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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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SANDIA CORPORATION

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.

The code number, appearing to the right of each entry, is a unique identification number used for machine subject retrieval. The final letter of the code indicates the major subject of the article and determines the order of listing in this bulletin.

<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

COCHRAN TH NASA LEWIS
AN EXPERIMENTAL INVESTIGATION OF BOILING IN NORMAL AND ZERO GRAVITY
=IES PROC.1967,P.505-511 8REF 8FIG

COC7001A

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

THE EFFECTS OF GRAVITY ON BOILING FROM A FLAT HORIZONTAL SURFACE IS INVESTIGATED IN THE HEAT FLUX RANGE DEFINED AS THE DISCRETE BUBBLE REGION FOR VARIOUS SUBCOOLINGS, FLUID PROPERTIES AND HEAT TRANSFER RATES. THE ZERO GRAVITY DATA WERE OBTAINED BY ALLOWING THE EXPERIMENTAL PACKAGE TO FREE FALL IN A 100 FT DROP TOWER. DATA TAKEN FROM HIGH SPEED MOTION PICTURES INDICATED THAT BOILING WAS INDEPENDENT OF GRAVITY AT HIGH SUBCOOLING AND THAT THE TRANSITION FROM THE DISCRETE BUBBLE REGION OCCURRED AT A LOWER HEAT FLUX IN ZERO GRAVITY THAN IN NORMAL GRAVITY.

FINGER JT SANDIA CORP
HIGH SPEED WATER TUNNEL TESTING
=IES PROC.1967,P.537-540 3FIG

FIN7001A

1.DESIGN 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE 7.TUNNELS-
WATER,MODEL,GAGE-STRAIN,OPTICAL-INSTR 8.ENVIRO-MEAS 9.PRO-
GRAMMED

A BRIEF DESCRIPTION OF WATER TUNNEL TESTING AND THE FACILITIES THAT SANDIA CORPORATION HAS USED FOR THIS TESTING.

LAGERWERFF JM LOCKHEED
PROLONGED WEIGHTLESSNESS EXPOSURE AND ITS EXPECTED EFFECTS ON MAN
=IES PROC.1967,P.585-590 20REF 2FIG 2TABLES

LAG7001A

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

DESCRIBES DEMINERALIZATION OF BONES, MUSCLE DISUSE DYSTROPHY, AND THE DECONDITIONING EFFECTS OF SPACE FLIGHT AFFECTING THE CARDIOVASCULAR AND URINARY SYSTEMS. SOME OF THE WAYS BEING CONSIDERED TO PREVENT OR ATTENUATE THE EFFECTS OF PROLONGED WEIGHTLESSNESS ARE--1)A SMALL ONE MAN ON-BOARD CENTRIFUGE EAR-MARKED FOR INCLUSION IN THE APOLLO-LUNAR EXCURSION MODEL, 2)A LOWER BODY NEGATIVE PRESSURE DEVICE, AND 3)A SCALED-DOWN BI-CYCLE ERGOMETER WHICH CAN BE MOUNTED INSIDE THE LBNP DEVICE TO PROVIDE A MEANS OF EXERCISE WHICH OFFERS THE BEST POSSIBILITY FOR PREVENTION OF THE DEBILITATING EFFECTS OF WEIGHTLESSNESS.

LARKIN BK MARTIN CO

LAR7001A

THE VENTING OF SATURATED LIQUIDS IN ZERO GRAVITY
=IES PROC.1967,P.591-598 4REF 13FIG 1TABLE

1.XPER-RESULTS 2.METHOD 3.SPACE 4.NOMINAL 5.SINGLE 7.PROPEL-
LANT-LIQUID 8.ENVIRO-EFFECTS 9.SUB-GRAVITAL

AN EXPERIMENTAL PROGRAM WAS CARRIED OUT TO INVESTIGATE THE PROBLEM OF SUDDEN VAPOR REMOVAL FROM AN INITIALLY CLOSED TWO-PHASE SYSTEM DURING FREE FALL. EXPERIMENTS WERE PERFORMED IN A 75-FT DROP TOWER USING FREON 1F AT SATURATED CONDITIONS, AND A 13-FT DROP TOWER WITH SATURATED LIQUID HYDROGEN. IN EACH TYPE OF EXPERIMENT A VACUUM RESERVOIR WAS INSTALLED IN THE DROP CAPSULE, AND A THROTTLE VALVE CONNECTING THE EXPERIMENT TO THE VACUUM RESERVOIR WAS OPENED FOLLOWING CAPSULE RELEASE. IN ALL OF THE EXPERIMENTS, VAPOR BUBBLES TENDED TO REMAIN IN THE VICINITY OF THEIR NUCLEATION SITES. VENTING OF LOW VOLUMES PRODUCED NO MORE INTERFACE DISTURBANCE THAN MERELY DROPPING A SEALED VESSEL. BY ASSUMING THAT NONE OF THE VAPOR FORMED DURING VENTING JOINS THE ORIGINAL ULLAGE VOLUME, A SIMPLE THERMODYNAMIC CALCULATION OF ALLOWABLE PRESSURE DECREASE WAS MADE.

LARKIN BK MARTIN CO

LAR7002A

ANALYSIS OF SUPERCRITICAL CRYOGENIC STORAGE SYSTEMS
=IES PROC.1967,P.525-532 11REF 10FIG 3TABLES

1.THEORY 2.METHOD 3.SPACE 4.NOMINAL 5.SINGLE 7.CRYO-LIQUID,
COMPUTER 8.ENVIRO-MEAS 9.SUB-GRAVITAL

THE STORAGE AND SUPPLY OF SINGLE-PHASE CRYOGENIC FLUIDS IS CONSIDERED. BY USING FINITE DIFFERENCE APPROXIMATIONS TO THE CONTINUITY AND ENERGY EQUATIONS ON A DIGITAL COMPUTER, THE BEHAVIOR OF THE STORAGE SYSTEM IS SIMULATED. HEAT TRANSFER BY CONDUCTION, CONVECTION AND RADIATION WAS TREATED. COMPUTATIONS SHOWED TRANSIENT PRESSURES AND TEMPERATURES WITHIN THE STORAGE SYSTEM AS FLUIDS WERE BEING REMOVED.

STADELBAUER DG MB/TREBEL

STA7001A

MASS PROPERTIES DETERMINATION ON AEROSPACE BALANCING SYSTEMS
=IES PROC.1967,P.571-584 36FIG

1.EVALUATION 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE 6.ISO
7.SPACECRAFT,TEST-EQUIP 8.ENVIRO-EFFECTS 9.FORCES

FOLLOWING AN EXPOSITION OF THE TERMS AND PRINCIPLES OF BALANCING, AND ALSO THE CAUSES AND METHODS OF DETERMINING UNBALANCE, THE LATEST GENERATION OF HARDWARE IS DESCRIBED.

