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ENVIRONMENTAL ENGINEERING ABSTRACTS

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ENVIRONMENTAL ENGINEERING ABSTRACTS

Prepared for

THE ENVIRONMENTAL TESTING LABORATORY

Organization 7300

By

The Simulated Environments Information Center
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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

ADELBERG M CONSULTANT

ADE6001A

SCALING OF FLUIDS FOR STUDYING THE EFFECT OF GRAVITY UPON
NUCLEATE BOILING

=IES PROC.1966,P.427-432 34REF 1TABLE

1.THEORY 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE 7.LIQUIDS
8.ENVIRO-EFFECTS 9.SUB-GRAVITAL, GRAVITAL

AFTER DEVELOPING THE EQUATIONS NECESSARY FOR THE STUDY OF THE GRAVITATIONAL EFFECTS ON NUCLEATE BOILING, THE AUTHORS PREPARED A TABLE SUMMARIZING THE VALUES FOR THESE EQUATIONS FOR A GROUP OF SATURABLE FLUIDS. THE FLUIDS CHOSEN MAY BE CONSIDERED CANDIDATES FOR HI-G EXPERIMENTS WHICH COULD BE PERFORMED ON A CENTRIFUGE. THESE FLUIDS HAVE REASONABLE BOILING POINTS, ARE GENERALLY AVAILABLE, ARE MODERATE IN COST, ARE NOT VERY HAZARDOUS TO HANDLE, AND THEIR PROPERTIES ARE AVAILABLE.

BOWMAN TE MARTIN CO

BOW6001A

DYNAMICS OF AN AXI-SYMMETRIC LIQUID FREE SURFACE FOLLOWING A
STEPWISE ACCELERATION CHANGE

=IES PROC.1966,P.553-560 21REF 13FIG

1.STUDY 2.EFFECTS, METHOD 3.INDUCED 4.NOMINAL 5.SINGLE
7.PROPELLANT-LIQUID 8.ENVIRO-EFFECTS 9.GRAVITAL, SUB-GRAVITAL

THE DYNAMIC RESPONSE OF AN AXI-SYMMETRIC LIQUID SURFACE TO SUDDEN CHANGES IN AXIAL ACCELERATION IS INVESTIGATED BOTH ANALYTICALLY AND EXPERIMENTALLY. THE ANALYSIS IS BASED ON POTENTIAL FLOW EQUATIONS, LINEARIZED ABOUT A PLANE. A SOLUTION IS OBTAINED IN THE FORM OF A FOURIER-BESSEL SERIES, AND IS EVALUATED FOR A NUMBER OF CASES OF ACCELERATION REVERSAL. THE EXPERIMENTS CONSISTED OF ACCELERATING TEST SPECIMENS DOWNWARD, RELATIVE TO FREE FALL, FOR 2.1 SEC. GOOD QUALITATIVE AGREEMENT BETWEEN ANALYTICAL AND EXPERIMENTAL RESULTS IS SHOWN, DESPITE CONTACT ANGLE DIFFERENCES.

FELDMANIS CJ AF FLIGHT DYN LAB

FEL6001A

PRESSURE AND TEMPERATURE CHANGES IN CLOSED LOOP FORCED CONVECTION
BOILING AND CONDENSING PROCESSES UNDER ZERO GRAVITY
CONDITIONS

=IES PROC.1966,P.455-461 7REF 7FIG

1.STUDY 2.METHOD, EFFECTS 3.ATMOSPHERE 4.NOMINAL 5.SINGLE
7.SPACECRAFT, LIQUIDS 8.ENVIRO-EFFECTS 9.SUB-GRAVITAL

ZERO GRAVITY CONDITIONS WERE INDUCED BY A KC-135 TEST AIRCRAFT WHILE FLYING THROUGH THE KEPLERIAN TRAJECTORIES. THE TEST CAPSULE EXPERIENCED APPROX 8 TO 19 SEC IN ZERO GRAVITY AND FREE FLOATED IN THE AIRCRAFT CABIN. A STRAIGHT TUBE ELECTRICALLY HEATED EVAPORATOR AND WATER COOLED TAPERED CONDENSER WERE USED TO EVAPORATE AND CONDENSE THE WORKING FLUID, WHICH WAS WATER. A CENTRIFUGAL PUMP WAS USED TO CIRCULATE THE FLUID THROUGH THE SYSTEM. SINGLE TUBES WERE USED, AND PARALLEL FLOW CONDITIONS WERE NOT INVESTIGATED. RESULTS INDICATED THAT THE SYSTEM PRESSURE DURING THE ZERO GRAVITY TIME PERIOD INCREASED, AND PRESSURE OSCILLATIONS, CAUSED BY INSTABILITY IN THE BOILING PROCESS, WERE DAMPED OUT.

GRONNER AD SIMMONDS PREC PROD
METHODS OF GAGING FLUIDS UNDER ZERO-G CONDITIONS
=JL.SPACECRAFT AND ROCKETS VOL.3,P.1058-1062 JULY 1966 5REF
=10FIG

GRO6001A

1.THEORY,DESIGN 2.INSTRUMENT 3.SPACE 4.NOMINAL 5.SINGLE
7.GAGE,TRANSDUCER,LIQUIDS 8.ENVIRO-EFFECTS 9.SUB-GRAVITAL

THREE DEFINITIVE CONCEPTS ARE PRESENTED, EACH OF WHICH HOLDS PROMISE FOR APPLICATION ON SPACE VEHICLES OPERATING IN ZERO-G ENVIRONMENT. ADVANTAGES AND DISADVANTAGES ARE LISTED, EMPHASIZING PARAMETERS OF WEIGHT, PHYSICAL SIZE, POWER CONSUMPTION, AND HEAT GENERATION, AS WELL AS ADAPTABILITY OF VARIOUS TANK CONFIGURATIONS. DISCUSSIONS ARE IN DESCENDING ORDER OF PROBABLE ACCEPTANCE CONSIDERING THESE LISTS. OF CONSIDERABLE INTEREST IS THE MOLIMETRIC SYSTEM. OTHER METHODS DISCUSSED INCLUDE A PRESSURE-VOLUME (ACOUSTIC) SYSTEM, AND A TANK WALL-LOCATED CAPACITANCE SYSTEM INVOLVING A FAIR AMOUNT OF LOGIC CIRCUITRY.

KOVAL LR TRW SYSTEMS
SLOSH CONTROL BY DIELECTROPHORESIS
=IES PROC.1966,P.237-242 8REF 3FIG 1TABLE

KOV6001A

1.STUDY 2.MITIGATION 3.INDUCED 4.NOMINAL 5.SINGLE 7.PROPELLANT-LIQUID 8.ENVIRO-CONTROL 9.SUB-GRAVITAL

IT IS SHOWN THAT THE STABILITY OF THE LIQUID-VAPOR INTERFACE CAN BE ENHANCED BY THE PRESENCE OF A DIELECTROPHORETIC DEVICE. NUMERICAL RESULTS ARE GIVEN FOR SYSTEMS WITH OR WITHOUT THIS STABILIZATION. BECAUSE DIELECTROPHORETIC EFFECTS PERMIT THE DESIGN OF AN ACTIVE SYSTEM, SUCH EFFECTS MAY BE USED TO CONTROL THE PROPELLANT DYNAMIC BEHAVIOR DURING NEAR OR COMPLETE WEIGHTLESSNESS.

ACOUSTIC ENVIRONMENTS

FLDRED KM WYLE LAB
HIGH INTENSITY ACOUSTIC TESTING--PROS AND CONS OF MEASURED VS. SIMULATED ENVIRONMENT
=TEST ENG VOL.16,P.14-16+ SEPT.1966 7REF 8FIG

ELD6001B

1.ORGANIZATION 2.SIMULATION 3.INDUCED 4.NOMINAL 5.SINGLE
7.FACILITY,STRUCTURE-SHELL 8.ENVIRO-MEAS 9.ACOUSTIC

SIX BASIC CONCLUSIONS ARE DRAWN--1.MULTIPLE PANEL ARRAYS RATHER THAN SINGLE PANELS SHOULD BE USED, 2.PANEL AREA SHOULD BE LESS THAN 50 PERCENT OF THE DUCT CROSS SECTIONAL AREA, 3.IF IT IS NECESSARY TO PROVIDE A SOUND FIELD WITH DISTRIBUTED ANGULAR INCIDENCE, A REVERBERANT FIELD MAY BE MORE APPROPRIATE THAN A PROGRESSIVE WAVE, 4.THE LOWER BOUND FREQUENCY OF THE REVERBERATION ROOM SHOULD BE LESS THAN THE LOWEST ACOUSTICALLY COUPLED RESONANCE OF THE TEST SPECIMEN, 5.THE RECOMMENDED LOWER BOUND FREQUENCY FOR A REVERBERANT ROOM IS GIVEN BY 2120 DIVIDED BY THE CUBE ROOT OF THE VOLUME, 6.THE USE OF LAB ACOUSTICS TO SIMULATE AERODYNAMIC PRESSURE FLUCTUATIONS GENERALLY REQUIRES AN ADJUSTMENT IN SPECTRUM TO ACCOUNT FOR THE DIFFERING SPATIAL CORRELATIONS OF THE TWO FORCING FUNCTIONS.

MASON V UNIV OF SOUTHAMPTON
ON THE COUPLING OF A MEMBRANE WITH AN INCIDENT SOUND FIELD
=JL.SOUND VIBR VOL.4,P.9-17 JULY 1966 8REF 4FIG

MAS6001B

1.THEORY 2.EFFECTS 3.INDUCED 4.NOMINAL 5.SINGLE 7.STRUCTURE-
LINEAR 8.ENVIRO-EFFECTS 9.ACOUSTIC

ONE TYPE OF COUPLED ACOUSTO-STRUCTURAL VIBRATION PROBLEM IS
CONSIDERED. THE TRADITIONAL ANALYTICAL APPROACH USING GREEN
FUNCTIONS IS USED ALTHOUGH THIS MAY NOT BE THE BEST APPROACH
FOR COMPUTATIONAL WORK. COMPUTER RESULTS ARE OBTAINED FOR THE
PROBLEM OF A ONE-DIMENSIONAL MEMBRANE IN AN INFINITE BAFFLE
EXCITED BY NORMAL AND OBLIQUE PLANE SOUND WAVES.

CLIMATIC ENVIRONMENTS

CHRISTOPHER WC YUMA PROVING GROUND
SOME ASPECTS OF THE YUMA ENVIRONMENT
=IES PROC.1966,P.321-323 5FIG

CHR6002D

1.INFORMATION 2.SOURCE 3.NATURAL 4.NOMINAL 5.SINGLE 8.ENVIRO-
MEAS 9.NAT-EXPOS

A CURSORY DISCUSSION OF THE THREE PRIME FACTORS CONTRIBUTING
TO THERMAL STRESSES TO WHICH TEST ITEMS ARE SUBJECTED. THESE
ARE SOLAR RADIATION, GROUND RADIATION, AND AMBIENT TEMPERATURE
AS MEASURED AT THE YUMA PROVING GROUND.

