATIONS BY ASTRONAUTS ARE CONSIDERED.

ACOUSTIC ENVIRONMENTS

KRISHNAPPA G. UNIV OF WATERLOO
EFFECT OF TEMPERATURE ON THE HIGH-FREQUENCY COMPONENT OF THE JET NOISE
=ACoust.SOC.AM.JL VOL.41,P.1208-1211 MAY 1967 6REF 4FIG KRI7001B

1.STUDY 2.EFFECTS 3.ATMOSPHERE,INDUCED 4.NOMINAL 5.COMBINED
7.AIRCRAFT 8.ENVIRO-EFFECTS 9.ACOUSTIC,HI-TEMP

IT IS KNOWN THAT SOUND RAYS ARE REFRACTED IN THE ATMOSPHERE OWING TO TEMPERATURE DIFFERENCES. THE EFFECT OF TEMPERATURE DIFFERENCES BETWEEN THE JET AND THE OUTSIDE FLUID ON THE HIGH-FREQUENCY COMPONENT OF A JET NOISE IS DISCUSSED BY GEOMETRICAL ACOUSTICS APPROXIMATION AND COMPARED WITH THE EXISTING EXPERIMENTAL RESULTS.

MILLS JF. LING ELECTRONICS
A STUDY OF REVERBERATION CHAMBER CHARACTERISTICS
=IES PROC.1967,P.421-427 12REF 12FIG MIL7001B

1.STUDY 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE 6.MIL-STD-810
7.CHAMBER 8.ENVIRO-MEAS 9.ACOUSTIC

CRITERIA FOR DECIDING EFFECTIVENESS OF THE SHAPE OF THE CHAMBER ARE THE MODAL DENSITY AND SPACING OF THE MODES. THE THEORY FOR RECTANGULAR CHAMBERS IS STATED AND DISCUSSED AND THE CHARACTERISTICS ARE COMPARED FOR AN IRREGULAR ROOM ANALYZED EXPERIMENTALLY. THE RELATIONSHIP BETWEEN ACOUSTIC POWER AND SOUND PRESSURE LEVEL IS DISCUSSED. IT WAS FOUND THAT FOR CHAMBERS USED TO TEST ELECTRONIC EQUIPMENT, THE THEORY OF SOUND IN LARGE ENCLOSURES DOES NOT GENERALLY APPLY, AND THAT CORRECTIONS ARE NECESSARY.

SCHLOSS F. DAVID TAYLOR MODEL BASIN
MEASUREMENTS OF THE EFFECT OF GEOMETRIC SCALE ON STRUCTURAL IMPEDANCE AND RADIATED SOUND
=ACoust.SOC.AM.JL VOL.41,P.1193-1195 MAY 1967 2REF 8FIG SCH7003B

1.STUDY 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE 7.SHIP,
MODEL 8.ENVIRO-MEAS 9.ACOUSTIC,IMPEDANCE

TWO WOODEN STRUCTURES RESEMBLING RIBBED FLOWER BOXES GEOMETRICALLY SCALED IN THE RATIO OF 4 TO 1 WERE DRIVEN IN AIR AND WATER WITH SINUSOIDAL FORCES. TRANSFER IMPEDANCE AND RADIATED SOUND MEASUREMENTS WERE MADE. IT WAS FOUND THAT THE RESONANT FREQUENCIES OF THE LOWER MODES OF THE TWO STRUCTURES WERE IN THE RATIO OF 1 TO 4 WITHIN A FEW PERCENT. RECIPROCAL TRANSFER IMPEDANCE MEASUREMENTS WERE ESSENTIALLY IDENTICAL. TRANSFER IMPEDANCE MEASUREMENTS AT SYMMETRICAL POINTS OF THE SAME STRUCTURE WERE ALMOST IDENTICAL, AND AT UP TO 600 CPS--REFERRED TO THE LARGER OF THE TWO VESSELS--THE IMPEDANCE MAGNITUDE AND RADIATED SOUND AVERAGED OVER SMALL FREQUENCY RANGES SCALED IN THE RATIO OF 16 TO 1.

SMITH FW L.A.B. CORP

SMI7003B

NOISE DISTURBANCES IN LARGE MECHANICAL VIBRATION TABLES
=ENVIR.QUAR VOL.13,P.26-27 JUNE 1967 3FIG

1.INFORMATION 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE
7.SHAKER 8.ENVIRO-MEAS 9.ACOUSTIC

A FEW QUALITATIVE BASES FROM WHICH TO CONSIDER THE PROBLEM OF NOISE AND HARMONIC DISTORTION OF THE BASIC WAVEFORM ARE OFFERED,ALONG WITH A FEW TYPICAL QUANTITATIVE MEASUREMENTS.

WIKSTEN D JPL

WIK7001B

HIGH-VOLUME DATA-PROCESSING TECHNIQUES APPLIED TO RANGER
ACOUSTIC TESTING
=IES PROC.1967,P.429-436 1REF 17FIG

1.XPER-RESULTS 2.DATA,SIMULATION 3.INDUCED 4.NOMINAL 5.SINGLE
7.RANGER,DATA-SYSTEM,COMPUTER 8.ENVIRO-EFFECTS 9.ACOUSTIC

A GROUND ACOUSTIC TEST ON THE RANGER SPACECRAFT IS DESCRIBED. THE PURPOSES OF THE TESTS WERE TO DEVELOP VIBRATION PREDICTION TECHNIQUES,TO MEASURE THE DISTRIBUTION OF ACOUSTICALLY REDUCED VIBRATION OVER THE SPACECRAFT, AND TO MEASURE THE DIRECTIONALITY OF VIBRATION RESPONSE. THE TEST PROGRAM,THE APPLICATION OF THE DATA COLLECTION AND COMPRESSION PROGRAMS, AND THE TEST CONCLUSIONS ARE DISCUSSED.

WILLIAMS LA NASA GODDARD

WIL6003B

NOISE LEVEL MEASUREMENTS FOR IMPROVED DELTA,ATLAS/AGENA-D AND TAT/AGENA-D LAUNCH VEHICLES
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND VIBRATION ENVIRONMENTS,SYMPOSIUM,36TH,OCT.1966 PT.7,P.89-102 2REF 14FIG

1.XPER-RESULTS 2.SOURCE 3.INDUCED 4.NOMINAL 5.SINGLE 7.AGENA,
DELTA,THOR-AGENA,ATLAS-AGENA 8.ENVIRO-MEAS 9.ACOUSTIC

ACOUSTIC NOISE DATA OBTAINED WITHIN THE SHROUD DURING MAJOR FLIGHT EVENTS,IE,LIFT-OFF,TRANSONIC,AND MAXIMUM DYNAMIC PRESSURE ARE PRESENTED AS WELL AS LEVELS MEASURED EXTERNAL TO THE SHROUD DURING LIFT-OFF. DATA COMPARISONS OF THE VARIOUS MEASUREMENTS,IE,INTERNAL TO EXTERNAL,VEHICLE TO VEHICLE,AND ACOUSTIC SIGNATURE TO SPACECRAFT VIBRATION SIGNATURE,ARE MADE FOR THE TIMES OF INTEREST.

CLIMATIC ENVIRONMENTS

TOMASSONI JE MARTIN CO

TOM6001D

GROUND-WIND-INDUCED OSCILLATIONS OF GEMINI-TITAN AIR VEHICLE AND ITS ERECTOR
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVIRONMENTS,SYMPOSIUM,36TH,OCT.1966 PT.7,P.79-88 14FIG

1.STUDY 2.EFFECTS 3.NATURAL 4.NOMINAL 5.SINGLE 7.GEMINI,
TITAN,MODEL,TUNNELS-WIND 8.ENVIRO-EFFECTS 9.WIND

THE PROGRAM TO EVALUATE THE EFFECTS OF GROUND WINDS ON THE GEMINI-TITAN SYSTEM ENCOMPASSED THREE PHASES--1)FULL-SCALE VIBRATION TESTS IN WHICH DYNAMIC CHARACTERISTICS OF THE AIR VEHICLE AND ERECTOR WERE MEASURED. THE DATA WERE USED IN SCALE MODEL DESIGN. 2)MODEL WIND TUNNEL TESTS FROM WHICH STATIC AND DYNAMIC DATA WERE OBTAINED FOR BOTH THE AIR VEHICLE AND ERECTOR,COVERING ALL WIND AZIMUTHS AND VARIOUS ERECTOR POSITIONS. 3)MEASUREMENT OF FULL-SCALE WIND-INDUCED RESPONSES OF THE AIR VEHICLE AND ERECTOR. THE FULL-SCALE AIR VEHICLE DATA CORRELATED WELL WITH THE WIND TUNNEL RESULTS,ALTHOUGH THE FULL-SCALE DATA ARE LIMITED WITH RESPECT TO RANGE OF WIND VELOCITY AND DIRECTION.