VINOGRAD SP NASA

VIN7001A

WEIGHTLESSNESS AND MANNED SPACE FLIGHT, MEDICAL DATA TO DATE
=IES PROC.1967,P.599-603

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

DURING THE GEMINI PROGRAM, A SERIES OF EIGHT IN-FLIGHT MEDICAL EXPERIMENTS WERE FLOWN, SEVERAL OF THEM MORE THAN ONCE. FROM THESE EXPERIMENTS AND FROM THE OPERATIONAL MEDICAL PROCEDURES, DATA WAS OBTAINED ON CARDIOVASCULAR FUNCTION, THE MUSCULO-SKELETAL SYSTEM, BLOOD AND BLOOD VOLUME, FLUID AND ELECTROLYTE BALANCE, ENDOCRINE ACTIVITY, SLEEP, AND VESTIBULAR FUNCTIONS.

ACOUSTIC ENVIRONMENTS

CAMPBELL J MACH DESIGN
MEASURING NOISE

CAM7001B

=MACH.DESIGN VOL.39,P.216-224 SEPT.14,1967 7REF 15FIG
=3TABLES

1.EVALUATION 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE
7.MICROPHONE,METER,RECORDER 8.ENVIRO-MEAS 9.ACOUSTIC

THE FIRST PART OF THIS PAPER ANALYZES THE CHARACTERISTICS OF
NOISE. PART II DESCRIBES THE MOST COMMON INSTRUMENTS IN USE
TO MEASURE NOISE.

DOMBROVSKII RV USSR

DOM7002B

A SMALL ANECHOIC CHAMBER FOR ACOUSTICAL MEASUREMENTS
=SOV.PHYS-ACOUST VOL.13,P.109-110 JULY-SEPT.1967 3FIG

1.DESIGN 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE 7.CHAMBER
8.ENVIRO-MEAS 9.ACOUSTIC

A SMALL MEASURING CHAMBER WAS DESIGNED FOR LABORATORIES THAT
HAVE NO NEED FOR CONDUCTING MEASUREMENTS OVER A VERY WIDE
RANGE OF FREQUENCIES OR WITH EXTREME ACCURACY. THE INSIDE
DIMENSIONS ARE 3.4X4.4X2.35 M. THE ACOUSTIC-PRESSURE-DECAY
CURVES RECORDED BY MEANS OF A POINT SOURCE DO NOT DEPART FROM
THE INVERSE PROPORTIONALITY LAW BY MORE THAN PLUS OR MINUS
2 DB AT A DISTANCE OF FROM 0.5 TO 1.5 M FROM THE EMITTER, BE-
GINNING WITH A FREQUENCY OF 200 CPS OR MORE. THE INTRINSIC
NOISE LEVEL AS MEASURED ON THE C SCALE DOES NOT EXCEED 45 DB.

ELDRED KM WYLE LAB

ELD7001B

ACOUSTIC TESTING APOLLO
=TEST ENG VOL.18,P.16-17 NOV.1967 3FIG

1.DESIGN 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE 7.APOLLO,
CHAMBER 8.ENVIRO-MEAS 9.ACOUSTIC

ACOUSTIC TESTING OF APOLLO WAS ACCOMPLISHED BY DESIGNING AN
ACOUSTICAL HOOD OR SHROUD COMPRISING A CLUSTER OF DUCTS
AROUND THE COMMAND VEHICLE THAT COULD BE USED TO EXPOSE VARI-
OUS SECTIONS TO VARIOUS PROGRESSIVE WAVE ACOUSTIC PRESSURES BY
VARYING THE CROSS SECTIONAL AREA OF THE DUCT. IN AN ALTERNA-
TIVE CONFIGURATION, THE SHOULDER OF THE VEHICLE COULD BE
PLACED NEAR THE THROAT OF AN ACOUSTIC HORN WHILE THE REST OF
THE VEHICLE REMAINED OUTSIDE THE HORN IN A REVERBERANT ENVI-
RONMENT OF APPROXIMATELY PROPER LEVEL. THE RESULT WAS THE
CONSTRUCTION OF A 400000 CU FT REVERBERATION TEST ROOM AND THE
DEVELOPMENT OF A MULTIPLE SYSTEM OF 16 ACOUSTIC HORNS AND
DUCTS DRIVEN BY 10000 ACOUSTIC WATTS TO SIMULATE THE REQUIRED
FLUCTUATING PRESSURES RANGING FROM 169 DB AT THE VEHICLE
SHOULDER TO 155 DB ALONG UNBROKEN SURFACES OF THE LEM ADAPTER
SECTION.

MARINO PA PRATT AND WHITNEY

MAR7001B

MEASUREMENT OF ACOUSTIC RESISTANCE AT SOUND-PRESSURE LEVELS
TO 171 DB
=ACoust.SOC.AM.JL VOL.41,P.1325-1327 MAY 1967 3REF 4FIG
=1TABLE

1.DESIGN 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE 7.MOTOR,
ROCKET,MICROPHONE,TRANSDUCER 8.ENVIRO-EFFECTS 9.ACOUSTIC

ABSORBING LINERS CONSISTING OF ARRAYS OF ACOUSTIC RESONATORS ARE BEING USED TO SUPPRESS COMBUSTION INSTABILITY IN ROCKET AND AIR-BREATHING ENGINES. FOR THE DESIGN OF ACOUSTIC LINERS, INFORMATION IS NEEDED ON THE VARIATION OF ACOUSTIC RESISTANCE WITH SOUND PRESSURE LEVELS ABOVE THE LINEAR REGIME, IE, APPROXIMATELY 100 DB. IN THE WORK REPORTED HEREIN, A STANDARD IMPEDANCE TUBE DRIVEN BY A HIGH-INTENSITY SOUND GENERATOR WAS USED ALONG WITH AN IMPROVED DATA-RECORDING TECHNIQUE TO MEASURE THE RESISTANCE OF HELMHOLTZ-TYPE RESONATOR ARRAYS. INCIDENT SOUND-PRESSURE LEVELS OF 171 DB WERE OBTAINED, WHICH REPRESENTS AN 11-DB INCREASE IN SOUND LEVEL OVER THAT REPORTED BY ANOTHER INVESTIGATOR IN AN EARLIER, SIMILAR EXPERIMENT. A SIMPLE CORRELATION OF THE NONLINEAR RESISTANCE EFFECTS WITH SOUND PRESSURE IS PRESENTED.