HARRISON WL ARMY TANK-AUTO CENTER
SOIL STRENGTH PREDICTION BY USE OF SOIL ANALOGS
=IES PROC.1966,P.577-581 4REF 7FIG

HAR6003D

1.STUDY 2.SOURCE 3.NATURAL 4.NOMINAL 5.SINGLE 7.GROUND
8.ENVIRO-MEAS 9.NAT-XPOS

FIELD AND LAB. EXPERIMENTS WERE DESIGNED TO DETERMINE--1. THE
VARIATION IN LAND LOCOMOTION LAB SOIL VALUES OF USDA SOIL
SERIES FROM ANALOGOUS SITES 2.THE POSSIBILITY OF GROUPING USDA
SOIL SERIES BASED ON LAND LOCOMOTION LAB SOIL VALUE SYSTEM, AND
3.DETERMINE THE GROSS EFFECT OF THE VARIATION IN SOIL STRENGTH
PARAMETERS FROM ANALOGOUS SITES ON VEHICLE PERFORMANCE PRE-
DICTIONS.

HYGRO-ENVIRONMENTS

ZWART HC ZWART ASSOC
ERRORS IN HUMIDITY MEASUREMENTS
=INSTR.AND CONT.SYS VOL.39,P.95-96 AUG.1966 5FIG

ZWA6001H

1.EVALUATION 2.MEASUREMENT 3.NATURAL 4.NOMINAL 5.SINGLE
7.HUMID-INDICTR 8.ENVIRO-MEAS 9.HUMIDITY

EXPLAINS THE MAJOR CAUSES OF ERRORS IN HUMIDITY MEASUREMENT
AND OUTLINES EXACTING TECHNIQUES TO BE USED TO OBTAIN FAIRLY
RELIABLE RELATIVE-HUMIDITY MEASUREMENT WITH WET/DRY-BULB
PSYCHROMETERS.

INDUCED ENVIRONMENTS

HARTZ RA WEST INSTR CORP

HAR6004I

TEMPERATURE TRANSDUCERS--A GUIDE FOR SELECTION
=MACH.DESIGN VOL.38,P.188-192 SEPT.15,1966 6FIG 2TABLES

1.EVALUATION 2.INSTRUMENT 3.INDUCED 4.NOMINAL 5.SINGLE
7.TRANSDUCER,SENSOR-TEMP 8.ELECTRICAL 9.HOT,COLD

A SUMMARY OF THE PERFORMANCE CHARACTERISTICS OF THE FOUR BROAD GROUPS OF TEMPERATURE TRANSDUCERS--THERMOELECTRIC, RESISTANCE, BULB-FILLED, AND RADIATION--WITH EMPHASIS ON THE THERMOELECTRIC TYPE. A TABLE GIVES SUGGESTED THERMOCOUPLES AND SUGGESTED WELL OR TUBE FOR 75 APPLICATIONS IN 12 INDUSTRIES.

KOWALEWSKI JS GENERAL ELEC

KOW6001I

UNIVERSAL TEST FIXTURES FOR THE ENVIRONMENTAL LAB
=JL.ENVIR.SCI VOL.9,P.22-24 AUG.1966 7FIG 1TABLE

1.INFORMATION 2.METHOD 3.INDUCED 4.NOMINAL 5.SINGLE 7.SHAKER
9.VIBR,PROGRAMMED,SHOCK

DESCRIBES FIXTURES DESIGNED AT GENERAL ELECTRIC WHICH CAN BE MODIFIED TO ACCOMMODATE MORE THAN ONE BLACK BOX. THE BLACK BOXES ARE ATTACHED TO FLAT PLATES AND THE SHOCK, VIBRATION AND ACCELERATION MACHINES ARE MODIFIED TO ACCEPT THESE FIXTURES.

MAZOUCH CH GLASSCO INSTR CO

MAZ6001I

PRESSURE SENSING IN SEVERE ENVIRONMENTS
=INSTR.AND CONT.SYS VOL.39,P.101-102 SEPT.1966 1FIG

1.EVALUATION 2.INSTRUMENT 3.INDUCED 4.NOMINAL 5.SINGLE
7.PRESSURE-SENSOR,SWITCHES 8.MECHANICAL 9.HOT,VIBR

DESCRIBES THE DESIGN OF A DEVICE TO MONITOR THE STATUS OF 12 HYDRAULIC PUMPS IN THE XB-70A AIRCRAFT. IT EMPLOYS A SINGLE BOURDON-HELIX PRESSURE SENSING ELEMENT ACTUATING BOTH AN UPPER AND LOWER PRESSURE LIMIT SWITCH. SINCE THE SWITCHES ARE LOCATED NEAR THE PUMPS IN THE ENGINE BAYS, THEY ARE SUBJECTED TO CONTINUOUS TEMPERATURE AND VIBRATION EXTREMES.

MONROE K GENERAL DYNAMICS

MON6001I

SIMULATION OF ENVIRONMENTS FOR THE TESTING OF A SPACE VEHICLE
EXPLOSIVE SEPARATION SYSTEM
=IES PROC.1966,P.289-292 7FIG

1.DESIGN 2.SIMULATION 3.INDUCED 4.NOM-
INAL 5.COMBINED 7.EXPLOSIVE, GUIDED MISSILE, CHAMBER 8.ENVIRO-
CONTROL 9.AERODYNAMIC, VL-TEMP, CRYOGENIC, LO-PRESS, HI-HUM, RDM-
VIBR

DETAILS A PROVEN TEST SYSTEM UTILIZED DURING THE QUALIFICATION TEST PROGRAM, WHICH REQUIRED THE FOLLOWING ENVIRONMENTS--
1.HUMIDITY 90 PERCENT, 2.TEMPERATURES FROM -65 TO -400 DEG F,
3.VACUUM PROFILE TO 60,000 FT IN 3 MINUTES FOLLOWED BY AN ASCENT TO 95,000 FT IN 45 SECONDS, 4.RANDOM VIBRATION OF 0.5 G SQUARED/CPS POWER SPECTRAL DENSITY, 5.AERODYNAMIC HEATING.

MYERS WH AF AERONAUTICAL SYS DIV

MYE40011

DYNAMIC TESTING OF MILITARY CONTAINERS VERSUS RELIABILITY
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,34TH,OCT.1964 PT.4,P.263-268 3FIG 4TABLES

1.DESIGN 2.MITIGATION 3.INDUCED 4.NOMINAL 5.SINGLE 6.MIL-STD-810,MIL-P-9024,MIL-R-27542,MIL-R-22256 7.PACKAGING 8.ENVIRO-EFFECTS 9.VIBR,TRANSPORT

ASD PROPOSES TWO ACTIONS BE TAKEN TO CHANGE BASIC POLICY AS A MEANS OF RELATING PACKAGING DESIGN AND PERFORMANCE IN TERMS OF RELIABILITY. CHAPTER 5 OF THE DEFENSE STANDARDIZATION MANUAL M200A DEFINES THE MANNER IN WHICH SECTION 5 OF ITEM SPECIFICATIONS SHALL BE PREPARED. IN THE EXAMPLES CITED, THERE IS CLEAR INDICATION OF A NEED FOR CORRELATION BETWEEN PACKAGING REQUIREMENTS AND OTHER SPECIFICATION REQUIREMENTS WHICH MAY DICTATE SOME LIMITATIONS ON CONTAINER PERFORMANCE.

POWELL CA NASA LANGLEY

POW50011

VIBRATION OF SANDWICH PANELS IN A VACUUM
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,35TH,OCT.1965 PT.2,P.131-138 3REF 14FIG

1.STUDY 2.SIMULATION 3.INDUCED 4.NOMINAL 5.COMBINED 7.CHAMBER, STRUCTURE-SANDWICH,SHAKER 8.ENVIRO-EFFECTS 9.LO-PRESS,VL-PRESS,HI-VAC,HF-VIBR,HI-TEMP,CRYOGENIC

AN INVESTIGATION WAS CONDUCTED TO DETERMINE THE VIBRATIONAL CHARACTERISTICS OF SANDWICH PANELS OVER A WIDE RANGE OF PRESSURES. A PANEL EXCITATION-SUPPORT SYSTEM,SUITABLE FOR VACUUM CHAMBER APPLICATION, WAS DEVELOPED WHICH PROVIDES A DISTRIBUTIVE VIBRATORY LOADING AS WELL AS FREE-EDGE CONDITIONS. NATURAL FREQUENCIES AND DAMPING COEFFICIENTS WERE DETERMINED FOR SEVERAL MODES OF VIBRATION AT PRESSURE LEVELS FROM 1 ATMOSPHERE TO 10 TO -6 TORR. RESULTS INDICATE THAT CLASSICAL PLATE THEORY IN WHICH A FINITE DIFFERENCE METHOD OF SOLUTION IS USED IS APPLICABLE FOR OBTAINING FREQUENCIES AND MODE SHAPES OF SANDWICH PANELS,EXCEPT IN CASES OF EXTREMELY LOW CORE STIFFNESS. A DECREASE IN PRESSURE RESULTS IN AN INCREASE IN FREQUENCY FROM 2 TO 10 PERCENT AND A LINEAR DECREASE IN DAMPING. DAMPING COEFFICIENTS ARE ESSENTIALLY INDEPENDENT OF THE AMPLITUDE OF VIBRATION.

STRANDRUD HT BOEING

STR50011

A BROADBAND HYDRAULIC VIBRATION EXCITER
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,35TH,OCT.1965 PT.2,P.157-163 6REF 14FIG

1.EVALUATION 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE 7.HYDR-SYSTEM,SHAKER 8.ENVIRO-CONTROL 9.LF-VIBR,HF-VIBR,LO-G

BASED ON THE USE OF AN ELECTRIC-FIELD SENSITIVE HYDRAULIC FLUID,THE VIBRATOR HAS VALVES WITH NO MOVING PARTS AND WITH CONSEQUENT HIGH OPERATING SPEED,SIMPLICITY AND RELIABILITY OF OPERATION,AND EASE OF MANUFACTURE. AN ELECTROSTATIC FIELD OF THE DESIRED FREQUENCY IS APPLIED ACROSS THE FLUID FLOWING THRU THE VALVES. THE FIELD PRODUCES VARIATIONS OF FLUID VISCOSITY WITHIN THE VALVE PASSAGEWAYS,THUS PRODUCING VARIATIONS IN PRESSURE ON THE PISTON SURFACES AND CAUSING THE PISTON TO VIBRATE. THIS CONFIGURATION OFFERS AN ECONOMICAL DESIGN FOR OBTAINING LARGE FORCE OUTPUT AT HIGH FREQUENCIES WITH THE CAPABILITY FOR OPERATION DOWN TO ZERO FREQUENCY.