GASEOUS ENVIRONMENTS

KAVITS VB OGDEN TECH LABS

KAV7001F

IMPROVED DECONTAMINATION RELIABILITY...THROUGH RADIOGRAPHIC ANALYSIS
=ENVIR.QUAR VOL.13,P.28-29 JUNE 1967

1.EVALUATION 2.METHOD 3.GENERAL 4.NOMINAL 5.SINGLE 7.CLEAN-ROOM,OPTICAL-INSTR,TEST-EQUIP 8.NONDESTRUC-TEST 9.CONTAMIN

THE RESULTS,CONCLUSIONS AND OPERATING PARAMETERS OF THE RADIOGRAPHIC ANALYSIS TECHNIQUE FOR INSPECTING FOR PARTICULATE MATTER ON AN INTRICATE,PERMANENTLY ASSEMBLED COMPONENT ARE GIVEN. TO DETERMINE THE FEASIBILITY OF USING RADIOGRAPHIC TECHNIQUES ON OTHER HARD-TO-CLEAN COMPONENTS,A VARIETY OF CONFIGURATIONS, MATERIALS AND CONTAMINANTS WERE EVALUATED.

THOMAS RJ WESTINGHOUSE

THO7002F

NOMOGRAPHS FOR DETERMINING COOLING AIR FLOW RATES AND VOLUMES OF FUEL NECESSARY FOR CONDUCTING EXPLOSION TESTS
=JL.ENVIR.SCI VOL.10,P.22-24 OCT.1967 3FIG

1.THEORY 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE
6.MIL-E-5272,MIL-T-5422,MIL-STD-810 7.CHAMBER,CHART,RADAR
8.ENVIRO-MEAS 9.XPLOS-VAP

FIGURES 1 AND 2 WERE DEVELOPED TO ENABLE FAST AND ACCURATE DETERMINATION OF COOLING AIR FLOW DURING TEMPERATURE ALTITUDE TESTING OF AIRBORNE RADAR. FIGURE 3 IS ANOMOGRAPH FOR DETERMINING THE QUANTITY OF FUEL,IN CUBIC CENTIMETERS,REQUIRED TO OBTAIN AN EXPLOSIVE MIXTURE AS A FUNCTION OF TEMPERATURE, PRESSURE AND CHAMBER VOLUME.

HYGRO-ENVIRONMENTS

ALLEN DC EPS LTD

ALL7001H

DESICCATION--ARE WE TOO GENEROUS
=ENVIR.ENG NO.29,P.12-14 NOV.1967 6REF 2FIG

1.STUDY 2.PROTECTION 3.NATURAL 4.NOMINAL 5.SINGLE 6.DEF1234,BS3177,BS2540 7.ENVIRO-EFFECTS 9.HI-HUM

IT IS SHOWN THAT THERE ARE SOUND THEORETICAL AND PRACTICAL ARGUMENTS FOR REDUCING THE AMOUNT OF DESICCANT USED IN SERVICE PACKAGES, AND THAT THESE ARE CONFIRMED BY THE RESULTS AND LABORATORY TESTS.

DIPIPPO R NAVAL UNDERWATER RES
SONAR EQUATION NOMOGRAPH
=UNDERSEA TECH VOL.8,P.43-44 NOV.1967 4REF 2FIG

DIP7001H

1.THEORY 2.MEASUREMENT 3.NATURAL 4.NOMINAL 5.SINGLE 7.SONAR,
CHART 8.ENVIRO-MEAS 9.OCEAN

THESE NOMOGRAPHS ALLOW THE SONAR PROPAGATION EQUATION TO BE
SOLVED COMPLETELY, RAPIDLY AND RELIABLY FOR A WIDE SPAN OF
HYDROPHONE-TO-TARGET DISTANCES, FOR BOTH ACTIVE AND PASSIVE
SYSTEMS. NOMOGRAPH 2 IS FOR LOW-FREQUENCY, LONG-RANGE
APPLICATIONS.

INDUCED ENVIRONMENTS

COHEN ML STEVENS INST OF TECH
VARIATION OF THE THERMAL CONDUCTIVITY OF SOLID PROPELLANTS IN
AN ACOUSTIC FIELD
=AIAA JOURNAL VOL.5,P.1295-1299 JULY 1967 15REF 6FIG

COH7001I

1.STUDY 2.EFFECTS 3.INDUCED 4.NOMINAL 5.COMBINED 7.PROPELLANT-
SOLID, MODEL 8.ENVIRO-EFFECTS 9.HI-TEMP, LO-TEMP, ACOUSTIC

AN EXPERIMENTAL INVESTIGATION IS UNDERTAKEN USING TWO DOUBLE-
BASE SOLID PROPELLANTS, DQO AND ARP, AND A THIRD POLYMERIC MATE-
RIAL, POLYMETHYLMETHACRYLATE (PMMA) AS SAMPLES. THESE SAMPLES
ARE SUBJECTED TO OSCILLATIONS OF 1, 3, AND 10 KC, AT A CONSTANT
AMPLITUDE IN THE TEMPERATURE RANGE 0 TO 100 DEGREES F. THE
RESULTS INDICATE THAT THE THERMAL CONDUCTIVITY OF THE DOUBLE-
BASE PROPELLANTS HAS INCREASED BY 2 AND 5 PERCENT FOR THE DQO
AND ARP, RESPECTIVELY. NO VARIATION WAS OBSERVED FOR THE PMMA.

OSGOOD CC RCA
PACKAGING WITH FOAM
=MACH.DESIGN VOL.39,P.176-181 NOV.9,1967 6FIG

OSG7001I

1.DESIGN 2.PROTECTION 3.INDUCED 4.NOMINAL 5.SINGLE
7.PACKAGING, ELECTRONIC 8.ENVIRO-MEAS 9.LF-VIBR, HF-VIBR,
LO-G, DAMPING

SIMPLE AND INEXPENSIVE, FOAM PADS CAN PROTECT DELICATE COM-
PONENTS AGAINST ALMOST ANY AMOUNT OF SHOCK AND VIBRATION,
EITHER IN TRANSIT OR DURING OPERATION. A METHOD IS PRESENTED
FOR DESIGNING THE RIGHT PACKAGE FOR ANY PARTICULAR
APPLICATION.

RASTOGI V BABCOCK AND WILCOX
HIGH-TEMPERATURE STRAIN GAGES FOR USE IN SODIUM ENVIRONMENTS
=EXPER.MECH VOL.7,P.525-531 DEC.1967 4REF 10FIG

RAS7002I

1.EVALUATION 2.INSTRUMENT 3.INDUCED 4.NOMINAL 5.COMBINED
7.GAGE-STRAIN, CALIBR-EQUIP, REACTORS 8.ENVIRO-MEAS 9.VH-TEMP,
CORR-VAP

THE SILVER-GOLD ALLOY USED FOR BRAZING CONNECTIONS IN THE
MICRO-DOT-TYPE WELDABLE GAGE DISSOLVED EASILY IN A SODIUM EN-
VIRONMENT. THIS PAPER DESCRIBES TECHNIQUES FOR PROTECTING THE
GAGE ELEMENTS FOR VARYING PERIODS OF TIME FROM THE SODIUM EN-
VIRONMENT. ALSO GIVEN IS A CALIBRATING TECHNIQUE WHEREBY THE
BONDED-GAGE CHARACTERISTICS OF EACH GAGE CAN BE OBTAINED PRIOR
TO ACTUALLY BONDING THE GAGE TO THE STRUCTURE UNDER TEST.