MILLS JF LING ELECTRONICS

MIL7002B

A COMPLETE HIGH INTENSITY SOUND TEST FACILITY
=IES PROC.1967,P.495-501 13FIG

1.DESIGN 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE 7.CHAMBER,
ELECTRONIC,STRUCTURE 8.ENVIRO-MEAS 9.ACOUSTIC

THE REQUIREMENTS FOR WHICH THIS ACOUSTIC TEST FACILITY WAS DESIGNED INCLUDE A CAPABILITY OF TESTING ELECTRONIC PACKAGES AND STRUCTURES IN A REVERBERANT SOUND FIELD UP TO 158 DB AND STRUCTURAL PANELS AT GRAZING INCIDENCE WITH SPLS UP TO 168 DB. THE DESIGN IS SELF-CONTAINED, REQUIRING ONLY THE HOOK-UP OF UTILITIES TO PRODUCE A WORKING SYSTEM.

MILLER WR LING ELECTRONICS

MIL7003B

DEVELOPMENT OF A WIDE BAND, TEN KILOWATT ACOUSTIC NOISE SOURCE
=IES PROC.1967,P.473-481 7REF 15FIG 2TABLES

1.DESIGN 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE 7.TRANSDUCER,
VALVE 8.ENVIRO-CONTROL 9.ACOUSTIC

THE DESIGN AND DEVELOPMENT PROGRAM OF AN ELECTROPNEUMATIC TRANSDUCER WHICH GENERATES 10 KILOWATTS OF ACOUSTIC POWER AND HAS A FLAT OUTPUT PRESSURE RESPONSE OVER THE FREQUENCY RANGE OF 10 TO 5000 HZ IS PRESENTED. THE TRANSDUCER ALSO HAS THE ABILITY TO PRODUCE DISCRETE FREQUENCY ENERGY AT THE FULL 10 KILOWATT LEVEL OVER THE FREQUENCY RANGE OF 25 TO 1000 HZ.

STEVENS CL NORTH AM AV STE7002B
VIBRATION RESPONSE OF APOLLO SHELL STRUCTURES TO ACOUSTIC AND
AERODYNAMIC NOISE
=IES PROC.1967,P.619-627 15FIG 1TABLE

1.XPER-RESULTS 2.MEASUREMENT,EFFECTS 3.INDUCED 4.NOMINAL
5.SINGLE 7.APOLLO,STRUCTURE-SHELL 8.ENVIRO-MEAS,ENVIRO-
EFFECTS 9.ACOUSTIC

DATA ARE BRIEFLY SUMMARIZED TO SHOW THE GENERAL CHARACTERIS-
TICS OF THE FLUCTUATING PRESSURE ENVIRONMENT FOR THE APOLLO
SPACECRAFT AND THE VIBRATION RESPONSE OF THE EXTERNAL SHELL
STRUCTURES WHEN EXCITED BY RANDOM FLUCTUATING PRESSURES IN A
FREELY EXPANDING ACOUSTIC FIELD(ENGINE NOISE AT LIFT-OFF),BY
AERODYNAMIC NOISE AT DIFFERENT MACH NUMBERS AND IN A REVERBER-
ANT ACOUSTIC FACILITY.

TEST ENGINEERING TES7002B
HOW NOISE FROM GIANT MB SHAKER IS ISOLATED AT BELL AEROSYSTEMS
=TEST ENG VOL.18,P.18-19 SEPT.1967 2FIG

1.INFORMATION 2.MITIGATION 3.INDUCED 4.NOMINAL 5.SINGLE
7.SHAKER,ISOLATOR,STRUCTURE 9.ACOUSTIC

INDUSTRIAL ACOUSTICS COMPANY SUPPLIED AN ENCLOSURE FOR A LARGE
VIBRATION UNIT ASSEMBLED FROM THEIR MODULAR NOISE-LOCK PANELS,
WHICH ARE 4 INCHES THICK WITH OUTER SURFACES OF 18-GAGE SHEET
STEEL AND INNER SURFACES OF 22-GAGE PERFORATED SHEET STEEL. AN
ACOUSTICAL/THERMAL INSULATING FILL IS USED IN THE PANELS TO
PROVIDE ABSORPTION. THESE ACOUSTICAL PANELS HAVE A NOISE
REDUCTION COEFFICIENT OF 0.95.

WOLFF SS JOHNS HOPKINS UNIV WOL7001B
ROBUST TWO-INPUT CORRELATORS
=ACoust.SOC.AM.JL. VOL.41,P.1212-1219 MAY 1967 25REF 6FIG
=4TABLES

1.THEORY 2.DATA 3.INDUCED 4.NOMINAL 5.SINGLE 7.MODEL 8.ENVIRO-
MEAS 9.ACOUSTIC

TWO-INPUT CORRELATORS FOR THE DETECTION OF A COMMON-MODE SIG-
NAL IN TWO DATA CHANNELS ARE ANALYZED IN THE ASYMPTOTIC CASE
OF A WEAK SIGNAL AND LONG INTEGRATION TIME FROM THE STAND-
POINT OF THE EFFECT ON THEIR PERFORMANCE OF UNKNOWN,AND POS-
SIBLY NON-GAUSSIAN,NOISE ENVIRONMENTS. THE OPTIMUM CORRELATOR
FOR A FIXED,KNOWN NOISE PROBABILITY DISTRIBUTION IS DERIVED.
A NATURAL PERFORMANCE CRITERION IS DEVELOPED THAT ALLOWS TWO
CORRELATORS TO BE COMPARED. USING THIS CRITERION,THE EXISTENCE
OF EPSILON-MAXIMIN ROBUST CORRELATORS FOR QUITE GENERAL
CLASSES OF NOISE STRUCTURES IS PROVED. THESE CORRELATORS HAVE
THE PROPERTY THAT,AS THE NOISE DISTRIBUTION IS VARIED,THEIR
DEPARTURE FROM OPTIMUM PERFORMANCE IS AS SMALL AS POSSIBLE.
THE MATHEMATICAL DEVELOPMENT IS APPLIED TO THE DERIVATION OF
SEVERAL MAXIMIN ROBUST MODIFICATIONS OF THE ORDINARY CORRELA-
TOR AND THE CLIPPER CORRELATOR,SUGGESTED BY THE THEORY OF RO-
BUST STATISTICAL TESTS.