STATIC ENVIRONMENTS

GUNKEL VK NORTH AM AV GUN6001J

GAS FILLED ELECTRONIC ENCLOSURES
=JL.ENVIR.SCI VOL.9,P.25-28 AUG.1966 3REF 1FIG 1TABLE1.STUDY 2.METHOD 3.GENERAL 4.LIFE 5.SINGLE 7.COMPUTER,MINUTE-
MAN,PACKAGING 8.LEAK-DETECT 9.SEAL-PROP

DEALS WITH A METHOD OF ESTABLISHING A LEAK SPECIFICATION BASED ON SHELF LIFE. DEFINES FOUR GENERAL LEAK PATTERNS BASED ON MOLECULAR, SLOW VISCOUS, CAPILLARY, OR ORDINARY LEAKS. THESE ARE EXPRESSED BY FOUR WELL-DEFINED EQUATIONS. KNOWING THE PACKAGE PRESSURE REQUIREMENTS AND LIFE, THE AVERAGE LEAK OVER THE LIFE CAN BE DETERMINED. THE PROBLEM DEFINES HOW TO FIND THE INSTANTANEOUS LEAK RATE. SPECIFIC EXAMPLES ARE TAKEN FROM WORK IN PROGRESS ON THE D37 MINUTEMAN COMPUTER.

HUNT HH UNIV OF DAYTON HUN6002J

PROJECTILES VS. HONEYCOMB
=ORDNANCE VOL.51,P.185-188 SEPT-OCT.1966 5FIG 2TABLES1.XPER-RESULTS 2.EFFECTS 3.INDUCED 4.NOMINAL 5.SINGLE 7.AIR-
CRAFT,HONEYCOMB,ADHESIVE,WEAPONS 8.ENVIRO-EFFECTS 9.SURFACE
EFFECTS

THE INVESTIGATION WAS LIMITED TO THE PRIMARY EFFECT OF IMPACTS OF CONVENTIONAL MUNITIONS ON UNSTRESSED PANELS OF ADHESIVELY BONDED ALUMINUM HONEYCOMB. ATTENTION WAS FOCUSED ON THE EXTENT OF DAMAGE TO THE PANEL SURFACES, CORE DESTRUCTION AND ADHESIVE BOND RUPTURE.

MCCOY ME CHRYSLER SPACE DIV MCC5003J

APPLICATION OF THE DIRECT STIFFNESS METHOD TO THE ELASTIC
MATHEMATIC MODELING OF THE SATURN S-1B
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
RONMENTS,SYMPOSIUM,35TH,OCT.1965 PT.3,P.149-159 7REF 9FIG
=1TABLE1.THEORY 2.METHOD 3.INDUCED 4.NOMINAL 5.SINGLE 7.MODEL,SATURN,
STRUCTURE-ELASTIC BODY 8.ENVIRO-EFFECTS 9.STATIC,PHYSICAL-TEST

THE CLUSTERED-SHELL LAUNCH VEHICLE, ALTHOUGH A PROVEN EXPEDIENT FOR OBTAINING THE HIGH THRUST REQUIRED FOR MANNED SPACE MISSIONS, HAS INTRODUCED A NEW ORDER OF MAGNITUDE PROBLEM IN STRUCTURAL AND DYNAMIC ANALYSES. HIGH REDUNDANCY, PLUS THE IMPRACTICABILITY OF A FULL-SCALE STATIC TEST OF A SATURN VEHICLE, HAS GIVEN IMPETUS TO THE DERIVATION OF AN ADVANCED ELASTIC MATH-MODEL FOR ANALYZING THE INTERNAL LOADS DISTRIBUTION ON THE VARIOUS COMPONENTS OF THE S-1B STAGE CLUSTER.

NATURAL ENVIRONMENTS

BILLET AB VICKERS INC
THE HOSTILE LONG TERM STORAGE ENVIRONMENTS (THE STORY OF MY
GAL SAL)
=IES PROC.1966,P.299-305 20FIG

BIL6001L

1.INFORMATION 2.EFFECTS 3.NATURAL 4.LIFE 5.COMBINED 7.PUMP,
AIRCRAFT,SEALS 8.FUNCTIONAL 9.LO-TEMP,HI-HUMIDITY,NAT-XPOS

DISCUSSES THE EFFECTS OF THE HIGH-TEMPERATURE,LOW-HUMIDITY
ENVIRONMENT OF THE DESERT AND THE LOW-TEMPERATURE,HIGH-HUMIDI-
TY ENVIRONMENT OF GREENLAND ON NORMAL AIRCRAFT EQUIPMENT UNDER
THESE STORAGE CONDITIONS FOR 17 YRS. FROM THE PRELIMINARY RE-
SULTS OF THESE INVESTIGATIONS,IT CAN BE CONCLUDED THAT HYDRAU-
LIC SYSTEMS CAN WITHSTAND MANY YEARS OF NORMAL EARTH ENVIRON-
MENTS. IT APPEARS THAT SEALS IN ICBMS MIGHT BE CHANGED OVER A
5-10YR PERIOD INSTEAD OF A 2YR PERIOD.

PRESSURE ENVIRONMENTS

BOODA LL EDITOR
WORLD'S LARGEST PRESSURE TEST COMPLEX BEING BUILT AT MARINE
ENGINEERING LAB
=UNDERSEA TECH VOL.7,P.30-31 SEPT.1966 2FIG

BOO6001M

1.INFORMATION 2.FACILITY 3.NATURAL 4.NOMINAL 5.SINGLE 7.CHAM-
BER,TEST-LAB 9.UH-PRESS

WHEN THIS FACILITY IS COMPLETE,IT WILL HOUSE 3 VESSELS--1)A
750-TON VESSEL WITH A STATIC PRESSURE CAPABILITY OF 12000 PSI
WHICH CAN BE REACHED IN 2 HRS,2) AN 80-TON TANK WITH THE SAME
12000 PSI CAPABILITY,BUT IT CAN BE ACHIEVED IN 9 MIN, AND 3)A
300-TON TANK WITH A PRESSURE LIMIT OF 26000 PSI. EACH TANK
WILL HAVE A 500 CHANNEL DIGITAL DATA ACQUISITION SYSTEM AND A
CLOSED CIRCUIT TV INSIDE THE TANK TO MONITOR THE TEST ITEM,AND
DIGITAL STRAIN GAGE ANALYZER TO MONITOR STRESS IN TANK WALLS.

DAS KB BOEING
ABSOLUTE CALIBRATION OF IONIZATION GAGES USING STANDARD
ORIFICE TECHNIQUES
=ISA JI VOL.13,P.43-48 JULY 1966

DAS6001M

1.STUDY 2.INSTRUMENT 3.GENERAL 4.NOMINAL 5.SINGLE 7.GAGE
8.CALIBRATION 9.VL-PRESS,HI-VAC,VH-VAC

STANDARDS FOR CALIBRATING EXTREMELY LOW PRESSURES ARE BECOMING
INCREASINGLY IMPORTANT. INDUSTRIES NEED AN ACCURATE AND RELI-
ABLE METHOD FOR CALIBRATING VACUUM GAGES IN THE RANGES BELOW
10 TO -5 TORR. THIS ARTICLE DESCRIBES A METHOD FOR CALIBRATING
VACUUM GAGES,USING THE STANDARD ORIFICE TECHNIQUE. CALCULATED
PRESSURES SHOW GOOD AGREEMENT WITH MCLEOD AND IONIZATION
GAGES.

ENVIRONMENTAL QUARTERLY

ENV6002M

E297--CALIBRATING IONIZATION VACUUM GAGE TUBES
=ENVIR.GUAR VOL.12,P.24+ SEPT.1966 3FIG

1.DESIGN 2.INSTRUMENT 3.SPACE 4.NOMINAL 5.SINGLE 6.ASTM-E297
7.PRESSURE-SENSOR 8.CALIBRATION 9.HI-VAC

TWO DYNAMIC TECHNIQUES WERE ADOPTED BY ASTM AS STANDARD FOR CALIBRATING ION GAGE TUBES USED FOR PRECISION MEASUREMENTS IN HIGH AND ULTRAHIGH VACUUM WORK--ONE IS A PRESSURE-GAGE BASED SYSTEM, THE OTHER IS FLOW-METER-BASED. BOTH INVOLVE MEASURING THE FLOW RATES OF GASES THROUGH ORIFICES WHOSE CONDUCTANCES CAN BE CALCULATED THEORETICALLY. THIS REPORT SUMMARIZES AND PARTIALLY QUOTES THE TEXT OF A SPACE SIMULATION STANDARD ADOPTED BY ASTM AT ITS 1966 ANNUAL MEETING.

GILES S CONSULTANT

GIL6002M

VACUUM GAUGE CALIBRATION (10 TO -5 TO 10 TO -9 TORR)
=TEST ENG VOL.15,P.76+ FEB.1966 1FIG

1.INFORMATION 2.METHOD 3.INDUCED 4.NOMINAL 5.SINGLE 7.GAGE
8.CALIBRATION 9.HI-VAC

BRIEFLY DISCUSSES OLD AND NEW METHODS FOR CALIBRATING GAGES IN THE HIGH AND ULTRA-HIGH VACUUM RANGES. THE BEST METHOD AVAILABLE--A MULTIPLE CHAMBER, DYNAMIC-GAGE-SYSTEM--IS DESCRIBED IN A LITTLE MORE DETAIL.

STOLLENWERK EJ LOCKHEED

STO6001M

WIND TUNNELS--FROM HYPERSONIC TO HYPERVELOCITY
=MECH.ENG VOL.88,P.67-69 SEPT.1966 5FIG

1.INFORMATION 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE
7.TUNNELS-WIND 9.SHOCK-PRESS

A BRIEF REVIEW OF THE FUNDAMENTAL CHARACTERISTICS OF SHOCK, HOT-SHOT, GAS-GUN, COUNTER-FLOW, AND MHD WIND TUNNELS. FROM AN ARTICLE WHICH APPEARED IN LOCKHEED HORIZONS.

RADIATION ENVIRONMENTS

GILES S CONSULTANT

GIL5010N

HEAT TRANSFER IN THE SPACE ENVIRONMENT
=TEST ENG VOL.14,32+ NOV.1965 3FIG

1.INFORMATION 2.SOURCE 3.SPACE 4.NOMINAL 5.SINGLE 7.GUIDED
MISSILE 9.SOLAR,ALBEDO

A BRIEF DESCRIPTION OF THREE THERMAL ENVIRONMENTS TO WHICH AN INTERPLANETARY SPACE VEHICLE MAY BE EXPOSED--1.LAUNCHING FROM THE EARTH WHERE IT MAY GO INTO AN ORBIT SITUATION AND BE INFLUENCED BY THE EARTHS SHADOW, BLACK SKY, SOLAR RADIATION, AND THE ALBEDO, 2.ITS FLIGHT THROUGH SPACE UNDER RELATIVELY CONSTANT HEAT STRESS, AND 3.ITS FINAL APPROACH TO LANDING ON ANOTHER PLANET WHERE IT MAY ORBIT A PLANET WITHOUT ATMOSPHERE.