ROBERTSON KD ARMY MATS RES AGENCY

ROB6003I

THE VACUUM SPRING
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS, SYMPOSIUM, 36TH, OCT. 1966 PT. 7, P. 103-111 1REF 8FIG

1.EVALUATION 2.MITIGATION 3.INDUCED 4.NOMINAL 5.SINGLE
7.ISOLATOR, COMPUTER, MODEL 8. ENVIRO-MEAS 9.VIBR, SHOCK

A NEW NONLINEAR SPRING HAS BEEN DEVELOPED WHICH WILL SATISFY BOTH SHOCK AND VIBRATION REQUIREMENTS. HIGH ENERGY ABSORPTION AND VIBRATION ATTENUATION OVER A WIDE RANGE OF FORCING FREQUENCIES IS PRODUCED BY A STEPWISE NONLINEARITY IN ITS LOADING CURVE WHICH IS COMPOSED OF TWO STRAIGHT-LINE SEGMENTS OF DIFFERING SLOPES REPRESENTING TWO INDEPENDENT SPRING RATES. THE SLOPES OF THESE LINE SEGMENTS AND THE POINT OF INTERSECTION CAN BE ADJUSTED TO SUIT ANY PARTICULAR DESIGN REQUIREMENTS.

UNDERSEA TECHNOLOGY

UND7001I

DYNAMIC TESTING PREDICTS MARINE CABLE FAILURES
=UNDERSEA TECH VOL. 8, P. 26-28 OCT. 1967 4FIG

1.INFORMATION 2.SIMULATION,EFFECTS 3.INDUCED 4.NOMINAL
5.SINGLE 7.CABLES,WIRE,WIRE-ROPE 8. ENVIRO-EFFECTS 9.STATIC,
VIBR, SHOCK

DYNAMIC PROBLEMS CONNECTED WITH MARINE CABLES ARE INVESTIGATED--WAVES AND REPEATED LOADING, STRUMMING, DANCING, SHOCK LOADS, AND SHEAVE STUDIES. THE TYPES OF TESTS USED TO STUDY THE EFFECTS OF THE VARIOUS ENVIRONMENTS ARE MENTIONED.

STATIC ENVIRONMENTS

RYMAN RJ TESTWELL LTD

RYM7001J

THE APPLICATION OF FATIGUE DATA TO DESIGN
=ENVIR.ENG NO. 28, P. 17-21 SEPT. 1967 15REF 21FIG

1.STUDY 2.EFFECTS 3.INDUCED 4.LIFE 5.SINGLE 7.PLATING,METALS,
STRUCTURE 8. ENVIRO-EFFECTS 9.STATIC

THE NATURE AND FORM OF FATIGUE DATA IS CAREFULLY CONSIDERED AND EVALUATED. FATIGUE IS A PHENOMENON WHICH IS THE RESULT OF VERY LOCALIZED STRESS CONDITIONS. REFUGE IN GENERALIZED STRESS CONDITIONS CAN BE COSTLY AND LEAD TO A STATE OF FALSE SECURITY. ATTENTION TO DETAIL DESIGN IS THE ONLY ADVICE THAT CAN BE APPLICABLE TO ALL FATIGUE PROBLEMS.

PRESSURE ENVIRONMENTS

ANDERSON JD RADIATION INC

AND7002M

VACUUM INSTRUMENTATION
=JL.ENVIR.SCI, VOL. 10, P. 19-23 JUNE 1967 12REF 9FIG

1.EVALUATION 2.INSTRUMENT 3.SPACE 4.NOMINAL 5.SINGLE
6.ASTM-E296-66T, ASTM-E297-66T 7.GAGE 8. ENVIRO-MEAS 9.HI-VAC

ATTEMPTS TO CONSOLIDATE THE AVAILABLE INFORMATION ON VACUUM INSTRUMENTATION, PROVIDE REFERENCES TO WORK BEING ACCOMPLISHED IN THIS FIELD, AND PROVIDE A BASIS FOR DETERMINATION OF GAGE CHOICE, USE AND UTILIZATION.

CRAIG RR AF AERO PROPULSION LAB
USE OF NITROUS OXIDE FOR OBTAINING HIGH STAGNATION ENTHALPIES
IN SHOCK TUNNELS
=AIAA JL VOL.5,P.2271-2274 DEC.1967 6REF 4FIG 2TABLES

CRA7001M

1.STUDY 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE 7.SHOCK-TUBE
8.ENVIRO-MEAS 9.SHOCK-PRESS,AERODYNAMIC

A SIMPLE AND ECONOMIC METHOD OF IMPROVING SHOCK-TUNNEL PERFORMANCE IS TO USE ROOM-TEMPERATURE HELIUM AS A DRIVER AND A MIXTURE OF ONE MOLE OF NITROUS OXIDE PER 0.886 MOLE OF NITROGEN IN THE DRIVEN TUBE TO PRODUCE AIR AT INCREASED STAGNATION TEMPERATURES. THIS METHOD WAS VERIFIED.

JOHN JEA UNIV OF MARYLAND
CRYOGENICS AND SPACE VACUUM SIMULATION
=JL.ENVIR.SCI VOL.10,P.24-27 JUNE 1967 24REF 1TABLE

JOH7002M

1.EVALUATION 2.FACILITY 3.SPACE 4.NOMINAL 5.SINGLE 7.PUMP
8.ENVIRO-MEAS 9.HI-VAC

PRESENTS, FIRST, THE ROLE OF CRYOGENIC PUMPING IN THE SPACE SIMULATORS CURRENTLY IN USE. NEXT, THE RESULTS OF EXPERIMENTATION WITH ADSORPTION PUMPING IS DESCRIBED. FINALLY, SOME OF THE REQUIREMENTS OF FUTURE SIMULATORS AND THE ROLE OF CRYOGENICS IN THESE SIMULATORS IS DISCUSSED.

NIEMEYER GM MCDONNELL DOUGLAS
REMOTE MEASUREMENTS OF PRESSURES IN VACUUM SYSTEMS
=JL.ENVIR.SCI VOL.10,P.16-18 JUNE 1967 4FIG

NIE7002M

1.DESIGN 2.INSTRUMENT 3.SPACE 4.NOMINAL 5.SINGLE 7.GAGE,
CABLES,GEMINI 8.ENVIRO-MEAS 9.HI-VAC

THREE TECHNIQUES FOR REMOTE OPERATION OR MONITORING OF VACUUM GAGES WERE SUCCESSFULLY EMPLOYED IN THE GEMINI DEVELOPMENT TEST PROGRAM. THE CONCEPTS USED INVOLVED THE USE OF MERCURY-WETTED REED RELAYS, POWER RELAYS AND CABLES FOR REMOTE MEASUREMENT OF A COLD CATHODE IONIZATION GAGE, THE LENGTHENING OF THE ALPHATRON GAGE CABLES, AND THE DISTRIBUTION OF GAGE READINGS MADE AT A CENTRAL LOCATION TO TWO REMOTE LOCATIONS USING REPEATERS DESIGNED TO DUPLICATE THE METER READINGS.

ROTHENBERG JH GENERAL ELEC
GENERAL TRENDS IN VACUUM SIMULATION
=JL.ENVIR.SCI VOL.10,P.32-34 JUNE 1967 13REF 2FIG

ROT7002M

1.PHILOSOPHY 2.SIMULATION 3.SPACE 4.NOMINAL 5.SINGLE, COMBINED
7.CHAMBER 8.ENVIRO-MEAS 9.HI-VAC

A REVIEW OF SOME OF THE RECENT AND FUTURE REQUIREMENTS FOR VACUUM SIMULATION SYSTEMS.

STALKER RJ AUSTRALIAN NATL UNIV
A STUDY OF THE FREE-PISTON SHOCK TUNNEL
=AIAA JL VOL.5,P.2160-2165 DEC.1967 9REF 9FIG

STA7002M

1.STUDY 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE 7.TUNNELS-
WIND,PRESSURE-SENSOR 8.ENVIRO-MEAS 9.SHOCK-PRESS

IT IS SHOWN THAT TAILORED INTERFACE OPERATION CAN BE ACHIEVED AT HIGH SHOCK SPEEDS,AND THAT THIS IS COMBINED WITH GENERATION OF HIGH STAGNATION PRESSURES AT THE ENTRANCE TO THE HYPERSONIC NOZZLE. A FREE-PISTON SHOCK TUNNEL IS DESCRIBED,AND EXPERIMENTS ARE REPORTED IN WHICH HELIUM DRIVER GAS IS USED TO ACHIEVE TAILORED INTERFACE OPERATION AT SHOCK MACH NUMBERS OF UP TO 18.5 IN AIR. TEST SECTION MEASUREMENTS OF PITOT PRESSURE AND STAGNATION-POINT HEAT TRANSFER ARE USED TO SHOW THAT STAGNATION ENTHALPIES CALCULATED FROM THE SHOCK-TUBE MEASUREMENTS ARE REALIZED IN THE TEST SECTION. IT IS CONCLUDED THAT ENTHALPY SIMULATION OF FLIGHT AT SPEEDS IN EXCESS OF ORBITAL VELOCITY CAN BE ACHIEVED WITH THIS TYPE OF SHOCK TUNNEL.