GASEOUS ENVIRONMENTS

HEAD VP RCA

HEA7001F

CORRELATION OF METEOROID ENVIRONMENTS IN THE SOLAR SYSTEM
=AIAA JOURNAL VOL.5,P.1976-1984 NOV.1967 10REF 6FIG

1.STUDY 2.SOURCE 3.SPACE 4.NOMINAL 5.SINGLE 7.SPACECRAFT
8.ENVIRO-MEAS 9.METEOROIDS

METEOROID MASSES CANNOT BE INFERRED FROM THE OBSERVED DECELERATIONS OF METEORS IN THE EARTH'S ATMOSPHERE. MOREOVER, THE EFFECTS OF SOLAR ELECTROMAGNETIC RADIATION ON THE SMALLER METEOROIDS CANNOT BE RELATED TO THEIR MASS ALONE. THE NAME MASS CONCENTRATION AND SYMBOL C^* ARE PROPOSED FOR THE PERTINENT PROPERTY, ESSENTIALLY THE MASS PER UNIT PROJECTED AREA, G CM TO THE MINUS 2. THE RADIATION PRESSURE LIMIT MAY BE DESIGNATED AS $C^* = 10$ TO THE MINUS 4 WITHOUT REFERENCE TO METEOROID DENSITY, POROSITY, OR SIZE. THE NAME METEOROID PERFORATION CAPABILITY AND SYMBOL C ARE PROPOSED FOR A SIMILAR PROPERTY, DIRECTLY MEASURABLE IN SPACE EXPERIMENTS, REGARDLESS OF STATISTICAL VARIATIONS IN METEOROID DENSITY AND VELOCITY. METEOR OBSERVATIONS, SPACE EXPERIMENTS, AND HYPERVELOCITY IMPACT DATA ARE ANALYZED IN TERMS OF C^* AND C , AND A LOG-NORMAL FORM FOR THE MEAN CUMULATIVE FLUX OF METEOROIDS AT 1 A.U. IS DERIVED. THE INFLUENCES OF HELIOCENTRIC LONGITUDE AND OF UNKNOWN METEOROID STREAMS IN THE INTERPLANETARY ENVIRONMENT ARE TREATED STATISTICALLY FOR SPACE MISSIONS TO VENUS AND MARS.

WOHLERS HC DREXEL INST

WOH7001F

THE AIR POLLUTION EMISSION INVENTORY - PHILOSOPHY AND METHODOLOGY
=IES PROC.1967,P.613-618 17REF 1FIG 1TABLE

1.DESIGN 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE 8.ENVIRO-MEAS 9.CONTAMIN

AN EMISSION INVENTORY OF AIR POLLUTANTS INVESTIGATES ALL SOURCES, EVALUATES AIR POLLUTION CONTROL DEVICES AND PRESENTS THE WEIGHT OF SPECIFIC POLLUTANTS RELEASED IN AN AREA ON A TIME BASIS. GENERAL PROCEDURES AND CONSIDERATIONS FOR SUCH AN INVENTORY ARE DISCUSSED.

HYGRO-ENVIRONMENTS

RAND G SPERRY

RAN7001H

EVOLUTION OF UNDERWATER LISTENING SENSORS
=IES PROC.1967,P.463-471 9REF 12FIG 1TABLE

1.EVALUATION 2.INSTRUMENT 3.NATURAL 4.NOMINAL 5.SINGLE 7.SENSOR, HYDROPHONE, TRANSDUCER, COMPUTER 8.ENVIRO-MEAS 9.OCEAN

BRIEFLY TRACES THE HISTORY OF UNDERWATER SENSOR TECHNIQUES AND PRESENTS THE RESULTS OF A STUDY IN WHICH LARGE NUMBERS OF INDIVIDUAL SENSORS ARE COMBINED TO PROVIDE IMPROVED DIRECTIONAL RESPONSE. ALSO INCLUDED IS THE DESCRIPTION OF A PROGRAM UTILIZING A DIGITAL COMPUTER FOR THE RAPID COMPUTATION AND PLOTTING OF TWO AND THREE DIMENSIONAL SENSOR ARRAY PERFORMANCE CHARACTERISTICS.

SNAVELY BL NAVAL ORD LAB

SNA7001H

SPAR--A STABLE PLATFORM FOR ENVIRONMENTAL MEASUREMENTS
=IES PROC.1967,P.533-536 2FIG

1.DESIGN 2.MEASUREMENT 3.NATURAL 4.NOMINAL 5.SINGLE 7.SUB-
MARINE,SONAR,CABLES 8.ENVIRO-EFFECTS 9.OCEAN

SPAR(STABLE PLATFORM FOR ACOUSTIC RESEARCH)IS A CIGAR-SHAPED VESSEL 16 FT IN DIAMETER AND NEARLY 355 FT LONG. IT HAS NO PROPULSION MACHINERY AND MUST BE TOWED BETWEEN STATIONS. WHEN ON STATION FOR ACOUSTICAL MEASUREMENTS,ITS LONG AXIS IS VERTICAL WITH LESS THAN 55 FT ABOVE WATER AND WITH THE HYDROPHONES AT ITS LOWER END 300 FT BELOW THE SURFACE. THE MOST IMPORTANT PROBLEM FOR SPAR AT PRESENT IS DETERMINATION OF THE EXTENT TO WHICH THE OCEAN LIMITS THE ACCURACY OF BEARINGS OBTAINED WITH A SONAR SYSTEM.

INDUCED ENVIRONMENTS

ASAMOTO RR GENERAL ELEC

ASA7001I

TUNGSTEN-RHENIUM THERMOCOUPLES FOR USE AT HIGH TEMPERATURES
=REV.SCI.INSTR VOL.38,P.1047-1052 AUG.1967 24REF 5FIG
=2TABLES

1.EVALUATION 2.INSTRUMENT 3.INDUCED 4.NOMINAL 5.COMBINED
7.SENSOR-TEMP,METALS,REACTORS,CALIBR-EQUIP 8.ENVIRO-MEAS
9.UH-TEMP,NUCLEAR

TUNGSTEN-RHENIUM THERMOCOUPLE SYSTEMS WERE EVALUATED FOR USE IN MEASURING TEMPERATURES BETWEEN 1600 AND 3000 DEGREES C. TEMPERATURE-MILLIVOLT RELATIONSHIPS WERE EXTENDED FROM 2300 TO 3000 DEGREES FOR BARE-WIRE W3RE/W25RE AND W5RE/W26RE THERMOCOUPLES IN VACUUM. THE PERFORMANCE OF W26RE SHEATHED,HIGH-FIRED BERYLLIA-INSULATED THERMOCOUPLES WAS LIMITED ONLY BY THE MELTING POINT OF THE BERYLLIA INSULATION. THE THERMOELECTRIC OUTPUT OF HIGH-FIRED THORIA-INSULATED THERMOCOUPLES SHEATHED IN W26RE WAS DETERMINED AND FOUND TO BE RELIABLE UP TO AT LEAST 2850 DEGREES C WHEN CORRECTED FOR ELECTRICAL SHUNTING THROUGH THE INSULATION. STABILITY OF HIGH TEMPERATURE THERMOCOUPLES USING THORIA INSULATION WAS WITHIN A PLUS OR MINUS .3 MV(PLUS OR MINUS 40 DEGREES C)WHEN HELD AT 2425 DEGREES C FOR 148 H.