TEST ENGINEERING

TES6007N

SPECTROLAB RECEIVES OFF-AXIS SOLAR SIMULATOR PATENT
=TEST ENG VOL.16,P.39 SEPT.1966

1.INFORMATION 2.FACILITY 3.SPACE 4.NOMINAL 5.SINGLE 7.OPTICS
9.SOLAR

THIS PATENT RELATES TO THE USE OF OFF-AXIS COLLIMATING MIRRORS WITH SOLAR RADIATION SIMULATORS TO PREVENT RE-REFLECTION OF THE SIMULATORS ENERGY FROM THE COLLIMATOR TO THE TEST OBJECT IN A SPACE TESTING FACILITY.

MECHANICAL SHOCK ENVIRONMENTS

ATEN E GENERAL MOTORS

ATE60010

HIGH INTENSITY PYROTECHNIC SHOCK TESTING OF TITAN III AIRBORNE
INERTIAL GUIDANCE EQUIPMENT
=IES PROC.1966,P.243-255 9REF 31FIG

1.DESIGN,XPER-RESULTS 2.METHOD,EFFECTS 3.INDUCED 4.NOMINAL
5.SINGLE 7.EXPLOSIVE,TITAN III,COMPUTER,SPECTRUM ANALYZER,
ISOLATOR 8.ENVIRO-EFFECTS 9.BLAST-SHOCK

ONE OUTSTANDING IMPROVEMENT WAS THE DEVELOPMENT OF A GALVANOMETER ANALYZER. THE TEST VERIFIED THAT TESTING USING UP TO 250 GRAINS OF PETN COULD SAFELY PERFORM INDOORS. CONSIDERABLE ATTENTION WAS DIRECTED TOWARD THE FORM OF THE PRIMARY SHOCK PULSE AND IT WAS CONCLUDED THAT IT IS OF A DOUBLE PULSE RATHER THAN A SINGLE PULSE NATURE. THIS TEST ALSO INDICATED THAT PRIMARY ATTENTION SHOULD BE DIRECTED TO THE MECHANICAL TRANSMISSION OF THE SHOCK AND SECONDARY ATTENTION TO THE ACOUSTICAL PATH.

BRESK F MONTEREY RES LAB

BRE60010

UNIVERSAL IMPULSE-IMPACT SHOCK SIMULATION SYSTEM WITH INITIAL
PEAK SAWTOOTH CAPABILITY
=IES PROC.1966,P.405-416 3REF 11FIG

1.DESIGN 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE 7.SHOCK-
TESTERS 8.ENVIRO-CONTROL 9.SHOCK

DESCRIBES A NEW SHOCK TEST MACHINE,CALLED A UNIVERSAL MACHINE, WHICH MAY BE USED TO SUBJECT SPECIMENS TO EITHER IMPULSE OR IMPACT SHOCKS. ALSO PRESENTS REASONS FOR USING EITHER THE IMPULSE OR IMPACT MODES.

DE MALHERBE MC U OF WITWATERSRAND

DEM60010

RESPONSE OF A CYLINDRICAL SHELL TO INTERNAL BLAST LOADING
=JL.MECH.ENG.SCI VOL.8,P.91-98 MAR.1966 11REF 7FIG

1.STUDY 2.EFFECTS,METHOD 3.INDUCED 4.NOMINAL 5.SINGLE 7.GAGE-
STRAIN,EXPLOSIVE,CHAMBER,STRUCTURE-SHELL 8.ENVIRO-EFFECTS
9.BLAST-SHOCK

CONCERNS STRESSES INDUCED IN A THIN-WALLED CYLINDER EXPOSED TO INTERNAL BLAST LOADING ORIGINATING FROM A DETONATION WAVE. THE MATHEMATICAL FORM OF THE PRESSURE-TIME PROFILE OF THE BLAST WAVE WAS FORMULATED ON THE BASIS OF EXPERIMENTAL DATA. STRESS RESPONSE OF THE CYLINDRICAL SHELL TO THIS LOADING WAS THEN PREDICTED USING A SIMPLIFIED DYNAMIC MODEL FOR THE VIBRATING SYSTEM. THE THEORY WAS CHECKED EXPERIMENTALLY BY MEANS OF SURFACE STRAIN MEASUREMENTS MADE ON A 2-FT DIA, 20-FT LONG STAINLESS STEEL VESSEL SUBJECTED TO THE IMPACT LOADING OF A DETONATION WAVE PROPAGATING IN A HYDROGEN-OXYGEN MIXTURE WHICH FILLED THE VESSEL INITIALLY AT PRESSURES OF 100 TO 200 MMHG.

HALL RL EDGERTON GERMESH AND GRIER
VIBRATION ISOLATION THROUGH PNEUMATIC SPRING AND DAMPING
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,35TH,OCT.1965 PT.5,P.217-226 4REF 13FIG

HAL50020

1.THEORY 2.MITIGATION 3.INDUCED 4.NOMINAL 5.SINGLE 7.COMPUTER,
ISOLATOR 9.TRANSPORT

CONCERNS THE PASSIVE ISOLATION OF HARMFUL SHOCK AND VIBRATIONS AS APPLIED TO A RELATIVELY LARGE PACKAGE CONTAINING FRAGILE DATA ACQUISITION EQUIPMENT. THE ISOLATOR CONSISTED OF A LIGHT-WEIGHT CYLINDER CONTAINING COMPRESSED AIR AND A PISTON WHICH IS FULLY EXTENDED AT STEADY STATE,WHICH FUNCTIONS AS ZERO DEFLECTION SUPPORT,SPRING AND DAMPER. ELECTRONIC SIMULATION INDICATED THAT THIS ISOLATOR WILL MORE EFFECTIVELY ISOLATE SINGLE SHOCK PULSES THAN WILL OTHER CONVENTIONAL SYSTEMS.

LIBER T IIT RES INST
OPTIMAL SHOCK ISOLATION SYNTHESIS
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,35TH,OCT.1965 PT.5,P.203-215 3REF 13FIG
=1TABLE

LIB50010

1.THEORY 2.MITIGATION 3.INDUCED 4.NOMINAL 5.SINGLE 7.ISOLATOR
9.SHOCK

THE PROBLEM OF OPTIMUM SHOCK ISOLATOR SYNTHESIS HAS BEEN FORMULATED AND SOLVED FOR SINGLE DEGREE OF FREEDOM SYSTEMS. METHODS OF DYNAMIC AND LINEAR PROGRAMMING ARE FOUND APPLICABLE TO A DISCRETE VERSION OF THE PROBLEM. THE LATTER TECHNIQUE WAS MORE EFFICIENT. RESULTS OF OPTIMAL ISOLATOR PERFORMANCE ARE OBTAINED FOR FOUR TYPES OF INPUT SHOCK WAVE FORMS. THESE RESULTS,EXPRESSED AS A RELATIONSHIP BETWEEN LIMITING VALUES OF RELATIVE ISOLATOR DISPLACEMENT AND MASS ACCELERATION,PERMIT DIRECT DETERMINATION OF THE MARGIN FOR IMPROVEMENT EXISTING BETWEEN THE OPTIMAL AND ANY SPECIFIED CANDIDATE ISOLATOR DESIGN.

MUSTIN GS SPEC PROJS CONSULTANTS
A NEW APPROACH TO PACKAGE CUSHIONING DESIGN
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,35TH,OCT.1965 PT.5,P.193-202 18REF 3FIG
=3TABLES

MUS50020

1.THEORY 2.PROTECTION 3.INDUCED 4.NOMINAL 5.SINGLE 7.PACKAG-
ING,PLASTIC 9.SHOCK

DYNAMIC SHOCK ABSORPTION DATA FOR 16 NONLINEAR CUSHIONING MATERIALS WERE ANALYZED. IT WAS FOUND THAT THE SHOCK ISOLATION INFORMATION NEEDED BY THE DESIGNER COULD BE REDUCED TO TWO CURVES FOR EACH MATERIAL,PLUS A GENERAL ENVELOPE CURVE APPLICABLE TO ALL OF THE MATERIALS.

THORNTON EA DAVID TAYLOR MODEL BASIN
RESPONSE OF RESILIENT MOUNTS UNDER SHOCK LOADING
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS, SYMPOSIUM, 35TH, OCT. 1965 PT. 5, P. 187-191 2REF 11FIG

TH050030

1. STUDY 2. MITIGATION 3. INDUCED 4. NOMINAL 5. SINGLE 7. ISOLATOR,
RUBBER 8. ENVIRO-EFFECTS 9. SHOCK

EXPERIMENTAL AND THEORETICAL STUDIES OF THE TYPE 5M10,000-H
RUBBER RESILIENT MOUNT ASSEMBLY CONSISTING OF A COMPRESSION
AND SHEAR MOUNT AND SNUBBER WERE CONDUCTED TO DETERMINE ITS
PERFORMANCE UNDER SHOCK LOADING. DYNAMIC FORCE-DEFLECTION
CURVES OBTAINED FROM EXPERIMENTAL AND THEORETICAL DATA SHOWED
GOOD AGREEMENT. THE STUDIES DEMONSTRATED THAT THE VISCOUS EF-
FECTS OF RUBBER PLAY A SIGNIFICANT ROLE UNDER SHOCK LOADING.
THUS, THE CONCLUSION WAS THAT THE BEHAVIOR OF RESILIENT MOUNTS
FOR SHIPBOARD INSTALLATIONS CANNOT BE BASED ON STATIC TESTS
ALONE.

VIGNESS I NAV RES LAB
INTERNATIONAL SPECIFICATION FOR SHOCK PULSE SHAPES AND MAGNI-
TUDES
=IES PROC. 1966, P. 333-338 1REF 9FIG

VIG60010

1. STUDY 2. ENGR-PRACTICE 3. INDUCED 4. NOMINAL 5. SINGLE 6. INTL
7. PULSE 9. SHOCK

GENERAL ENVIRONMENTAL TEST SPECIFICATIONS ARE CURRENTLY BEING
DEVELOPED BY IEC/TC50. ONE OF THE ACCOMPLISHMENTS OF THIS
COMMITTEE AT ITS OCT. 1965 MEETING WAS TO APPROVE A GENERAL
MECHANICAL SHOCK TEST SPECIFICATION AS A PROPOSED INTERNATION-
AL STANDARD. A DESCRIPTION OF THIS STANDARD, A DISCUSSION OF
THE REASONING THAT TOOK PLACE DURING ITS FORMULATION, AND A
COMPARISON WITH USA PRACTICES, IS THE SUBJECT OF THIS PAPER.

SPACE ENVIRONMENTS

DISTEFANO FJ DAVID CLARK CO
THE DESIGN OF FULL PRESSURE GARMENTS WITH RESPECT TO SPECIFIC
MISSION OBJECTIVES AND ENVIRONMENTAL CONDITIONS
=IES PROC. 1966, P. 203-208 3FIG 1TABLE

DIS6001P

1. PHILOSOPHY 2. PROTECTION 3. SPACE 4. NOMINAL 5. COMBINED
7. HUMAN, SPACECRAFT

INCLUDES A TABLE OF THE GEMINI SPACE SUIT ENVIRONMENTAL RE-
QUIREMENTS. HOWEVER, THE PURPOSE OF THIS PAPER IS TO PROPAGATE
A PHILOSOPHY FOR SPACE SUIT DESIGN AND DETAILS ARE DISCUSSED
ONLY TO THE EXTENT REQUIRED FOR MAKING THIS PHILOSOPHY UNDER-
STANDABLE.