WALKER WW BOEING
SELECTION AND APPLICATION OF HIGH VACUUM PUMPING SYSTEMS
=JL.ENVIR.SCI VOL.10,P.28-31 JUNE 1967 9REF 4TABLES

WAL7001M

1.EVALUATION 2.FACILITY 3.SPACE 4.NOMINAL 5.SINGLE 7.PUMP
8.ENVIRO-MEAS 9.HI-VAC

A PRACTICAL SUMMARY OF THE TYPES OF HIGH VACUUM PUMPING SYSTEMS INCLUDING OPERATING CHARACTERISTICS,COSTS,ADVANTAGES AND DISADVANTAGES OF EACH. A LIST OF SELECTION CRITERIA CONCLUDES THE ARTICLE.

RADIATION ENVIRONMENTS

CASTLE JA SPECTROLAB
MODULAR XENON SOLAR SIMULATOR FOR LARGE AREA APPLICATION
=IES PROC.1967,P.687-694 2REF 7FIG

CAS7001N

1.DESIGN 2.FACILITY 3.SPACE 4.NOMINAL 5.SINGLE 7.ARC-LAMP,
OPTICS 8.ENVIRO-MEAS 9.SOLAR

REVIEWS DEVELOPMENT WORK DIRECTED PRIMARILY TO A VERTICALLY MOUNTED MODULE FOR USE IN A SYSTEM EXPANDABLE TO 37 MODULES FOR IRRADIATION OF A 24-FT DIAMETER TEST VOLUME. THE PRIMARY COMPONENTS MAKING UP THE SOLAR MODULE CONSIST OF A SOURCE MODULE,TRANSFER OPTICAL SYSTEM AND THE CASSEGRAIN MODULE, WHICH INCLUDES THE FILL-IN OPTICS.

HARRINGTON RE UNION CARBIDE
THE CARBON ARC SOURCE--II,CHARACTERISTICS OF BRIGHTNESS
=ENVIR.QUAR VOL.13,P.32-34 JUNE 1967 1FIG 1TABLE

HAR7004N

1.EVALUATION 2.FACILITY 3.SPACE 4.NOMINAL 5.SINGLE 7.ARC-LAMP
8.ENVIRO-MEAS 9.SOLAR

CONTINUING A DISCUSSION,BEGUN IN THE MARCH 1967 ISSUE OF EQ, OF VARIOUS FACTORS IN THE CHOICE AND USE OF CARBON ARCS AND SOME RESULTS THAT CAN BE EXPECTED FROM THEM IN SOLAR RADIATION SIMULATION.

MACK CL MIT

MAC7001N

VAN ALLEN BELT SIMULATION
 =JL.SPACECRAFT AND ROCKETS VOL.4,P.819-821 JUNE 1967 2REF
 =6FIG

1.DESIGN 2.FACILITY,EFFECTS 3.SPACE 4.NOMINAL 5.COMBINED
 7.SATELLITE,SEMICONDUCTOR,SHIELD 8.ENVIRO-MEAS,ENVIRO-EFFECTS
 9.VAN-ALLEN,HI-VAC

THE LINCOLN LAB ACCELERATOR FACILITY WAS DESIGNED TO CARRY OUT STUDIES OF VAN ALLEN RADIATION. THIS NOTE TREATS TWO ASPECTS OF THE WORK TO DATE--THE RADIATION ENVIRONMENT AT VARIOUS PLACES WITHIN A SATELLITE AND THE COMPARATIVE EFFECTS OF SPECTRAL EXPOSURE VS MONOENERGETIC EXPOSURE ON TWO TYPES OF SOLID-STATE DEVICE.

THE CARBON ARC FOR SOLAR SIMULATION
 =TEST ENG VOL.12,P.26+ JULY 1964 3FIG

1.INFORMATION 2.FACILITY 3.SPACE 4.NOMINAL 5.SINGLE 7.ARC-LAMP
 9.SOLAR

A VERY BRIEF SUMMARY OF THE DEVELOPMENT OF SPECIAL TECHNIQUES FOR CONTINUOUS OPERATION OF HIGH INTENSITY ARC CARBONS. A NEW TUNGSTEN NEGATIVE WHOSE TIP OPERATES IN AN INERT ATMOSPHERE OF ARGON MAKES POSSIBLE CONTINUOUS SOLAR SIMULATION FOR PERIODS UP TO 1000 HOURS.

TECOSKY JL LAWRENCE SYS CORP

TEC7002N

HEAT FLUX SIMULATOR
 =INSTR.AND CONT.SYS VOL.40,P.135-137 JUNE 1967 3FIG 1TABLE

1.DESIGN 2.FACILITY 3.SPACE 4.NOMINAL 5.COMBINED 7.RADIATION-SOURCE,DATA-SYSTEM,CNTRL-SYSTEM 8.ENVIRO-CONTROL 9.HI-VAC,
 SOLAR

THIS SYSTEM SUPPLIED BY LAWRENCE SYSTEMS CORP PROGRAMS AND CONTROLS HEAT ENERGY RADIATED TO A TEST VEHICLE IN THE MARK I AEROSPACE SYSTEMS ENVIRONMENTAL CHAMBER AT ARNOLD AIR FORCE ENGINEERING DEVELOPMENT CENTER. FLUX DISTRIBUTION OVER THE VEHICLE IN A GIVEN POSITION AND THE VARIATIONS OF THE FLUX PATTERN DUE TO ORBITAL MOTION OF THE VEHICLE ARE ACHIEVED BY PROVIDING 50 CONTROL AREAS EACH FURNISHED WITH A SEPARATE POWER REGULATOR AND CONTROL SYSTEM. THE INPUTS TO THE CONTROL AREAS ARE DIGITALLY PROGRAMMED BY PUNCHED CARDS OR TAPE PROGRAM AND CORRECTED BY A FEEDBACK SIGNAL FROM A SENSOR LOCATED IN THE FLUX FIELD OF EACH CONTROL AREA. THE DIGITAL PROGRAMMER AND 50 PROPORTIONAL CONTROLLERS PROVIDE HIGH SPEED,CLOSED LOOP CONTROL OF THE HEAT FLUX.

MECHANICAL SHOCK ENVIRONMENTS

BAKER WJ UNIV OF NEW MEXICO

BAK60020

INVESTIGATION OF PULSE X-RAY TECHNIQUES FOR STUDY OF SHOCK-WAVE-INDUCED EFFECTS IN SOIL
 =US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVIRONMENTS,SYMPOSIUM,36TH,OCT.1966 PT.6,P.225-236 11REF 5FIG

1.STUDY 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE 7.GROUND,
 OPTICAL-INSTR,MODEL 8.ENVIRO-EFFECTS 9.BLAST-SHOCK

THE FEASIBILITY OF A PULSE X-RAY SYSTEM IN THE STUDY OF SHOCK-WAVE-INDUCED MOTION OF MODELED STRUCTURES BURIED IN SOIL WAS INVESTIGATED. THE RESULTS FROM ABOUT 20 TESTS ON MODELS BURIED IN SOILS ARE PRESENTED BY RADIOGRAPHS AND 35-MM PHOTOGRAPHS. INITIAL TESTS DETERMINED THE TECHNIQUES,MODEL SIZE,AND DENSITY OF SOIL WHICH WOULD YIELD OPTIMUM PICTURES. THE USE OF GAMMA-RAY SOURCES AND OTHER X-RAY PHENOMENA FOR SHOCK-WAVE MEASUREMENTS WAS ALSO INVESTIGATED.

CIMORELLI SA CONSULTANT
MULTIPLE BLAST - SHOCK INTERACTION RE-ENTRY SHOCK-ON-SHOCK
INTERCEPT SIMULATION
=IES PROC.1967,P.645-650 2REF 14FIG

CIM70010

1.DESIGN 2.SIMULATION 3.INDUCED 4.NOMINAL 5.COMBINED 7.EX-
PLOSIVE,MODEL 8.ENVIRO-CONTROL 9.BLAST-SHOCK,SHOCK-PRESS

EXPERIMENTS WERE SPECIFICALLY CONDUCTED TO STUDY THE EFFECTS
OF THE INTERACTION OF THE BLAST WAVE SHOCK FRONT RESULTING
FROM A NUCLEAR DETONATION WITH THE BOW SHOCK (PRESSURE FIELD)
ASSOCIATED WITH A HYPERSONIC RE-ENTRY VEHICLE. SHEET EXPLO-
SIVES WERE USED TO SIMULATE THE SHOCK INTERACTION PHENOMENON.