CYPHERS HD NASA GODDARD

CYP6001I

AUTOMATIC CALIBRATION AND ENVIRONMENTAL MEASUREMENT SYSTEM
FOR LAUNCH PHASE SIMULATOR
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,36TH,OCT.1966 PT.6,P.207-214 6REF 6FIG

1.DESIGN 2.INSTRUMENT 3.INDUCED 4.NOMINAL 5.SINGLE 7.CALIBR-
EQUIP 8.CALIBRATION 9.VIBR,RDM-VIBR,ACOUSTIC,STATIC

THE DATA COLLECTION FACILITY IS DESIGNED AROUND A 98-CHANNEL CONSTANT BANDWIDTH FREQUENCY MULTIPLEX RECORDING SYSTEM WHICH USES ACCELEROMETER AND BRIDGE-TYPE SIGNAL CONDITIONS AS INPUTS. SPECIFIC REQUIREMENTS ARE FREQUENCY RESPONSE 0 TO 10000 HZ,SIGNAL-TO-NOISE RATIO OF 45 DB,AND INTERCHANNEL PHASE CORRELATION OF 5 DEGREES FROM 0 TO 4000 HZ. A UNIQUE FEATURE OF THIS COMPLEX SYSTEM IS THE COMPLETE INTEGRATION OF THE MANY SPECIALIZED CALIBRATORS BY SEVERAL AUTOMATIC CALIBRATORS,A DIGITAL VOLTMETER,A SCANNER,AND A MASTER CONTROL PANEL. SEVERAL ALTERNATE METHODS OF CALIBRATION,INCLUDING SOME DESIGN CONSIDERATIONS FOR EQUIPMENT SETUP AND FLEXIBILITY ARE BRIEFLY DISCUSSED.

DAVIS S FAIRCHILD HILLER

DAV6002I

SPACECRAFT DESIGN FOR ATLAS TORSIONAL SHOCK TRANSIENT
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,36TH,OCT.1966 PT.7,P.63-71 3REF 7FIG

1.STUDY 2.EFFECTS 3.INDUCED 4.NOMINAL 5.SINGLE 7.AOSO,ATLAS-
AGENA 8.ENVIRO-EFFECTS 9.TORSIONAL-VIBR,SHOCK

AN ANALYSIS OF THE AOSO CONFIGURATION DESIGNED BY ALL OTHER
SIGNIFICANT DESIGN CRITERIA,EXCEPT TORSION SHOCK,INDICATED
THAT THE FUNDAMENTAL PRIMARY STRUCTURE TORSIONAL FREQUENCY
WOULD FALL WITHIN THE WORST PART OF THE CRITICAL FREQUENCY
BAND. BECAUSE IT WAS FEARED THAT MANY EXPERIMENTS WOULD NOT BE
ABLE TO SURVIVE THIS SEVERE DYNAMIC CONDITION WITHOUT MAJOR
REDESIGN,IT WAS DECIDED THAT THE STRUCTURAL DESIGN SHOULD BE
MODIFIED TO MINIMIZE THE EFFECTS OF THE TORSION SHOCK TRAN-
SIENT ON THE EXPERIMENTS.

GREENSPON JE JG ENG RES ASSOC

GRE7002I

FAR-FIELD SOUND RADIATION FROM RANDOMLY VIBRATING STRUCTURES
=ACOUST.SOC.AM.JL VOL.41,P.1201-1207 MAY 1967 14REF 2FIG

1.THEORY 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE 7.STRUC-
TURE 8.ENVIRO-MEAS 9.ACOUSTIC,RDM-VIBR

PRESENTS GENERAL RELATIONSHIPS FOR THE CROSS-SPECTRAL DENSITY
OF THE SOUND PRESSURE RADIATED FROM A RANDOMLY VIBRATING
STRUCTURE. SIMPLIFIED RELATIONSHIPS FOR THE MEAN-SQUARE FAR-
FIELD PRESSURE ARE GIVEN FOR THE CASE OF LOW DAMPING. A FREE-
FIELD GREENS FUNCTION IS INTRODUCED TO STUDY THE DIRECTIVITY
OF THE RADIATION FROM CYLINDRICAL STRUCTURES.

KAPLAN RB FAIRCHILD

KAP7001I

A SIMPLE METHOD FOR VARYING THE LATERAL NATURAL FREQUENCY OF
UNIFORM BEAMS
=JL.ENVIR.SCI VOL.10,P.17-21 OCT.1967 2REF 7FIG

1.STUDY 2.METHOD 3.INDUCED 4.NOMINAL 5.SINGLE 7.STRUCTURE,
LOAD 8.ENVIRO-CONTROL 9.VIBR,STATIC

APPLICATION OF AXIAL LOADS CHANGES THE FUNDAMENTAL NATURAL
FREQUENCY OF A BEAM. THE MAGNITUDE OF THE CHANGE IS LIMITED BY
BUCKLING AND ELASTIC LOADS CONSIDERATIONS,AND BY THE ABILITY
TO APPLY THE REQUIRED AXIAL LOADS. THIS METHOD CAN BE APPLIED
TO BEAMS WITH UNIFORMLY DISTRIBUTED LOADS,AND WITH DIFFERENT
BOUNDARY CONDITIONS. IT CAN ALSO BE APPLIED TO MORE COMPLICATED
CASES,BUT THE SOLUTIONS BECOME MORE DIFFICULT.

MONTGOMERY PW 3M CO

MON7001I

SOUND VELOCITY MEASUREMENTS AT HIGH PRESSURES
=REV.SCI.INSTR VOL.38,P.1073-1076 AUG.1967 9REF 5FIG

1.DESIGN 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.COMBINED 7.PIEZO-
ELECTRIC,TRANSDUCER,PULSE 8.ENVIRO-MEAS 9.UH-PRESS,ACOUSTIC

DESCRIBES A TECHNIQUE FOR THE MEASUREMENT OF SOUND VELOCITIES
TO PRESSURES OF 100 KBAR,UTILIZING ULTRASONIC PULSE TECHNIQUES
IN WHICH VARIATIONS IN TRANSIT TIME TOGETHER WITH INDEPENDENT
MEASUREMENTS OF SAMPLE LENGTH CHANGES ARE TAKEN INTO ACCOUNT.
THIS ARRANGEMENT PERMITS MEASUREMENTS TO BE MADE THROUGH AND
ABOVE TRANSFORMATIONS IN SAMPLES UNDER PRESSURE AND FREES THE
APPARATUS FROM STRINGENT PARALLELISM REQUIREMENTS APPLICABLE
TO OTHER INTERFEROMETRY TECHNIQUES. THE ACCURACY OF THE VELOC-
ITY MEASUREMENTS AT HIGH PRESSURE IS 1 PERCENT. RESULTS OB-
TAINED IN THIS SYSTEM ON GOLD ARE IN GOOD AGREEMENT WITH PRE-
DICTIONS BASED ON LOW PRESSURE SINGLE CRYSTAL MEASUREMENTS.