GANNON RE AVCO
A SPACE ENVIRONMENT TEST CHAMBER TO DETERMINE THE STABILITY OF THERMAL CONTROL COATINGS
=IES PROC.1966,P.463-470 11REF 8FIG GAN6001P

1.STUDY 2.FACILITY SIMULATION 3.SPACE 4.NOMINAL 5.SINGLE
7.PLATING,CHAMBER,ARC-LAMP 8.ENVIRO-EFFECTS 9.HI-VAC,HI-TEMP,
VL-TEMP,SOLAR

A TEST CHAMBER IS DESCRIBED WHICH SIMULATES THE VACUUM AND HEAT SINK CHARACTERISTICS OF SPACE. THIS CHAMBER FEATURES A UNIQUE ENTRY LOCK WHICH FACILITATES QUICK SPECIMEN INTER-CHANGE. THE LIGHT SOURCE, WHICH CLOSELY SIMULATES THE SOLAR SPECTRUM UP TO 5 EQUIVALENT SUN INTENSITIES, IS DESCRIBED TOGETHER WITH THE METHODS USED TO CALIBRATE THIS SOURCE. A METHOD OF MEASURING THE PERTINENT PARAMETERS WITHIN THE TEST CHAMBER IS DESCRIBED WHICH MAKES THE OBSERVATION OF ANY DEGRADATION OF THE CONTROL COATINGS POSSIBLE WITHOUT REMOVAL FROM THE CHAMBER. RESULTS ARE PRESENTED FOR VARIOUS THERMAL CONTROL COATINGS EXAMINED IN CONNECTION WITH THE APOLLO PROGRAM.

GARETT GM GRUMMAN
THE DESIGN AND PERFORMANCE OF A SOLAR SIMULATION VACUUM TEST CHAMBER
=IES PROC.1966,P.521-525 4FIG GAR6001P

1.INFORMATION 2.SIMULATION,FACILITY 3.SPACE 4.NOMINAL
5.COMBINED 7.CHAMBER,ARC-LAMP,PUMP 8.ENVIRO-CONTROL 9.HI-VAC,
UL-TEMP,HI-TEMP,SOLAR

THE SYSTEM IS INTENDED TO ACCOMMODATE SPECIMENS UP TO 4FT DIA UNDERGOING THERMAL BALANCE TESTING UNDER THE FOLLOWING CONDITIONS--A.SOLAR SIMULATION OVER A NOMINAL 4FT DIA FIELD,B. OPTICALLY DENSE--TO THE SPECIMEN--LN2 CHILLED WALLS,C.PRESSURE 2 X 10 TO -5 TORR. THE TEMPERATURE AND PRESSURE REQUIREMENTS WERE TO BE MET WITHIN 8 HRS WITH A 0.5 TORR 1/S GAS LOAD.

GILES S CONSULTANT
SPACE SIMULATOR FOR NUCLEAR DEVICES
=TEST ENG VOL.16,P.40-41 SEPT.1966 1REF 2FIG 1TABLE GIL6004P

1.INFORMATION 2.FACILITY 3.SPACE 4.NOMINAL 5.COMBINED
7.PRESSURE-SYSTEM 9.NUCLEAR,HI-VAC

FIRST OF A 3-PART DISCUSSION OF SPACE SIMULATION AND TEST FACILITIES COMBINED WITH NUCLEAR ENVIRONMENTAL TESTING. DISCUSSES SUCH A SYSTEM AT ATOMICS INTERNATIONAL FIELD LAB BUILT UNDER THE SNAP 8 PROGRAM. THIS PART DESCRIBES THE VACUUM SYSTEM, WHICH OPERATES IN THE 1X10 TO THE -5 TO 1X10 TO THE -6 TORR RANGE.

HARMON HN BOEING
FOUR-FOOT SOLAR SIMULATION SYSTEM
=IES PROC.1966,P.531-536 5FIG 1TABLE HAR6001P

1.INFORMATION 2.FACILITY 3.SPACE 4.NOMINAL
5.COMBINED 7.OPTICS,PUMP,CHAMBER,ARC-LAMP 8.ENVIRO-CONTROL
9.HI-VAC,SOLAR,HI-TEMP,UL-TEMP

BOEING HAS BEEN OPERATING A 10-FT BY 20-FT SPACE SIMULATOR FOR OVER 1300 HRS OF SOLAR-VACUUM TESTING SINCE JUNE 1965. THIS ADVANCED FACILITY SIMULATES THE ULTRA-HIGH,ULTRA-CLEAN VACUUM AND EXTREME COLD OF SPACE,AND INCORPORATES AN ACCURATE 4-FT SOLAR BEAM AS A RADIATION SOURCE.

HARRS EA CONVAIR

HAR6002P

OPTIMIZING PERFORMANCE OF A 10 TO -12 TORR THERMAL VACUUM SYSTEM

=IES PROC.1966,P.527-530 5REF 5FIG

1.INFORMATION 2.FACILITY,SIMULATION 3.SPACE 4.NOMINAL
5.COMBINED 7.CHAMBER,PUMP 8.ENVIRO-CONTROL 9.HI-VAC,UH-TEMP,
UL-TEMP

DESCRIBES THE APPROACH USED AT CONVAIR TO OPTIMIZE THE PERFORMANCE OF A NEWLY ACQUIRED 10 TO -12 TORR THERMAL VACUUM SYSTEM. THE SYSTEM IS COMPRISED OF A 20-CU FT CHAMBER IN CONJUNCTION WITH FOUR MOLECULAR SIEVE SORPTION PUMPS, A TRIODE ION GETTER PUMP, AND TWO TITANIUM SUBLIMATION PUMPS.

LONDON A GENERAL ELEC

LON6001P

VACUUM-THERMAL ENVIRONMENTAL TESTING OF THE NIMBUS I CONTROL SYSTEM

=IES PROC.1966,P.583-592 7REF 15FIG

1.DESIGN,XPER-RESULTS 2.METHOD 3.SPACE 4.NOMINAL 5.COMBINED
7.SATELLITE,CNTRL-SYSTEM 8.ENVIRO-EFFECTS 9.HI-TEMP,LO-TEMP,
HI-VAC

AN ACCOUNT OF THE COMPLETE TESTING PROGRAM CARRIED OUT BY GE IN A VACUUM ENVIRONMENT OF 1 X 10 MINUS 5 TORR WITH TEMPERATURE REQUIREMENTS FROM MINUS 10 DEG C TO 55 DEG C, INCLUDING TEST PHILOSOPHY, SET-UP, FACILITY AND INSTRUMENTATION.

MCGINNIS CD ITT FED LABS

MCG6001P

A NEW-GENERATION SPACE SIMULATION FACILITY

=IES PROC.1966,P.147-151 8REF 7FIG

1.INFORMATION 2.FACILITY 3.SPACE 4.NOMINAL 5.SINGLE
7.PRESSURE-SYSTEM,CHAMBER 8.ENVIRO-CONTROL 9.HI-VAC,
HI-TEMP,UL-TEMP,SOLAR

THE TOTAL COMBINATION OF FEATURES MAKES THIS SYSTEM UNIQUE. IT COULD WELL BECOME THE MOST POPULAR TYPE OF SPACE SIMULATION FACILITY IN THE IMMEDIATE FUTURE.

SAUNDERS JJ MARTIN CO

SAU6002P

VACUUM AND CRYOGENICS IN AEROSPACE

=INDUS.RES VOL.8,P.64-69 SEPT.1966 4FIG

1.PHILOSOPHY 2.ENGR-PRACTICE 3.SPACE 4.NOMINAL 5.SINGLE,COM-
BINED,SYNERGISTIC 7.CHAMBER,PUMP 9.VH-VAC,SOLAR

DISCUSSES THE VALUE OF FIRST-GENERATION SPACE CHAMBERS FOR FUTURE SPACE WORK AND EXAMINES OUTLOOKS FOR FUTURE SPACE SIMULATION CHAMBERS.

SUNLEY HLG BRISTOL SIDDELEY ENGINES
THE INFLUENCE OF SPACE ENVIRONMENT ON THE DESIGN AND DEVELOPMENT OF ROCKET ENGINES FOR SPACE APPLICATIONS
=JL.ENVIR.SC VOL.9,P.13-17 AUG.1966 5FIG

SUN6001P

1.XPER-RESULTS 2.EFFECTS 3.SPACE 4.NOMINAL 5.SINGLE
7.ROCKET,MOTOR,LUBRICANT 9.HI-VAC,PROGRAMMED,HF-VIBR

THE ENVIRONMENTAL ASPECTS OF THE DEVELOPMENT OF THE BRISTOL SIDDELEY GAMMA SERIES OF ENGINES WHICH HAVE SUCCESSFULLY PROPELLED THE BLACK KNIGHT TEST VEHICLES TO APOGEE HEIGHTS OF UP TO 500 MILES ARE DESCRIBED. THE 3 PRINCIPAL ASPECTS OF FLIGHT ENVIRONMENT CONSIDERED WERE ALTITUDE, ACCELERATION AND VIBRATION. MODIFICATIONS IN DESIGN REQUIRED AS A RESULT OF THE ENVIRONMENTAL TEST PROGRAM ARE DISCUSSED.

LOW TEMPERATURE AND TEMPERATURE SHOCK

HAFSTROM JR HAFSTROM TECH PROD
CARBON DIOXIDE COOLING CAN BE ECONOMICAL
=ENVIR.QUAR VOL.12, P.40-42 SEPT.1966 4FIG

HAF6001S

1.EVALUATION 2.METHOD 3.GENERAL 4.NOMINAL 5.SINGLE 7.CRYO -
LIQUID 8.ENVIRO-CONTROL 9.VL-TEMP

COOLING OF CARBON DIOXIDE LIQUID CAN BE IMPROVED BY LOWERING THE STORAGE TEMPERATURE TO 15 OR 20 DEG AWAY FROM FREEZING. THIS MAY BE ACCOMPLISHED EITHER BY REDUCING THE TEMPERATURE OF THE ENTIRE SUPPLY OR BY MEANS OF A SMALL COOLING UNIT BETWEEN THE SUPPLY AND THE FLASHING DEVICE. METHODS OF PURIFYING THE CARBON DIOXIDE ARE DESCRIBED. SEVERAL HELPFUL SUGGESTIONS ARE GIVEN FOR ECONOMICAL USE OF THIS COOLANT.

TEST ENGINEERING
STAINLESS STEEL HAS UNIQUE VIRTUES FOR SPACE TEST CHAMBER
HEAT TRANSFERENCE
=TEST ENG VOL.16,P.37+ SEPT.1966 2FIG

TES6008S

1.INFORMATION 2.FACILITY 3.SPACE 4.NOMINAL 5.SINGLE 7.METALS,
CHAMBER 9.CRYOGENIC

TYPES 304 AND 316 STAINLESS STEEL ARE BEING USED BY A LEADING FABRICATOR OF HEAT TRANSFER EQUIPMENT BECAUSE OF THE METALS ABILITY TO WITHSTAND REPEATED AND EXTREME TEMPERATURE VARIATIONS IN THE CRYOGENIC RANGE. ITS USE IN A PLATE TYPE COIL BY TRANTER MFG INC IS DESCRIBED.