DCNSELMAN RW LOCKHEED
BALLISTIC-RANGE BLAST TRAVERSAL TESTING
=JL.SPACECRAFT AND ROCKETS VOL.4,P.929-933 JULY 1967 14REF
=14FIG

DON70010

1.STUDY 2.SIMULATION,MEASUREMENT 3.COUNTER-MEAS 4.NOMINAL
5.SINGLE 7.MODEL,TELEM-SYSTEM,OPTICAL-INSTR,EXPLOSIVE,CALIBR-
EQUIP 8.ENVIRO-MEAS 9.BLAST-SHOCK

SCALE MODELS CONTAINING FAST-RESPONSE FM TELEMETRY SYSTEMS
MODULATED BY CAPACITANCE-TYPE PRESSURE TRANSDUCERS WERE GUN-
LAUNCHED TO SUPERSONIC VELOCITY THROUGH A BLAST FIELD GENER-
ATED BY THE DETONATION OF A 500-LB TNT SPHERE. SURFACE PRES-
SURES EXPERIENCED BY THE MODELS DURING FLIGHT WERE TELEMETERED
FROM TWO SUBMINIATURE TELEMETRY SYSTEMS,CONTAINED WITHIN THE
MODEL,TO A GROUND STATION. EACH CHANNEL OF PRESSURE INFORMA-
TION WAS PICKED UP BY ITS OWN RECEIVER AND FED TO A DUAL RE-
CORDING SYSTEM CONSISTING OF A TAPE RECORDER AND OSCILLOSCOPES
PHOTOGRAPHED BY 35-MM CAMERAS. THE MODEL-BLAST ENTRANCE AND
EXIT WERE PHOTOGRAPHED BY HIGH-SPEED FRAMING CAMERAS. IN ORDER
TO CORRELATE ACCURATELY THE VARIOUS EVENTS,ALL FILMS CONTAINED
TIMING SIGNALS. DATA FOR A VARIETY OF CONDITIONS WERE PRODUCED
BY VARYING MODEL MACH NUMBER,BLAST PRESSURE RATIO,AND BLAST
INTERSECTION ANGLE.

HASSELMAN TK TRW
SHOCK RESPONSE OF ELECTRONIC EQUIPMENT CABINETS BY NORMAL MODE
METHOD
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,36TH,OCT.1966 PT.7,P.129-134 9REF 4FIG

HAS60010

1.THEORY 2.EFFECTS 3.INDUCED 4.NOMINAL 5.SINGLE 7.MODEL,SHIP,
STRUCTURE,SONAR 8.ENVIRO-EFFECTS 9.SHOCK

SEVERAL SONAR SYSTEM CABINETS WERE ANALYZED WHICH AVERAGED 65
IN. IN HEIGHT AND WEIGHED APPROXIMATELY 300 TO 1200 LB. EXCITA-
TION CONSISTED OF AN ACCELERATION PULSE RECORDED DURING PRIOR
TESTING OF SIMILAR EQUIPMENT ON THE NAVY MEDIUM WEIGHT SHOCK
MACHINE USING THE 25- TO 30-CPS SIMULATED DECK. INSIGHT INTO
THE EXCITATION-SYSTEM-RESPONSE RELATIONSHIP CAN BE PROVIDED BY
EXAMINATION OF PLOTTED MODE SHAPES AND A COMPARISON OF THEIR
CORRESPONDING FREQUENCIES WITH THE FREQUENCY CONTENT OF THE
EXCITATION.

MCNAMARA W MIT

MCN70010

FLAME COMPUTER CODE FOR THE AXISYMMETRIC INTERACTION OF A
BLAST WAVE WITH A SHOCK LAYER ON A BLUNT BODY
=JL.SPACECRAFT AND ROCKETS VOL.4,P.790-795 JUNE 1967 12REF
=7FIG 1TABLE

1.EVALUATION 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE 7.COM-
PUTER 8.ENVIRO-MEAS 9.BLAST-SHOCK

THE FLOATING AXISYMMETRIC MESH NUMERICAL PROCEDURE IS BASED
UPON AN ACOUSTIC MODIFICATION OF THE FINITE-DIFFERENCE METHOD
OF GODUNOV. A FLOATING EULERIAN MESH IS ATTACHED TO THE BOW
SHOCK AND TO THE BODY AND IS PERIODICALLY REALIGNED TO FOLLOW,
IN A LAGRANGIAN FASHION, THE PRIMARY CONTACT SURFACE RESULTING
FROM THE BLAST-WAVE/BOW-SHOCK INTERACTION. COMPARISONS WITH
STEADY-STATE SOLUTIONS SHOW ERRORS LESS THAN 5 PERCENT, AND
COMPARISONS WITH INTERACTION DATA SHOW ERRORS LESS THAN 10
PERCENT.

USHER T UNHOLTZ-DICKIE

USH70030

SIGNAL CONDITIONER CHARACTERISTICS FOR SHOCK APPLICATIONS
=JL.ENVIR.SCI VOL.10,P.31-34 OCT.1967 7FIG 3TABLES

1.EVALUATION 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE
7.ACCELEROMETER,AMPLIFER,FILTER 8.ENVIRO-MEAS 9.SHOCK

IT HAS BEEN SHOWN THAT THE PHASE LAG OF THE FREQUENCY RESPONSE
FUNCTION OF SIGNAL-CONDITIONING AMPLIFIERS SHOULD BE EXACTLY
PROPORTIONAL TO FREQUENCY. FOR WIDE-BAND AMPLIFIERS, THIS LEADS
TO A PHASE SPECIFICATION OF VERY NEARLY 0 DEGREE FOR THE LOW-
FREQUENCY PORTION OF THE RESPONSE FUNCTION. A SIMPLE METHOD
OF PHASE COMPENSATION TO MINIMIZE REPRODUCTION ERRORS HAS BEEN
DESCRIBED. FOR THE HIGH-FREQUENCY PORTION OF THE RESPONSE
FUNCTION, A THIRD-ORDER BUTTERWORTH FILTER HAS BEEN DESCRIBED.

ZAGIEBOYLO W ARMY NATICK LAB

ZAG70010

SHOCK-WAVE INTERACTION WITH AIR-SUPPORTED STRUCTURES
=EXPER.MECH VOL.7,P.532-536 DEC.1967 4REF 8FIG

1.XPER-RESULTS 2.EFFECTS 3.INDUCED 4.NOMINAL 5.SINGLE
7.STRUCTURE,RUBBER,SHOCK-TUBE,MODEL 8.ENVIRO-EFFECTS 9.BLAST-
SHOCK

A LOW-MACH, HIGH-MASS-FLOW, SHOCK TUBE WAS USED TO CHARACTERIZE
THE RESPONSE OF AIR-SUPPORTED MODELS TO LOW-YIELD NUCLEAR-
BLAST EFFECTS. SHOCK-WAVE INTERACTION WITH BALLOONS AND EL-
LIPSOIDAL SECTIONS WAS OBSERVED WITH SHADOWGRAPHIC TECHNIQUE
AND INTERNAL-PRESSURE MEASUREMENTS WERE MADE. IN EACH CASE,
PROTECTION FROM DYNAMIC FORCES WAS ACHIEVED AND THE INTERNAL
PRESSURE EXHIBITED DIFFERENCES FROM THE SHOCK-WAVE OVERPRES-
SURE. ALTHOUGH DEFORMATION WAS LARGE, MOST MODELS SURVIVED
FREQUENT TESTS AT RELATIVELY HIGH OVERPRESSURES. RELATIVELY
INEXPENSIVE AIR-SUPPORTED STRUCTURES AFFORD SOME DEGREE OF
PROTECTION AGAINST BLAST EFFECTS.