O'CONNOR CA BENDIX

OCO7001I

HIGH-ALTITUDE EXPLOSION-PROOF TESTING
=TEST ENG VOL.18,P.12-13 NOV.1967 1FIG 1TABLE

1.DESIGN 2.FACILITY 3.ATMOSPHERE,INDUCED 4.NOMINAL 5.COMBINED
6.MIL-E-5009A 7.CHAMBER,EXPLOSIVE,MOTOR,AIRCRAFT 8.ENVIRO-
MEAS 9.LO-PRESS,XPLOS-VAP

TURBOFAN AND TURBOJET ENGINE COMPONENTS WERE OPERATED FOR TWO HOURS IN AN ALTITUDE TEST CHAMBER AT SIMULATED ALTITUDES OF 65000 FT AND ABOVE CHARGED WITH A COMBUSTIBLE MIXTURE OF ACETYLENE AND AIR. A SMALL ALTITUDE TEST CHAMBER WAS MODIFIED AT RELATIVELY LOW COST. PROPANE WAS TRIED AS THE COMBUSTIBLE FUEL,BUT ACETYLENE WAS FOUND TO GIVE BETTER RESULTS.

NATURAL ENVIRONMENTS

KOWALEWSKI J GENERAL ELEC

KOW7001L

THE SYMBOL PH
=JL.ENVIR.SCI VOL.10,P.25-26 OCT.1967 2REF 1TABLE

1.INFORMATION 2.MEASUREMENT 3.NATURAL 4.NOMINAL 5.SINGLE
7.LIQUIDS 8.ENVIRO-MEAS 9.HUMIDITY,SALT,DUST,FUNGUS

THE PH FACTOR IS A MEASURE OF AN ACID OR BASE. IN THE ENVIRONMENTAL LABS IT MUST BE CONTROLLED IN HUMIDITY,FUNGUS,SALT SPRAY AND SAND AND DUST TESTS. THIS ARTICLE EXPLAINS WHAT PH MEANS,HOW IT IS DERIVED AND HOW IT IS MEASURED.

PERRY HA NAVAL ORD LAB

PER7001L

TRANSPARENT STRUCTURES IN THE DEEP SEA ENVIRONMENT
=IES PROC.1967,P.545-555 15REF 25FIG 4TABLES

1.EVALUATION 2.EFFECTS 3.NATURAL 4.NOMINAL 5.COMBINED
7.GLASS,PLASTIC 8.ENVIRO-EFFECTS 9.OCEAN,VH-PRESS,MARINE-LIFE,
STATIC,IMPACT-HARD

PLASTIC OVERLAYS HAVE BEEN FOUND EFFECTIVE IN REDUCING STRAINS IN GLASS STRUCTURES UNDER IMPACT LOADS AND UNDERWATER SHOCK WAVES. ALTHOUGH THEY ARE NOT NEEDED TO ANY APPRECIABLE EXTENT FOR THE CHEMICAL PROTECTION OF THE GLASS THEY MAY BE OF VALUE IN REDUCING THE AMOUNT OF FOULING THAT OCCURS. ALTHOUGH PLASTICS ARE NOT PARTICULARLY ABRASION RESISTANT THEY MAY BE OF SACRIFICIAL VALUE IN SUPPRESSING ABRASION OF PRIMARY GLASS STRUCTURE.

PRESSURE ENVIRONMENTS

HOOD CB CVI CORP

HOO7001M

LARGE HELIUM REFRIGERATORS FOR CRYOPUMPING
=IES PROC.1967,P.483-486 3REF 3FIG

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

THE HELIUM REFRIGERATION CYCLE TO PRODUCE TEMPERATURES IN THE RANGE OF 12 TO 25 DEGREES K IS DESCRIBED. DESIGN CONSIDERATIONS AND OPERATING CHARACTERISTICS ARE ALSO DISCUSSED.

JOHN JEA NASA GODDARD

JOH7001M

RECENT DEVELOPMENTS IN THE APPLICATION OF CRYOGENICS TO SPACE
SIMULATION
=IES PROC.1967,P.487-494 2REF 6FIG 3TABLES

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

DATA ARE PRESENTED TO SHOW THE PERFORMANCE OF A ONE WATT, LOW TEMPERATURE REFRIGERATOR IN A VACUUM SYSTEM OPERATING OVER THE RANGE 50 MICRONS TO 10 TO THE -8 TORR. THE USE OF CRYOPUMPING AND CRYOSORPTION TO EVACUATE A TEST VOLUME FROM 10 TO THE -8 TORR TO 10 TO THE -12 TORR IS REPORTED. THE COMBINATION OF THESE TECHNIQUES TO PRODUCE A PRACTICAL, ALL CRYOGENIC SYSTEM IS DISCUSSED.

NOISEUX DU BOLT BERANEK

NOI7001M

DESIGN OF A SONIC PRESSURE GAUGE
=REV.SCI.INSTR VOL.38,P.1229-1234 SEPT.1967 4REF 8FIG
=1TABLE

1.DESIGN 2.INSTRUMENT 3.SPACE 4.NOMINAL 5.SINGLE 7.PRESSURE-
SENSOR,GAGE 8.ENVIRO-MEAS 9.VL-PRESS,HI-VAC

THIS GAGE IS CAPABLE OF MEASURING GAS PRESSURES IN THE RANGE FROM ATMOSPHERIC PRESSURE TO 10 TO THE MINUS 4 MM HG. THE PRINCIPLES OF ACOUSTIC TRANSMISSION IN THE CLASSICAL AND GEOMETRICAL RELAXATION REGIMES OF GAS DYNAMICS ARE REVIEWED FOR THE CASE OF A CONFINED VOLUME OF GAS. THE GEOMETRICAL CONDITIONS FOR THE FEASIBILITY OF A SONIC PRESSURE GAGE FOLLOWING A LINEAR LAW ARE OBTAINED. PRACTICAL LIMITATIONS IN THE SOUND SOURCE USED GIVE RISE TO A CHANGE IN THE SENSITIVITY OF THE GAGE IN THE TRANSITION FROM CLASSICAL TO GEOMETRICAL RELAXATION REGIME. TRANSDUCER AND ELECTRONIC DESIGN AND A CALIBRATION CURVE OF THE GAGE ARE GIVEN. THE EXPERIMENTAL RESULTS ARE IN GENERAL AGREEMENT WITH THE ANALYSIS.