RANDOM VIBRATION AND UNSPECIFIED VIBRATION

GEMINDER R MECHANICS RESEARCH INC
VIBRATION TEST PRACTICE
=IES PROC.(TUTORIAL SERIES) 1966,P.45-52 3REF 7FIG

GEM6001T

1.PHILOSOPHY 2.ENGR-PRACTICE 3.INDUCED 4.NOMINAL 5.SINGLE
7.SHAKER,TEST-EQUIP,ACCELEROMETER 8.ENVIRO-CONTROL 9.RDM-VIBR,
VIBR

DISCUSSES CERTAIN ASPECTS OF SINUSOIDAL AND RANDOM VIBRATION TESTING. THE SUBJECT MATTER INCLUDES--(1)THE OBJECTIVES OF VIBRATION TESTS,(2)THE DESIRED PRE-VIBRATION CHECKOUT,AND(3)THE ACTUAL TEST. EMPHASIS IS PLACED ON THE PLANNING OF TESTS AND ON THE VARIOUS CHECKS PERFORMED PRIOR TO THE ACTUAL SPECIMEN TESTING.

OHEARNE CS MARTIN CO

OHE5001T

RANDOM VIBRATIONS AND RANDOM FUNCTIONS
=US DIRECTOR OF DEFENSE SHOCK, VIBRATION AND ASSOCIATED ENVI-
=RONMENTS, SYMPOSIUM, 35TH, OCT. 1965 PT. 3, P. 89-94 8REF 1FIG

1. PHILOSOPHY 2. ENGR-PRACTICE 3. INDUCED 4. NOMINAL 5. SINGLE
9. RDM-VIBR

THE RANDOM FUNCTION THEORY, THOUGH IN ITSELF QUITE ABSTRACT, RENDERS RANDOM VIBRATION CONCEPTS MORE CONCRETE BECAUSE IT CONSTITUTES A WELL-DEFINED PATTERN FOR SYMBOLICALLY DESCRIBING RANDOM VIBRATION. MORE RIGOROUS USE OF THE MATHEMATICAL THEORY WOULD MAKE RANDOM VIBRATION ENGINEERING EASIER, NOT HARDER.

RAY JM GE APOLLO SUPPORT DEPT

RAY5001T

A PRACTICAL APPROACH TO THE DETERMINATION OF ELECTRICAL SUPPORT EQUIPMENT TEST REQUIREMENTS WHICH ASSURE PROPER OPERATION IN HIGH STRESS SERVICE ENVIRONMENT
=US DIRECTOR OF DEFENSE SHOCK, VIBRATION AND ASSOCIATED ENVI-
=RONMENTS, SYMPOSIUM, 35TH, OCT. 1965 PT. 3, P. 235-242 11REF 4FIG

1. DESIGN 2. METHOD, ENGR-PRACTICE 3. INDUCED 4. NOMINAL 5. SINGLE
7. ELECTR-HDWR 8. ENVIRO-EFFECTS 9. RDM-VIBR

THE FEATURES OF THE PLAN ARE--(1) THE ESTABLISHMENT OF REALISTIC SPECIFICATION LEVELS FOR EACH EQUIPMENT LOCATION, (2) REPRESENTATIVE TESTING OF ESE BY STRUCTURAL CLASSIFICATION, (3) INVESTIGATION OF STRUCTURAL PROPERTIES OF ESE INCLUDING RESONANT FREQUENCY, RESONANT AMPLIFICATION AND BANDWIDTH, AND SERVICE LIFE, (4) DETERMINATION OF OPERATIONAL PERFORMANCE UNDER STRESS, AND (5) MODIFICATION OF OPERATIONAL EQUIPMENT TO THE QUALIFIED DESIGN CONFIGURATION AT A CONVENIENT TIME TO MINIMIZE SCHEDULE AND COST IMPACT.

SINUSOIDAL VIBRATION

ALLAWAY PH ABSORBIT LTD

ALL6001U

VIBRATION AMPLITUDES OF RESILIENTLY-MOUNTED MACHINES
=ASHRAE JOURNAL VOL. 8, P. 51-54 SEPT. 1966 2REF 5FIG

1. THEORY 2. MEASUREMENT 3. INDUCED 4. NOMINAL 5. SINGLE 7. MOTOR,
ISOLATOR 8. ENVIRO-MEAS 9. VIBR

PRESENTS A GRAPHICAL SOLUTION FOR THE CALCULATION OF THE AMPLITUDE OF SELF-INDUCED VIBRATION OF A RESILIENTLY MOUNTED SYSTEM. THESE INCLUDE AMPLITUDES DUE TO UNBALANCED VERTICAL FORCES, UNBALANCED VERTICAL COUPLES, AND HORIZONTAL UNBALANCES.

ARCILESI CJ NASA GODDARD

ARC5001U

INVESTIGATION OF DYNAMIC CHARACTERISTICS OF A 1/20TH SCALE
MODEL OF THE LAUNCH PHASE SIMULATOR
=US DIRECTOR OF DEFENSE SHOCK, VIBRATION AND ASSOCIATED ENVI-
=RONMENTS, SYMPOSIUM, 35TH, OCT. 1965 PT. 3, P. 207-225 3REF 22FIG
=3 TABLES

1. STUDY 2. FACILITY, METHOD 3. INDUCED 4. NOMINAL 5. SINGLE
7. ACCELEROMETER, MODEL, SHAKER, STRUCTURE 8. ENVIRO-EFFECTS 9. LF-
VIBR

VIBRATORY INVESTIGATIONS WERE CONDUCTED ON A 1-20TH-SCALE
DYNAMICALLY SIMILAR MODEL OF THE LAUNCH PHASE SIMULATOR, AN AD-
VANCED COMBINED ENVIRONMENTAL TEST FACILITY, TO OBTAIN DESIGN
DATA AND TO STUDY POTENTIAL PROBLEM AREAS. THE VIBRATION
MODES, FREQUENCIES, TRANSMISSIBILITIES, AND MODAL DAMPING CHARAC-
TERISTICS FOR THESE CONDITIONS ARE PRESENTED AND DISCUSSED.
COMPARISON OF THE MODEL CHARACTERISTICS WITH RESULTS FROM
THEORETICAL INVESTIGATIONS ARE PRESENTED AND INDICATE VERY
CLOSE AGREEMENT.

ARNOLD DD LING ELECTRONICS

ARN5002U

SHAKING A HEAVIER LOAD WITH NO OTHER MEANS OF SUPPORT
=ENVIR. QUAR VOL. 11, P. 46-47 DEC. 1965 2FIG

1. EVALUATION 2. FACILITY 3. GENERAL 4. NOMINAL 5. SINGLE 7. SHAKER
8. ENVIRO-CONTROL 9. VIBR

DESCRIBES LING'S MODEL 335, A 15000-LB SHAKER. SUSPENSION AND
GUIDANCE OF BOTH ARMATURE AND LOAD HAVE BEEN DIVIDED INTO
THREE SEPARATE COMPONENTS, PERMITTING OPTIMIZATION OF THE FUNC-
TION OF EACH--LOAD SUPPORT IN VERTICAL AXIS, LOAD SUPPORT IN
LATERAL DIRECTION AND LATERAL MOTION RESTRAINT, AND ROTATIONAL
RESTRAINT AND ELECTROMAGNETIC RECENTERING.

ASHLEY C UNIV OF BIRMINGHAM

ASH6001U

FREQUENCY RESPONSE OF AN ELECTRO-HYDRAULIC VIBRATOR WITH
INERTIAL LOAD
=JL. MECH. ENG. SCI VOL. 8, P. 27-35 MAR. 1966 21REF 8FIG 1TABLE

1. STUDY 2. FACILITY 3. INDUCED 4. NOMINAL 5. SINGLE 7. SHAKER, HYDR-
SYSTEM, VALVE 8. ENVIRO-CONTROL 9. LF-VIBR, HF-VIBR

THE CYLINDER EQUATIONS ARE EXTENDED TO INCLUDE END LEAKAGES
AND THE SERVO VALVE IS EXAMINED BOTH FOR TRANSFER CHARACTER-
ISTICS AND THE INTERDEPENDENCE OF FLOW AND LOAD. IT IS SHOWN
THAT THE CLASSICAL SQUARE ROOT RELATIONSHIP BETWEEN PRESSURE
DROP AND FLOW DOES NOT NECESSARILY APPLY FOR A 2-STAGE VALVE
WITH A SPRING-CENTERED SECOND STAGE AND THAT A DIMENSIONLESS
NUMBER KNOWN AS THE VALVE LOAD COMPENSATION COEFFICIENT DE-
SCRIBES THESE CHARACTERISTICS. FOR PRACTICAL VALVES IT IS
POSSIBLE FOR THE FLOW TO BE ALMOST INDEPENDENT OF THE LOAD
OVER A WIDE RANGE OF OPERATING CONDITIONS AND THUS A LINEAR
TRANSFER FUNCTION CAN BE USED FOR THE VALVE-CYLINDER COMBINA-
TION. THE EXPERIMENTAL WORK SHOWS GOOD AGREEMENT BETWEEN THE-
ORETICAL CHARACTERISTICS AND THOSE FOUND IN PRACTICE.

BEUDER LR NORTONICS

BEU5001U

ANALYSIS OF THE EFFECTS OF DYNAMIC COUPLING BETWEEN STRUCTURAL RESONANCES AND A TIME SAMPLING DATA CONTROL SYSTEM
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,35TH,OCT.1965 PT.3,P.169-186 14REF 15FIG
=1TABLE

1.STUDY 2.METHOD,EFFECTS 3.INDUCED 4.NOMINAL 5.SINGLE 7.MODEL,
SKYBOLT,TRACKING-SYSTEM 8.ENVIRO-EFFECTS 9.LF-VIBR,HF-VIBR,
RESONANT

DESCRIBES A DYNAMIC COUPLING PHENOMENA BETWEEN A STRUCTURAL RESONANCE AND THE RESPONSE OF A STAR TRACKER IN AN ACTUAL ASTROINERTIAL GUIDANCE INSTRUMENT WHICH WAS SUBJECTED TO VIBRATION. THE STRUCTURAL RESONANCE IS SHOWN TO CAUSE A RELATIVE TRANSLATIONAL MOTION BETWEEN THE ROTOR AND STATOR OF A VERNIER RESOLVER USED AS AN ANGULAR SENSING DEVICE IN A STAR TRACKER CONTROL LOOP. THE TRANSLATIONAL MOTION IS SHOWN TO RESULT IN AN ANGULAR POSITIONAL ERROR WHICH PROPAGATES THROUGH THE CONTROL LOOP, IN A NON-LINEAR MANNER, CAUSING EXCESSIVE ANGULAR MOTION OF THE STAR TRACKER.