SPACE ENVIRONMENTS

NAGLER RG JPL
THE MARS TRANSIT AND ENTRY ENVIRONMENT, A NEW PROBLEM FOR HEAT SHIELDS
=IES PROC. 1967, P. 443-455 17REF 7FIG 7TABLES NAG7001P

1. STUDY 2. SOURCE, PROTECTION 3. INDUCED, SPACE, PLANETARY 4. NOMINAL 5. SINGLE 7. SHIELD, PLASTIC, MATERIALS 8. ENVIRO-MEAS 9. LF-VIBR, HF-VIBR, RDM-VIBR, STERILIZATION, HI-G, HI-VAC, VH-VAC, HI-TEMP, REENTRY, METEORIDS, REENTRY-LOADS, UL-TEMP

OUTLINES THE TRANSIT AND ENTRY ENVIRONMENTS EXPERIENCED BY A VEHICLE LANDING ON THE SURFACE OF MARS FROM PRELAUNCH TO PARACHUTE DEPLOYMENT AND DISCUSSES THE IMPLICATIONS OF THE STERILIZATION, LAUNCH, INTERPLANETARY TRANSIT, AND ATMOSPHERIC ENTRY ENVIRONMENTS ON THE SELECTION OF HEAT SHIELD MATERIALS FOR VARIOUS MISSIONS. SOME OF THE NASA PROGRAMS NOW IN PROGRESS TO SCREEN THE AVAILABLE MATERIAL COMPOSITES IN THESE ENVIRONMENTS ARE ALSO OUTLINED.

TROY P DOUGLAS AIRCRAFT
ENVIRONMENTAL SIMULATION
=SPACE/AERO VOL. 48, P. 122-125 JULY 31, 1967 4FIG TRO7002P

1. INFORMATION 2. SIMULATION 3. SPACE, INDUCED 4. NOMINAL 5. COMBINED, SINGLE 7. SPACECRAFT, FACILITY 8. ENVIRO-MEAS 9. REENTRY, HI-VAC, VIBR, ACOUSTIC, RDM-VIBR, SHOCK, RADIATION

A GENERAL STATE-OF-THE-ART SURVEY OF EXISTING SPACE ENVIRONMENTAL SIMULATION WITH A BRIEF PROJECTION OF FUTURE NEEDS.

HIGH TEMPERATURE AND UNSPECIFIED TEMPERATURE

CARPENTER JE CORNELL AERO LAB
THE WAVE SUPERHEATER, AN ADVANCED AEROTHERMAL TEST FACILITY
=JL. ENVIR. SCI VOL. 10, P. 32-37 AUG. 1967 12REF 8FIG 1TABLE CAR7003R

1. EVALUATION 2. FACILITY 3. INDUCED 4. NOMINAL 5. SINGLE 7. SHOCK-TUBE 8. ENVIRO-MEAS 9. REENTRY

THE WAVE SUPERHEATER MAY BE CATEGORIZED AS A HIGH POWER, LARGE MASS FLOW, HIGH PRESSURE, AND MODERATE ENTHALPY FACILITY. IT IS UNIQUE IN ITS CAPABILITY TO PRODUCE A CLEAN SUPERSONIC JET OF HIGH TEMPERATURE AIR IN THERMAL, CHEMICAL AND PHYSICAL EQUILIBRIUM FOR SIGNIFICANT TEST DURATIONS. THROUGH THE BLOWDOWN PRINCIPLE, WHEREIN ENERGY STORED OVER A 4 HOUR PERIOD IS RELEASED IN 15 SECONDS OF FLOW, HIGH STREAM ENERGIES ARE AVAILABLE. THE PRESENT MAXIMUM OPERATIONAL CAPABILITY OF THE WAVE SUPERHEATER IS 7000 DEGREES R AND 110 ATMOSPHERES.

DEACON HJ MARTIN CO

DEA7001R

EQUILIBRIUM RADIATIVE HEATING OF SHOCKED CARBON DIOXIDE
=AIAA JL VOL.5,P.1358-1360 JULY 1967 12REF 2FIG 1TABLE

1.THEORY 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE 7.PLANET
8.ENVIRO-MEAS 9.REENTRY

FROM THE RESULTS OF THIS STUDY,AN ESTIMATION CAN BE MADE OF THE EQUILIBRIUM RADIANT HEAT TRANSFER TO BODIES AT HYPERSONIC VELOCITIES IN A CARBON DIOXIDE ATMOSPHERE,WHICH INCLUDE THE EFFECTS OF SELF-ABSORPTION OF THE CO FOURTH POSITIVE ELECTRONIC BAND SYSTEM. IT WAS ASSUMED THAT THE SHOCK LAYER IS REPRESENTED BY A CONSTANT PROPERTY SLAB MODEL WITH EQUILIBRIUM CHEMISTRY. THE STUDY HAS SHOWN THAT CO(4+) RADIATION IS INDEED PREDOMINANT BETWEEN 20 AND 30 KFT/SEC AND THAT IT IS REDUCED DUE TO SELF-ABSORPTION. HENCE,IT CANNOT BE TREATED BY EITHER THE TRANSPARENT OR OPTICALLY THICK LIMITS FOR TYPICAL SHOCK-LAYER THICKNESSES. RESULTS ALSO SHOWED THAT A REASONABLE CENTRAL WAVELENGTH FOR CO(4+) IS APPROX 0.149 MICRON AND THAT THE RESULTS OF A TRANSPARENT RADIATION ANALYSIS ARE STRONGLY DEPENDENT ON THE VALUE SELECTED FOR THE CENTRAL WAVELENGTH. FOR THE OTHER ELECTRONIC BAND SYSTEMS CONSIDERED,THIS EFFECT SHOULD BE OF SECONDARY IMPORTANCE DUE TO THE DOMINANCE OF CO(4+) RADIATION.

RANDOM VIBRATION AND UNSPECIFIED VIBRATION

PIERSOL AG MEASUREMENT ANAL CORP

PIE7002T

POWER SPECTRA MEASUREMENTS FOR SPACECRAFT VIBRATION DATA
=JL.SPACECRAFT AND ROCKETS VOL.4,P.1613-1617 DEC.1967 6REF
=6FIG

1.STUDY 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE 7.SPACE-
CRAFT,THOR-AGENA 8.ENVIRO-MEAS 9.RDM-VIBR,ACOUSTIC

PRACTICAL TECHNIQUES FOR DESCRIBING AND ANALYZING THE SPECTRAL CHARACTERISTICS OF SPACECRAFT LAUNCH VIBRATION DATA ARE REPORTED. THE ERRORS ASSOCIATED WITH THE PROCEDURE OF COMPUTING A TIME-VARYING POWER SPECTRUM BY DIRECT BAND-PASS FILTERING AND TIME AVERAGING OPERATIONS ARE DISCUSSED. IT IS NOTED THAT SPACECRAFT VIBRATION PRODUCED BY AERODYNAMIC BOUNDARY-LAYER NOISE DURING THE MAXIMUM-DYNAMIC-PRESSURE PHASE OF LAUNCH IS APPROXIMATELY OF THE LOCALLY STATIONARY FORM. THIS PERMITS THE TIME-VARYING POWER SPECTRUM TO BE SEPARATED INTO TIME AND FREQUENCY-DEPENDENT FUNCTIONS WHICH CAN BE INDIVIDUALLY MEASURED. AN ILLUSTRATION IS PRESENTED FOR ACTUAL SPACECRAFT LAUNCH VIBRATION DATA.

RICH RL BOEING

RIC6001T

S-IC RELIABILITY PROGRAM FROM STRUCTURAL LIFE VIEWPOINT
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVIRONMENTS,SYMPOSIUM,36TH,OCT.1966 PT.7,P.19-25 1REF 9FIG

1.DESIGN 2.METHOD 3.INDUCED 4.LIFE 5.SINGLE 7.PRESSURE-
SENSOR,VALVE,BATTERY,SWITCHES,RELAY,CONTACT,RELIABILITY
8.ENVIRO-EFFECTS 9.RDM-VIBR

MECHANICAL HARDWARE ARE PROVEN RELIABLE BY A SAFE-LIFE TECHNIQUE WHICH USES HISTORICAL FATIGUE DATA ESTABLISHED ON AIRPLANES. COMPONENTS ARE PROVEN CAPABLE OF WITHSTANDING REPEATED LIFE CYCLES OF VEHICLE SERVICE ENVIRONMENTS BY ANALYSIS AND TEST. THE VIBRATION ENVIRONMENTS,HARDWARE LIMITATIONS,FACTORS AFFECTING THE REQUIRED LIFE CYCLES,AND TEST CONDITIONS ARE DEVELOPED OR DEFINED. RELIABILITY OF ELECTRICAL HARDWARE IS SHOWN BY COMPARING FAILURE HISTORIES WITH MAXIMUM EXPECTED ENVIRONMENTS. FAILURES ARE CAUSED BY INCREASING,ONE AT A TIME,THE INDEPENDENT ENVIRONMENTS TO WHICH A COMPONENT MIGHT BE SUSCEPTIBLE. VIBRATION ENVIRONMENTS,TEST CONDITIONS AND METHODS OF ESTABLISHING THE RELIABILITY NUMBER ARE DISCUSSED.