WATSON RW BUR OF MINES

WAT7001M

GAUGE FOR DETERMINING SHOCK PRESSURES
=REV.SCI.INSTR VOL.38,P.978-980 JULY 1967 10REF 3FIG

1.EVALUATION 2.INSTRUMENT 3.INDUCED 4.NOMINAL 5.SINGLE
7.PRESSURE-SENSOR,CALIBR-EQUIP 8.ENVIRO-MEAS 9.SHOCK-PRESS

THIS NOTE DESCRIBES A SIMPLE, INEXPENSIVE GAGE CAPABLE OF DETERMINING THE PRESSURES ASSOCIATED WITH BLAST, SHOCK, AND DETONATION WAVES IN THE KILOBAR RANGE. IT CANNOT BE USED DIRECTLY TO DETERMINE THE DETONATION PRESSURES IN THE MORE POWERFUL MILITARY EXPLOSIVES. HOWEVER, IT CAN BE USED TO RANK EXPLOSIVES IN TERMS OF DETONATION PRESSURE IF A THIN BRASS BUFFER IS INSERTED BETWEEN IT AND THE DETONATING EXPLOSIVE.

RADIATION ENVIRONMENTS

KINCAID WK LOCKHEED

KIN7001N

SIMULATION OF THE IN-SPACE VISUAL ENVIRONMENT
=IES PROC.1967,P.261-269 20REF 5FIG 2TABLES

1.STUDY 2.EFFECTS,SIMULATION 3.SPACE,PLANETARY 4.NOMINAL
5.SINGLE 7.HUMAN,OPTICS,RADIATION-SOURCE 8.ENVIRO-MEAS
9.SOLAR,ALBEDO

IDENTIFIES THE PHOTOMETRIC AND GEOMETRIC REQUIREMENTS FOR EARTH-BASED SIMULATION OF THE IN-SPACE VISUAL ENVIRONMENT NECESSARY TO CONDUCT FURTHER STUDY,AND INDICATES FROM A STATE-OF-THE-ART SURVEY THAT A DIFFICULT HARDWARE DESIGN PROBLEM EXISTS. IT IS POSSIBLE TO OBTAIN THE REQUIRED FIDELITY IN A SOLAR ILLUMINATION SIMULATION SYSTEM BY THE JUDICIOUS USE OF EXISTING HARDWARE CAPABILITIES AND APPLICATION OF DESIGN TRADE-OFF CONSIDERATIONS. SOME ASPECTS OF THE DESIGN PROBLEM WHICH ARE IDENTIFIED DO NOT LEND THEMSELVES TO THE APPLICATION OF EXISTING TECHNIQUES AND SHOULD BE INVESTIGATED AS SEPARATE ENGINEERING STUDIES.

LANDAU A SRSC-IES

LAN7001N

A SUMMARY REPORT ON THE TECHNICAL CONFERENCE ON HIGH-POWERED RADIATION SOURCES,SEPTEMBER 1966,SPONSORED BY THE WEST COAST SECTION,SRSC-IES
=IES PROC.1967,P.541-544 2 TABLES

1.INFORMATION 2.FACILITY 3.SPACE 4.NOMINAL 5.SINGLE 7.RADIATION-SOURCE 8.ENVIRO-MEAS 9.SOLAR,REENTRY

THE MEETING PROVIDED A WORKSHOP STYLE PROGRAM AS A FORUM FOR THE EXCHANGE OF TECHNICAL INFORMATION AMONG BOTH THE MAKERS AND USERS OF HIGH POWERED(ABOVE 10 KW)RADIATION SOURCES FOR SOLAR SIMULATION,REENTRY SIMULATION,HIGH INTENSITY ILLUMINATION,AND OTHER APPLICATIONS. TABLE I LISTS THE USERS WITH THE TYPES USED AND CHARACTERISTICS DESIRED BY EACH. TABLE II LISTS THE MAKERS PANEL WITH THE PRESENT STATUS AND FUTURE DEVELOPMENT OF EACH TYPE OF SOURCE REPRESENTED.

LILLYWHITE M ELECTRO-MECHANICAL RES

LIL7001N

EVALUATION OF SEVERAL INTENSE LIGHT SOURCES USED FOR ACTINISM STUDIES
=IES PROC.1967,P.557-564 4REF 1FIG 5TABLES

1.EVALUATION 2.FACILITY,EFFECTS 3.SPACE 4.NOMINAL 5.SINGLE
7.RADIATION-SOURCE,PAINT,OPTICAL-INSTR 8.ENVIRO-EFFECTS
9.SOLAR

NINE SOURCES ARE DISCUSSED--XE, FILTERED XE, HGXE, KR, AR, H-XE, 2.5 KW COMPACT SHORT ARC LAMPS, A MEDIUM PRESSURE 500 WATT HG VAPOR LAMP, A CARBON ARC, AND AN AR FILLED EXPERIMENTAL VORTEX ARC LAMP. THE COATINGS USED ARE COMMERCIALY AVAILABLE WHITE PAINTS COMMONLY USED ON SATELLITES. THE SPECIAL IRRADIANCE CHARACTERISTICS OF THE SOURCES ARE GIVEN IN TERMS OF DEGREE OF SOLAR SPECTRAL MISMATCH, EFFECTIVE ABSORPTANCE VALUES OF EACH COATING, AND THE RATE AND MAGNITUDE OF THE DEGRADATION OBSERVED. THE RESULTS OF SHORT TERM (LESS THAN 200 HRS) TESTING, IRRADIATED WITH DIFFERENT SOURCES, SHOW THAT FOR SOME COATINGS LARGE ERRORS MAY RESULT FROM THE USE OF SOLAR SPECTRAL MISMATCH AND FOR OTHERS THE RATE OF DEGRADATION IS DIFFERENT BUT THE ULTIMATE ABSORPTANCE VALUE ACHIEVED THROUGH DEGRADATION MAY NOT BE SIGNIFICANTLY AFFECTED. THE ACTUAL ABSORPTANCE VALUE IS OBTAINED USING AN OPTICAL IN-SITU MEASUREMENT AND THE EFFECTIVE ABSORPTANCE VALUES ARE COMPUTED USING THE RELATIVE SPECTRAL REFLECTANCE OF THE COATING AND SPECTRAL IRRADIANCE OF THE SOURCE.