BLANCHFLOWER R GENERAL ELEC LTD

BLA6001U

DAMPING PROPERTIES OF ENGINEERING AND VISCO-ELASTIC MATERIALS
=ENVIR.ENG NO.19,P.19-25 MAR.1966 16REF 5FIG 2TABLES

1.STUDY 2.METHOD,MITIGATION 3.INDUCED 4.NOMINAL 5.SINGLE
7.STRUCTURE-SANDWICH,STRUCTURE,MATERIALS,METALS 8.ENVIRO-
EFFECTS 9.VIBR

AFTER GIVING SOME OF THE BASIC INFORMATION ON DAMPING OF MATERIALS, THE AUTHOR FORMULATES FIGURES OF MERIT FOR A SIMPLE COMPARISON BETWEEN MATERIALS FOR BOTH HOMOGENEOUS AND COMPOSITE STRUCTURES. THE THREE PRINCIPAL DESIGN AIMS ARE FATIGUE LIFE, COMPONENT OR INSTRUMENT MALFUNCTION AND NOISE TRANSMISSION. SOME EXPERIMENTS CARRIED OUT ON EXPERIMENTAL CANTILEVERS TO EVALUATE THE DEGREE OF DAMPING WHICH COULD BE OBTAINED FROM INTERNAL DAMPING SHOWED THAT ALL THE COMPOSITE BEAMS GAVE A GREATER DAMPING CAPACITY THAN THOSE MADE FROM STRUCTURAL MATERIALS. HOWEVER, THE EXPERIMENTS WERE NOT SUFFICIENTLY COMPLETE OR DETAILED TO GIVE ANY CONFIRMATION OF THE ANALYTICAL WORK OF THIS PAPER.

CURRERI JR POLYTECH INST BROOKLYN

CUR6001U

VIBRATIONS OF STRUCTURES
=IES PROC.(TUTORIAL SERIES) 1966,P.53-68 4REF 20FIG

1.THEORY 2.METHOD 3.INDUCED 4.NOMINAL 5.SINGLE 7.STRUCTURE,
MODEL 8.ENVIRO-CONTROL 9.VIBR

VIBRATIONS OF STRUCTURES ARE DEVELOPED FROM THE POINT OF VIEW OF FIXTURE DESIGN. EFFECT OF NONLINEARITY IS DISCUSSED. THE POSSIBILITY OF OPTIMUM LOCATION OF THE CONTROL PICKUP IS EXAMINED TOGETHER WITH GENERAL FIXTURE DESIGN CONSIDERATIONS. THE CHARACTERISTICS OF STRUCTURES IN BENDING ARE DERIVED BY TREATING THE COMPONENTS FIRST SEPARATELY, THEN IN COMBINATION. EXAMPLES INCLUDE THE OPEN PORTAL FRAME AS COMPARED WITH THE DIAGONALLY BRACED PORTAL FRAME.

DANIELS VR BELL AEROSYSTEMS

DAN5003U

DYNAMIC ASPECTS OF METAL BELLOWS
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,35TH,OCT.1965 PT.3,P.107-124 4REF 18FIG
=1TABLE

1.STUDY 2.METHOD,EFFECTS 3.INDUCED 4.NOMINAL 5.SINGLE 7.LIQ-
UIDS,GEMINI,PRESSURE-SYSTEM,STRUCTURE-ELASTIC BODY 8.ENVIRO-
MEAS 9.LF-VIBR,HF-VIBR

MAJOR RESONANT VIBRATION MODES IN BOTH LONGITUDINAL AND LATER-
AL DIRECTIONS WERE IDENTIFIED,ANALYTICALLY AND EXPERIMENTALLY,
FOR SINGLE- AND DOUBLE-PLY BELLOWS. ATTENUATION DEVICES WERE
INVESTIGATED TO MINIMIZE RESONANCE. SIMPLE FORMULAS AND MATRI-
CES FOR DIGITAL COMPUTER SOLUTIONS WERE ESTABLISHED FOR COM-
PUTING LONGITUDINAL AND LATERAL BELLOWS VIBRATION MODES, FOR
NEARLY EVERY CONCEIVABLE COMBINATION OF INTERNAL AND EXTERNAL
LIQUIDS AND GASES OPERATING WITH AND WITHOUT PRESSURIZATION.

GORMAN RM GENERAL DYNAMICS

GOR5003U

DESIGN AND ADVANTAGES OF A TWO-STAGE MOUNTING SYSTEM FOR MAJOR
MACHINES IN SHIPS ENGINE ROOM
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,35TH,OCT.1965 PT.5,P.227-234 16FIG 2TABLE

1.DESIGN 2.MITIGATION 3.INDUCED 4.NOMINAL 5.SINGLE 7.ISOLATOR,
SHIP,MODEL 8.ENVIRO-EFFECTS 9.LF-VIBR

AN ANALYTICAL COMPARISON OF ONE- AND TWO-STAGE SYSTEMS WAS
MADE ON THE BASIS OF ATTENUATION AND STABILITY CHARACTERIS-
TICS. FORCE TRANSMISSIBILITY WAS ANALYTICALLY DETERMINED FOR A
LARGE RANGE OF MOUNT DAMPING, MOUNT STIFFNESS, AND SUBBASE
WEIGHT. RESULTS INCLUDE A SET OF PARAMETRIC CURVES. THE FOUR
MACHINES ON THE SUBBASE AND THE SUBBASE ITSELF WERE CONSIDERED
RIGID MASSES TO SIMPLIFY DETERMINING ALL THE MOUNTING SYSTEMS
NATURAL FREQUENCIES. EACH ELEMENT WAS GIVEN SIX DEGREES OF
FREEDOM AND THE RESULTING 30 NATURAL FREQUENCIES WERE FOUND
USING ELECTRIC BOATS STANDARD STRUCTURES PROGRAM.

GUIGNARD JC RAF INST OF AV MED

GUI6001U

EFFECTS OF VIBRATION ON MAN
=JL.ENVIR.SCI VOL.9,P.29-32 AUG.1966 18REF 4FIG

1.STUDY 2.EFFECTS 3.INDUCED 4.NOMINAL 5.SINGLE 7.HUMAN
8.ENVIRO-EFFECTS 9.LF-VIBR

THE QUALITY AND SPECTRUM OF VIBRATION DISTURBING TO MAN ARE
DISCUSSED. THE LABORATORY EXPERIMENTS DESCRIBED INDICATED THE
PRINCIPAL EFFECTS OF LOW FREQUENCY VIBRATION--MECHANICAL,
PHYSIOLOGICAL,PSYCHOLOGICAL AND PATHOLOGICAL.

HOUCK F OHIO STATE UNIV

HOU6001U

PUTTING VIBRATION TO WORK
=MECH.ENG VOL.88,P.48-50 SEPT.1966 6FIG

1.INFORMATION 2.ENGR-PRACTICE 3.INDUCED 4.NOMINAL 5.SINGLE
7.LIQUIDS,STRUCTURE 9.VIBR

THE PROPER APPLICATION OF VIBRATION CAN BE VERY USEFUL,E.G.
ALLEVIATING FRICTION,MIXING AND DISPERSION IN LIQUIDS AND DE-
GASSING OF LIQUIDS AND SLURRIES. VIBRATION OF A WELDING ELEC-
TRODE CAN INCREASE THE DEPOSITION RATE. STRUCTURES WHICH HAVE
BEEN STRESSED BY MACHINING,GRINDING,ETC. CAN BE EFFECTIVELY
STRESS-RELIEVED BY THE USE OF VIBRATORY SYSTEMS.

KERFOOT RE SPECTRAL DYN CORP
MECHANICAL IMPEDANCE--SOME FUNDAMENTALS
=ENVIR.QUAR VOL.12,P.36-38 SEPT.1966 3FIG

KER6002U

1.THEORY 2.METHOD 3.INDUCED 4.NOMINAL 5.SINGLE 7.STRUCTURE
8.MECHANICAL 9.IMPEDANCE

THIS FIRST INSTALLMENT OF A SERIES TAKES UP FUNDAMENTAL DEFINITIONS AND REVIEWS SOME PROBLEMS OF MECHANICAL IMPEDANCE ANALYSIS.

MERCURIO SF SPERRY
DETERMINATION OF NATURAL FREQUENCIES AND MODE SHAPES
=IES PROC.1966,P.197-201 6REF 7FIG

MER6001U

1.STUDY 2.EFFECTS 3.INDUCED 4.NOMINAL 5.SINGLE 7.GYROSCOPE,
RADAR,CNTRL-SYSTEM,MOTOR,MODEL 8.ENVIRO-EFFECTS 9.RESONANT,
LF-VIBR

A LARGE SCALE TRACKING RADAR IN A SHIPBOARD ENVIRONMENT HAS A GYROSCOPE WHICH SENSES PRIMARILY A STRUCTURAL MODE OF VIBRATION AND A TACHOMETER WHICH SENSES PRIMARILY A DRIVE SYSTEM MODE. THE FOLLOWING PROBLEM AREAS AND THEIR SOLUTION ARE COVERED--1.DRIVE SYSTEM RESONANT FREQUENCIES AND MODE SHAPES INCLUDING FIXED MOTOR ROTOR FREQUENCIES, FREE MOTOR FREQUENCIES, AND CONTROL SYSTEM EFFECTS AND 2.STRUCTURAL RESONANT FREQUENCIES AND MODE SHAPES FOR A MULTI-DEGREE OF FREEDOM SYSTEM INCLUDING THE CONTROL SYSTEM EFFECTS.

NUCKOLLS CE SANDIA CORP
A PROGRESS REPORT ON FORCE CONTROLLED VIBRATION TESTING
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVIRONMENTS, SYMPOSIUM, 35TH, OCT.1965 PT.2,P.117-130 2REF 17FIG
=1TABLE

NUC5003U

1.STUDY 2.METHOD,SIMULATION 3.INDUCED 4.NOMINAL 5.SINGLE
7.MODEL,NIKE-TOMAHAWK,ROCKET 8.ENVIRO-EFFECTS,ENVIRO-CONTROL
9.HF-VIBR

THE NIKE-TOMAHAWK SYSTEM CONSISTS OF TWO ROCKET MOTORS AND A PAYLOAD. STUDIES HAVE BEEN AIMED TOWARD THE DERIVATION OF A LABORATORY TEST WHICH WILL APPROXIMATE THE PAYLOADS VIBRATION RESPONSE CHARACTERISTICS DURING FLIGHT. THE DISCUSSION OF THE PROCEDURES USED INCLUDES STATIC FIRING OF THE ROCKET MOTORS TO DETERMINE THEIR BLOCKED FORCE CHARACTERISTICS, APPARENT WEIGHT ANALYSES OF THE ROCKET MOTORS, FORCE CONTROLLED VIBRATION TESTING, AND ELECTRONIC SIMULATION OF APPARENT WEIGHT DURING A FORCE CONTROLLED TEST. FIRST, AN ELECTRICAL ANALOG OF AN ARBITRARY MOTOR PAYLOAD MODEL WAS USED TO ILLUSTRATE THE VALIDITY OF THE PROCEDURE USED. SECONDLY, THE TEST ON THE NIKE-TOMAHAWK IS PRESENTED TO ILLUSTRATE THE PRACTICAL APPLICATION OF THE TECHNIQUE.