STAHLE CV MARTIN CO

STA6003T

ESTIMATE OF EFFECT OF SPACECRAFT VIBRATION QUALIFICATION
TESTING ON RELIABILITY
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,36TH,OCT.1966 PT.7,P.1-18 17REF 13FIG
=2TABLES

1.EVALUATION 2.METHOD 3.INDUCED 4.NOMINAL 5.SINGLE 7.MODEL,
RELIABILITY 8.ENVIRO-EFFECTS 9.VIBR,RDM-VIBR

USING THE ESTIMATED STATISTICAL DISTRIBUTIONS FOR EQUIPMENT
STRESS AND STRENGTH,THE VIBRATION RELIABILITY OF THE SPACE-
CRAFT IS FORMULATED IN TERMS OF THE EQUIPMENT QUALIFICATION
TEST LEVEL AND THE NUMBER OF EQUIPMENTS TO BE QUALIFIED. THE
ESTIMATED RELIABILITY IS GIVEN FOR THE RANGE OF VIBRATION
LEVELS FOR WHICH DATA WERE OBTAINED.

USHER T UNHOLTZ-DICKIE CORP

USH7002T

AVERAGE CONTROL FOR SINUSOIDAL- AND RANDOM-VIBRATION TESTING
=ACOUST.SOC.AM.JL VOL.41,P.840-849 APR.1967 11REF 10FIG

1.STUDY 2.SIMULATION 3.INDUCED 4.NOMINAL 5.SINGLE 7.CNTRL-
SYSTEM 8.ENVIRO-CONTROL 9.VIBR,RDM-VIBR

THE VIBRATION TESTING SYSTEMS USING THE TIME-DIVISION MULTI-
PLEXERS ARE DESCRIBED. PERTINENT SYSTEM PARAMETERS ARE DETER-
MINED MATHEMATICALLY IN ORDER TO LIMIT SIGNAL HARMONIC DISTOR-
TION FOR THE SINUSOIDAL CASE,AND TO LIMIT TEST-LEVEL MODULA-
TION AND SPECTRAL SPREADING FOR THE RANDOM CASE. A SPECIAL
CASE FOR SINUSOIDAL TESTING IN WHICH A NARROW-BAND TRACKING
FILTER IS USED ON THE OUTPUT OF THE TDM IS ALSO DISCUSSED.

WEATHERSTONE JD NORTH AM AV

WEA6002T

VIBRATION DATA REDUCTION TECHNIQUES AS APPLIED TO SATURN S-II
VEHICLE
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,36TH,OCT.1966 PT.6,P.47-53 7FIG

1.DESIGN 2.DATA 3.INDUCED 4.NOMINAL 5.SINGLE 7.DATA-SYSTEM,
SATURN 8.ENVIRO-EFFECTS 9.VIBR,RDM-VIBR

S-II VIBRATION DATA REQUIREMENTS INDICATED THAT THE NUMBER OF
MEASUREMENTS PER TEST WOULD RANGE FROM APPROXIMATELY 50 TO
100. TEST DURATIONS WOULD EXTEND FROM A COUPLE OF SECONDS TO
395 SECONDS OR MORE. THE SYSTEM PROVIDES--1)HIGH-SPEED ANAL-
YSIS SUBSYSTEM CAPABLE OF COMPUTING THE PSD OF A RANDOM DATA
SIGNAL FOR EACH OF 50 CONSECUTIVE FREQUENCY SEGMENTS OVER A
3 KHZ BANDWIDTH IN REAL TIME 2)DIGITAL CONVERSION SUBSYSTEM
3)DETAIL ANALYSIS SUBSYSTEM CAPABLE OF PRODUCING ANALOG PLOTS
OF PSD,CROSS-SPECTRAL DENSITY,AND TRANSFER FUNCTION AND
4)PERIPHERAL EQUIPMENT CAPABLE OF REPRODUCING DATA FROM THE
ORIGINALLY RECORDED FORMAT.

SINUSOIDAL VIBRATION

BIEN HW MARTIN-BALTIMORE

BIE7001U

ALTERNATE HORIZONTAL LOCKOUT AVOIDS SHAKER RESONANCE PROBLEM.
=ENVIR.QUAR VOL.13,P.30-31 JUNE 1967 1FIG

1.INFORMATION 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE 7.SHAKER
8.ENVIRO-MEAS 9.VIBR

A LOCKOUT FEATURE WHEREBY THE SUSPENSION SYSTEM CAN BE ELIMINATED WORKED SATISFACTORILY IN THE VERTICAL DIRECTION, BUT PREVENTED LOCKING OUT THE VIBRATOR IN THE HORIZONTAL AXIS. WHEN FOUR BOLTS INSTALLED IN THE VIBRATOR END BELL SUPPORTS WERE TIGHTENED IN THE HORIZONTAL DIRECTION, THE ISOLATOR SYSTEM WAS LOCKED OUT AND FOR MOST TESTS REQUIRING NORMAL VIBRATION LEVELS, THE SHAKER WAS OPERATED BETWEEN THE SPECIFIED TEST FREQUENCIES.

CAUDLE RC FAIREY SURVEYS LTD

CAU7001U

DESIGN, USAGE AND LIMITATIONS OF HYDRAULIC VIBRATORS
=ENVIR.ENG NO.29,P.17-19 NOV.1967 6FIG

1.EVALUATION 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE
7.SHAKER, VALVE 8.ENVIRO-MEAS 9.LF-VIBR

COMPARES THE CAPABILITIES AND LIMITATIONS OF HYDRAULIC AND ELECTRO-DYNAMIC VIBRATION SYSTEMS.

EDELBERG A BOEING

EDE7001U

SATURN V DYNAMIC TEST VEHICLE INSTRUMENTATION AND DATA ACQUISITION SYSTEM
=IES PROC.1967,P.381-397 27FIG 2TABLES

1.DESIGN 2.MEASUREMENT, DATA 3.INDUCED 4.NOMINAL 5.SINGLE
7.SATURN, DATA-SYSTEM, CALIBR-EQUIP, ACCELEROMETER 8.ENVIRO-MEAS, CALIBRATION 9.LF-VIBR

INCLUDES A DESCRIPTION OF THE TEST SETUP USED TO SUPPORT AND EXCITE THE VEHICLE, THE TEST INSTRUMENTATION, AND A COMPUTER CONTROLLED DIGITAL DATA ACQUISITION SYSTEM USED IN ACQUIRING THE DATA. AN ERROR ANALYSIS IS ALSO INCLUDED WHICH DELINEATES THE ERRORS ASSOCIATED WITH EACH TYPE OF DATA, BEGINNING WITH THE TRANSDUCERS AND CONCLUDING WITH THE DIGITIZED DATA.

GRANT BE RAE

GRA7001U

SOME OBSERVATIONS ON MISSILE VIBRATION FLIGHT RESULTS AND THE DIFFICULTIES OF THEIR PREDICTION
=ENVIR.ENG NO.29,P.9-12 NOV.1967 9FIG

1.STUDY 2.SIMULATION 3.INDUCED 4.NOMINAL 5.SINGLE 7.COMPUTER, GUIDED-MISSILE 8.ENVIRO-MEAS 9.VIBR

A TECHNIQUE USING A SPECIAL DIGITAL CORRELATOR HAS BEEN DEVELOPED. WITH THIS GENERAL TECHNIQUE, A FUND OF EMPIRICAL DATA FROM LABORATORY MEASUREMENT CAN BE BUILT UP AND CORRECTED BY ANY AVAILABLE FLIGHT MEASUREMENTS. ANALYTICAL TECHNIQUES CAN BE APPLIED FOR EXTRAPOLATION AS THEY DEVELOP, AND THE EFFECTS OF CONTROLLED CHANGES IN MATERIAL DAMPING, STIFFNESS AND MASS CAN BE STUDIED SYSTEMATICALLY WITHOUT EXTENSIVE FLIGHT TRIALS OF EACH NEW CONFIGURATION.

KANA D. SOUTHWEST RES INST
LONGITUDINAL VIBRATION OF A MODEL SPACE VEHICLE PROPELLANT
TANK
=JL. SPACECRAFT AND ROCKETS VOL.4,P.1585-1591 DEC.1967 10REF
=11FIG 1TABLE

KAN7001U

1.STUDY 2.EFFECTS 3.INDUCED 4.NOMINAL 5.SINGLE 7.STRUCTURE-
ELASTIC-BODY,STRUCTURE-SHELL,PROPELLANT-LIQUID,MODEL
8.ENVIRO-EFFECTS 9.LF-VIBR,HF-VIBR

THE OVER-ALL VIBRATIONAL RESPONSE OF AN ELASTIC 1/16-SCALE
MODEL OF THE S-IC STAGE LOX TANK WAS EXPERIMENTALLY INVESTI-
GATED UNDER LONGITUDINAL EXCITATION. SEVERAL PARAMETERS WERE
VARIED TO DETERMINE THEIR INFLUENCE ON THE VIBRATION. THESE
INCLUDED LIQUID LEVEL, INTERNAL ULLAGE PRESSURE, AND THE
PRESENCE OF STIFFENERS AND RING BAFFLES.

TUSTIN W. TUSTIN INST OF TECH
GLUED VIBRATION AND SHOCK TEST FIXTURES
=TEST ENG VOL.18,P.20-21 JULY 1967 3FIG

TUS7006U

1.EVALUATION 2.METHOD 3.INDUCED 4.NOMINAL 5.SINGLE 7.ADHESIVE
8.ENVIRO-MEAS 9.VIBR

A METHOD OF JOINING PARTS TOGETHER IN VIBRATION AND SHOCK FIX-
TURES USING METAL-EPOXIES IS EVALUATED. ABSTRACTED FROM A
PAPER, GLUED VIBRATION TEST FIXTURES, BY JAMES L. MACKAY,
MARTIN CO., PRESENTED IN APRIL 1963 AT THE NATIONAL MEETING OF
THE INSTITUTE OF ENVIRONMENTAL SCIENCES.

TUSTIN W. TUSTIN INST OF TECH
POWER FACTOR CORRECTION
=TEST ENG VOL.18,P.12-13 SEPT.1967 2FIG

TUS7009U

1.DESIGN 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE 7.SHAKER,
AMPLIFIER,POWER-SOURCE 8.ENVIRO-MEAS 9.VIBR

FOR THOSE WITH MARGINAL POWER SUPPLIES FOR THEIR SHAKERS, THIS
ARTICLE DESCRIBES HOW POWER FACTOR CORRECTION INCREASES THE
CAPABILITY OF A POWER SUPPLY (EITHER ROTATING OR AMPLIFIER)
TO DRIVE AN ELECTROMAGNETIC SHAKER.

TUSTIN W. TUSTIN INST OF TECH
LAMINATED VIBRATION FIXTURES
=TEST ENG VOL.18,P.22 DEC.1967 2FIG

TUS7010U

1.INFORMATION 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE
7.SHAKER,ADHESIVE 9.VIBR

A BRIEF RESUME OF A PAPER BY ROBERT L. BERGEY WHICH APPEARED
IN SHOCK AND VIBRATION BULLETIN 34,FEB.1965. LAYERS OF ALUMI-
NUM SHEETS AND GLASS EPOXY SHEETS WERE BONDED TOGETHER WITH
PERMACEL SHEET EPOXY. OVERSIZED HOLES WERE DRILLED AT ATTACH-
MENT LOCATIONS. THESE WERE FILLED WITH SLUGS OF SOLID ALUMI-
NUM WHICH WERE ACCURATELY DRILLED AND TAPPED FOR FINAL ATTACH-
MENT OF THE TEST ITEM.

BIOLOGICAL ENVIRONMENTS

EGGINS HOW UNIV OF ASTON
THE ECONOMICS OF BIODETERIORATION
=ENVIR.ENG NO.29,P.15-16 NOV.1967 7REF

EGG7001V

1.INFORMATION 2.PROTECTION,ENGR-PRACTICE 3.NATURAL 4.NOMINAL
5.SINGLE 7.INFO-RETR,MATERIALS 9.INSECTS,RODENTS,FUNGUS

A GENERAL SURVEY IS GIVEN OF THE PROBLEM OF DAMAGE TO MATERIALS BY ORGANISMS. SOME OF THE WAYS THAT THE PROBLEM CAN BE CONTROLLED ARE LISTED. THE SERVICES AND PUBLICATIONS OF THE BIODETERIORATION INFORMATION CENTRE AT THE UNIVERSITY OF ASTON IN BIRMINGHAM ARE DESCRIBED.

MISCELLANEOUS ENVIRONMENTS

ELLIOTT CW INLAND TESTING LAB
ENVIRONMENTAL TESTING TECHNIQUES
=MACH.DESIGN VOL.39,P.176-181 NOV.23,1967 9FIG

ELL7002W

1.ORGANIZATION 2.FACILITY 3.NATURAL,INDUCED 4.NOMINAL
5.SINGLE,COMBINED 7.TEST-LAB 8.ENVIRO-MEAS 9.HOT,COLD,VIBR.
HUMIDITY,SHOCK,SUSTAINED,CLIMATIC,XPLOS-VAP,FUNGUS

THE TYPES OF TESTING CURRENTLY CARRIED OUT ARE ILLUSTRATED BY TAKING AN IMAGINARY TOUR OF A TYPICAL WELL-EQUIPPED ENVIRONMENTAL LABORATORY.

ENGINEERING PRACTICES

KENNARD DC NASA GODDARD
ENVIRONMENTAL TECHNOLOGY,HOW ARE WE DOING
=JL.ENVIR.SCI VOL.10,P.12-15 JUNE 1967 8REF

KEN7001Z

1.PHILOSOPHY 2.ENGR-PRACTICE 3.GENERAL 7.TRAINING

EXAMINES THE ADVANCES AND CHALLENGES IN ENVIRONMENTAL TECHNOLOGY. ALSO TREATS SOME OF THE TRENDS THAT WILL AFFECT THE FIELD--GOVERNMENT,EDUCATION,AND THE INFORMATION EXPLOSION.

KENYON HS MINISTRY OF TECH
ENVIRONMENTAL FACTORS IN MILITARY PACKAGING REQUIREMENTS
=ENVIR.ENG NO.27,P.21-23 JULY 1967

KEN7002Z

1.PHILOSOPHY 2.PROTECTION,ENGR-PRACTICE 3.NATURAL,INDUCED
4.NOMINAL 5.SINGLE 6.BS 1133 7.PACKAGING 9.NAT-XPOS,TRANSPORT

OUTLINES THE REQUIREMENTS OF THE DEFENCE SERVICES FOR THE PACKAGING OF THE SUPPLIES THEY ORDER. THE IMPLICATIONS OF THE REQUIREMENTS IN ENVIRONMENTAL TERMS AND MORE PARTICULARLY THE IMPLICATIONS IN TERMS OF PACKAGE TESTING ARE EXAMINED.

SIMPSON MH FRANKFORD ARSENAL

SIM7001Z

QUALIFYING OUR ENGINEERING TECHNICIANS TO GET THEM CERTIFIED
=JL.ENVIR.SCI VOL.10,P.20-23 AUG.1967 5REF 1FIG 3TABLES

1.PHILOSOPHY 2.ENGR-PRACTICE 7.TECHNICIAN

THE POSITION IN THIS PAPER IS THAT THE ENVIRONMENTAL ENGINEERING TECHNICIAN SHOULD BE CERTIFIED. THE REASONS WHY, AND WHY IT IS IN THE BEST INTEREST OF THE INSTITUTE OF ENVIRONMENTAL SCIENCES TO MOTIVATE AND HELP THE TECHNICIAN TO BECOME CERTIFIED ARE DEVELOPED.

YOUNG G MCDONNELL DOUGLAS

YOU7001Z

PLANNING AND IMPLEMENTING TEST PROGRAMS
=MACH.DESIGN VOL.39,P.142-148 NOV.23,1967 5FIG1.DESIGN 2.ENGR-PRACTICE 3.GENERAL 4.NOMINAL 5.SINGLE
7.QUALITY-CNTRL

PRODUCT TESTING IS PERFORMED TO DEVELOP OR EVALUATE A HARDWARE DESIGN. CLOSE ATTENTION MUST BE GIVEN TO SUCH DETAILS AS PURPOSE, SCHEDULE, AND AVAILABILITY AND COST OF FACILITIES AND EQUIPMENT. THE BASIC ELEMENTS OF TEST PLANNING AND IMPLEMENTATION ARE OUTLINED IN THIS ARTICLE.