OSTERGREN SM GENERAL ELEC
CONTROL OF SINUSOIDAL VIBRATION TESTS USING AVERAGING SYSTEMS OST6001U
=IES PROC.1966,P.215-224 7FIG 3TABLES

1.EVALUATION 2.METHOD 3.INDUCED 4.NOMINAL 5.SINGLE 7.SHAKER
8.ENVIRO-CONTROL 9.LF-VIBR,HF-VIBR

ANALYZES DIFFERENT TYPES OF AVERAGING SYSTEMS SHOWING DIFFERENT WAYS TO COMPUTE THE AVERAGE OF VIBRATION SIGNALS AND CONTROL VIBRATION TESTS.

PENZES LE GENERAL DYNAMICS
FREQUENCY,DYNAMIC RESPONSE AND JETTISON ANALYSES FOR JETTISON- PEN6002U
ABLE PAYLOAD SHROUDS,WITH APPLICATION TO THE ORBITAL ASTRONOMICAL OBSERVATORY (OAO) FAIRING.
=IES PROC.1966,P.259-269 4REF 15FIG 3TABLES

1.STUDY 2.METHOD,MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE
7.STRUCTURE-SHELL,GUIDED-MISSILE 8.ENVIRO-EFFECTS 9.LF-VIBR,
HF-VIBR

THE TEST PROGRAM CONSISTED OF 3 ATMOSPHERIC JETTISON TESTS USING A NITROGEN GAS BOTTLE EJECTION FORCE SYSTEM,3 VACUUM TESTS USING A SPRING-EJECTION SYSTEM AND A FREE VIBRATION TEST OF THE FAIRING HALF SHELL. THE MEASUREMENTS TAKEN INCLUDED TRAJECTORY PHOTOGRAPHS,SHELL DEFLECTIONS,JET-BOTTLE AND SPRING FORCES,HINGE LOADS AND SHOCK LEVEL ON THE CONTAINED SPACECRAFT. THE APPROXIMATE THEORETICAL ANALYSIS WAS BASED ON ORTHOTROPIC SHELL THEORY. COMPARISON OF THE THEORETICAL CALCULATIONS AND THE TEST DATA SHOWS GOOD AGREEMENT.

ROSS JA LTV LING ELECTRONICS
A COMPUTER CONTROLLED DECELERATION SYSTEM ROS6001U
=IES PROC.1966,P.229-235 6FIG

1.DESIGN 2.PROTECTION 3.INDUCED 4.NOMINAL 5.SINGLE 7.SHAKER,
COMPUTER 8.ENVIRO-CONTROL 9.VIBR

IN A VIBRATION TEST SYSTEM CONSISTING OF AN ELECTRODYNAMIC SHAKER DRIVEN BY A POWER AMPLIFIER,PROTECTIVE TERMINATION OF THE TEST MAY BE ACCOMPLISHED BY A COMPUTER SYSTEM DESIGNED TO CONTROL THE DECELERATION OF THE ARMATURE BY ANTICIPATING CONDITIONS WHICH WOULD RESULT IN AN EXCESSIVE DECELERATION LEVEL,BY INITIATING CONTROLLED DECELERATION BEFORE SUCH CONDITIONS ARE ALLOWED TO OCCUR,AND BY AUTOMATICALLY INSERTING A VARIABLE DAMPING RESISTANCE IN THE ARMATURE CIRCUIT TO LIMIT THE DECELERATION TO A PRESCRIBED LEVEL.

SALTER JP ROYAL ARM R AND D ESTAB
A VIBRATION EXCITER HAVING GENERALIZED MOBILITY CHARACTERISTICS SAL6001U
=JL.ENVIR.SCI VOL.9,P.18-21 AUG.1966 4FIG

1.PHILOSOPHY 2.SIMULATION 3.INDUCED 4.NOMINAL 5.SINGLE 6.MIL-STD-810 7.SHAKER 8.ENVIRO-CONTROL 9.LF-VIBR,HF-VIBR

DRAWS ATTENTION TO CERTAIN ILLOGICALITIES IN OUR CURRENT APPROACH TO VIBRATION TESTING AND OFFERS FOR CONSIDERATION AN ALTERNATIVE FORM OF TEST WHICH COULD HAVE SUBSTANTIAL ADVANTAGES IN SIMPLICITY,REPEATABILITY,AND REALISM.

TUSTIN W TUSTIN INST OF TECH
SPEED OF SOUND LIMITS SIZE OF VIBRATING STRUCTURES
=TEST ENG VOL.16,P.12-13 SEPT.1966 4REF 1TABLE

TUS6006U

1.INFORMATION 2.EFFECTS 3.INDUCED 4.NOMINAL 5.SINGLE 7.STRUC-
TURE 8.ENVIRO-EFFECTS 9.HF-VIBR

THE PURPOSE OF THIS ARTICLE IS TO GIVE DESIGNERS AND TEST PER-
SONNEL SOME FEELING FOR THE RELATIONSHIP BETWEEN THE SIZE OF
THEIR VIBRATING STRUCTURE AND THEIR RESONANT FREQUENCIES.

BIOLOGICAL ENVIRONMENTS

FARMER FH NASA LANGLEY
MICROBIOLOGICAL CONTAMINATION CONTROL IN SPACECRAFT STERILIZA-
TION
=IES PROC.1966,P.513-516 3FIG 2TABLES

FAR6001V

1.PHILOSOPHY 2.MITIGATION 3.NATURAL 4.OVERTEST 5.SINGLE
7.CLEAN-ROOM,GUIDED-MISSILE 8.LEAK-DETECT 9.STERILIZATION

A BRIEF BACKGROUND OF THE CHARACTERISTICS OF THE MICROORGAN-
ISMS PRESENT ON A SPACECRAFT IS GIVEN. THE MICROBIOLOGICAL
BASIS OF THE NASA DRY HEAT STERILIZATION REQUIREMENTS IS EX-
PLAINED. MEASURES THAT CAN BE TAKEN AT ANY STAGE IN THE ASSEM-
BLY OF THE VEHICLE WILL REDUCE THE FINAL ESTIMATE OF MICROBIAL
BURDEN. AFTER TERMINAL STERILIZATION,STERILIZATION CERTIFICA-
TION,STERILE REPAIR,CANISTER DESIGN,MICROMETEOROID PENETRATION
AND BUS-CANISTER-LANDER SEPARATION ARE THE MAIN PROBLEMS UNDER
STUDY.

KREITH F UNIV OF COLORADO
THE MICRO-ENVIRONMENT OF BROAD LEAF PLANTS--CONVECTION,
RADIATION,AND TRANSPIRATION
=IES PROC.1966,P.209-214 13REF 4FIG 2TABLES

KRE6001V

1.STUDY 2.MEASUREMENT 3.NATURAL 4.NOMINAL 5.SINGLE 8.ENVIRO-
MEAS 9.BIOLOGICAL

THE MICROENVIRONMENTAL APPROACH HAS AS ITS OBJECT TO DEVISE AN
ANALYTICAL,QUANTITATIVE DESCRIPTION OF THE INTERACTION BETWEEN
ORGANISMS AND THEIR ENVIRONMENTS. THIS PAPER DEVELOPS A NUMBER
OF FORMULAE WHICH ENABLE THE ENGINEER TO STUDY QUANTITATIVELY
THE ENERGY EXCHANGE OF PLANTS.

MISCELLANEOUS ENVIRONMENTS

TEST ENGINEERING
RELIABILITY TEST LABORATORY OPENED BY FORD MOTOR COMPANY
=TEST ENG VOL.16,P.12-13 JULY 1966 4FIG

TES6005W

1.INFORMATION 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE
7.RELIABILITY,COMPUTER

THIS FACILITY ENABLES THE COMPANY TO ACCELERATE EVALUATION OF
MAJOR AUTO COMPONENTS,SUCH AS BRAKE SYSTEMS,CHASSIS,AND STEER-
ING SYSTEMS--AS WELL AS TOTAL CAR PACKAGE--THROUGH COMPUTER-
CONTROLLED SIMULATION OF CUSTOMER USAGE ENVIRONMENTS.THE NERVE
CENTER OF THE COMPLEX IS A PHILCO 212 SCIENTIFIC COMPUTER,
WHICH SIMULATES TEST CONDITIONS AS WELL AS VERIFIES RESULTS.

TEST ENGINEERING

TES6006W

MISSILE GUIDANCE TEST CENTER COMPLETED BY MARTIN-ORLANDO
=TEST ENG VOL.16,P.34-35 JULY 1966 4FIG

1.INFORMATION 2.SIMULATION,FACILITY 3.GENERAL 4.NOMINAL
5.SINGLE 7.OPTICS,SENSOR-RADIATION,GUIDED-MISSILES

A TEST CENTER FOR SIMULATING THE FLIGHT PARAMETERS ENCOUNTERED BY THE GUIDANCE SYSTEMS OF SURFACE-TO-SURFACE AND AIR-TO-SURFACE MISSILES HAS JUST BEEN COMPLETED BY MARTIN. THE NEW FACILITY IS CAPABLE OF EVALUATING BOTH OPTICAL AND ELECTRO-MAGNETIC SEEKER SYSTEMS.

WILSON RE MARTIN CO

WIL6001W

DESIGN OF A COMBINED-ENVIRONMENTS TEST FACILITY
=IES PROC.1966,P.609-615 15 FIG

1.INFORMATION 2.FACILITY 3.GENERAL 4.NOMINAL 5.COMBINED
7.CHAMBER,SHAKER,TEMP-CHAMBER,HEATERS 8.ENVIRO-CONTROL 9.VIBR,
SUSTAINED,PRESSURE,SHOCK,HOT,COLD,HUMIDITY

A TEST FACILITY CAPABLE OF EIGHT ENVIRONMENTS EITHER SINGLY OR IN COMBINATION WAS BUILT TO INVESTIGATE THE SYNERGISTIC EFFECTS OF COMBINED ENVIRONMENTS.THE EIGHT ENVIRONMENTS COMBINED IN A BASIC RESEARCH PROGRAM USING THIS FACILITY WERE--1.SUSTAINED ACCELERATION 2.ALTITUDE 3.VIBRATION 4.MECHANICAL SHOCK 5.LOW TEMPERATURE 6.HIGH TEMPERATURE 7.THERMAL SHOCK AND 8.HUMIDITY.ALL PARAMETERS WERE REMOTELY SENSED AND CONTROLLED THROUGH THE CENTRIFUGE SLIP-RING SYSTEM.

ENGINEERING PRACTICES

TUSTIN W TUSTIN INST OF TECH

TUS6004Z

DEFINING SOME COMMON TERMS
=TEST ENG VOL.16,P.16-17+ JULY 1966

1.INFORMATION 2.ENGR-PRACTICE 3.GENERAL 7.NOMENCLATURE 9.VIBR,
SHOCK

DEFINITIONS OF 66 TERMS COMMONLY USED IN VIBRATION AND SHOCK TESTING AND MEASUREMENT.