MCCULLOUGH BA ARO INC

MCC7002N

AN INTENSITY AND UNIFORMITY MONITOR FOR SOLAR SIMULATORS
=JL SPACECRAFT AND ROCKETS VOL.4,P.1114-1116 AUG.1967 2REF
=7FIG

1.EVALUATION 2.INSTRUMENT 3.SPACE 4.NOMINAL 5.SINGLE 7.MONI-
TOR,SENSOR-TEMP,SENSOR-RADIATION 8.ENVIRO-MEAS 9.SOLAR

THE MONITOR DESCRIBED MINIMIZES THE POTENTIAL SOURCES OF ER-
ROR, DOES NOT REQUIRE A COOLANT AND WILL MONITOR A LARGE AREA.
ITS OPERATION IS BASED ON THE PRINCIPLE OF THE TRUNCATED INTE-
GRATING SPHERE IN THAT THE DETECTOR IS IRRADIATED BY MULTIPLE
REFLECTIONS FROM THE SPHERE WALL. A DISCUSSION IS GIVEN ON HOW
TO MODIFY THE INTEGRATING SPHERE THEORY TO ALLOW FOR THE LARGE
APERTURE. THE EFFECTS OF VARIABLE APERTURE, SPHERE SIZE, AND
WALL-TEMPERATURE VARIATIONS ARE ALSO DESCRIBED.

POLAK LF AEROSPACE CONTROLS

POL7001N

DESIGNING A COLLECTOR TO OBTAIN MAXIMUM UNIFORMITY
=IES PROC.1967,P.457-462 2FIG 2TABLES

1.DESIGN 2.FACILITY 3.SPACE 4.NOMINAL 5.SINGLE 7.RADIATION-
SOURCE 8.ENVIRO-MEAS 9.SOLAR

CONCERNED WITH A TECHNIQUE FOR PROVIDING A NEAR UNIFORM FIELD
USING A SINGLE OPTICAL ELEMENT IN A SOLAR SIMULATOR. THE PRIN-
CIPLE USED TO OBTAIN UNIFORMITY IS THAT OF SELECTIVELY DIS-
TRIBUTING IMAGES OF THE SOURCE FROM EACH ELEMENTAL SURFACE
AREA OF THE COLLECTOR ONTO A TARGET PLANE AT THE REQUIRED PRO-
JECTED DISTANCE.

MECHANICAL SHOCK ENVIRONMENTS

BROWN CR WESTINGHOUSE

BR060060

MISSILE HANDLING ANALYSIS
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,36TH,OCT.1966 PT.7,P.145-151 3REF 13FIG

1.STUDY 2.MITIGATION 3.INDUCED 4.NOMINAL 5.SINGLE 7.HANDLING-
EQUIP,POLARIS,POSEIDON,SUBMARINE 8.ENVIRO-MEAS 9.TRANSPORT

THE HANDLING OF POLARIS MISSILES FROM SUBMARINE TENDERS TO
SUBMARINES HAS BEEN STUDIED BY ANALYSES AND FULL-SCALE TESTS.
RESULTS ARE GIVEN OF A RIGID BODY SHOCK ANALYSIS AND OF LOAD-
ING TESTS AT A SELECTED HARBOR AND AT THE SAN FRANCISCO BAY
NAVAL SHIPYARD. WITH SHOCK ABSORBERS, THE SYSTEM OPERATES
SAFELY UP TO ABOUT 4.0 FPS. AN ALTERNATE SYSTEM, CALLED YO-YO,
WHICH AUTOMATICALLY CONTROLS THE POSITION OF THE LOADING FIX-
TURE RELATIVE TO THE SUBMARINE DECK, IS ALSO DISCUSSED. IT IS
CONCLUDED THAT THE SHOCK LOADING PROBLEM CAN BE ELIMINATED BY
USING EITHER SHOCK ABSORBERS OR A CONSTANT RELATIONSHIP CRANE
SYSTEM. A SHOCK ABSORBER SYSTEM HAS BEEN SELECTED FOR POSEIDON
HANDLING SYSTEM.

MURFIN WB SANDIA CORP

MUR60020

AUTOMATED DIGITAL SHOCK DATA REDUCTION SYSTEM
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,36TH,OCT.1966 PT.6,P.21-36 2REF 16FIG

1.EVALUATION 2.DATA 3.INDUCED 4.NOMINAL 5.SINGLE 7.DATA-
SYSTEM 8.ENVIRO-EFFECTS 9.SHOCK

A METHOD OF AUTOMATICALLY DIGITIZING,EDITING,FILTERING,REDUC-
ING,COMPARING,DISPLAYING,AND STORING SHOCK DATA IS DESCRIBED.
THE DESIRED FINAL DISPLAY OF THE SHOCK DATA IS GRAPHICAL AND
CAN BE GIVEN IN TWO FORMS--THE ACCELERATION-TIME HISTORY AND
THE SHOCK SPECTRUM. SUBSIDIARY OPERATIONS INCLUDE AUTOMATIC
EDITING OF DATA TO ELIMINATE SPURIOUS OR UNWANTED POINTS,FIL-
TERING TO REMOVE UNDESIRE HIGH-FREQUENCY COMPONENTS,OR COM-
PUTATION OF FOURIER SPECTRA. CERTAIN TYPES OF PULSES WHICH
DO NOT LEND THEMSELVES TO THE SHOCK SPECTRUM TREATMENT ARE
DESCRIBED,AND EXAMPLES ARE GIVEN SHOWING THE FLOW AND PRESEN-
TATION OF DATA FROM ROUGH FIRST LOOK RECORDS THROUGH FINAL RE-
DUCTION. THE MATHEMATICAL METHODS FOR COMPUTING SHOCK AND
FOURIER SPECTRA AND FOR FILTERING ARE DESCRIBED IN SUFFICIENT
DETAIL TO PERMIT ADAPTATION TO OTHER DATA SYSTEMS.

PENDERED JW UNIV COLLEGE LONDON

PEN70010

A STATISTICAL APPROACH TO PACKAGE DESIGN
=ENVIR.ENG. NO.27,P.11-17 JULY 1967 8FIG

1.THEORY 2.PROTECTION,ENGR-PRACTICE 3.INDUCED 4.NOMINAL
5.SINGLE 7.PACKAGING 8.ENVIRO-MEAS 9.TRANSPORT

MAXIMUM DROP HEIGHT,CUSHION PERFORMANCE AND FRAGILITY ARE EX-
AMINED ON A STATISTICAL BASIS,AND THE METHOD OF PREDICTING THE
DAMAGE RATE FROM THE STATISTICAL DESCRIPTIONS OF THESE PARAM-
ETERS IS DEVELOPED.

WHEELER EE PATRA

WHE70010

INSTRUMENTATION FOR A DROP TEST FACILITY
=ENVIR.ENG NO.27,P.17-20 JULY 1967 7REF 15FIG 2TABLES

1.DESIGN 2.INSTRUMENT 3.INDUCED 4.NOMINAL 5.SINGLE 7.CALIBR-
EQUIP,ACCELEROMETER,SHOCK-TESTERS 8.CALIBRATION 9.IMPACT-HARD

THE CALIBRATION METHODS USED AT THE PRINTING,PACKAGING AND
ALLIED TRADES RESEARCH ASSOCIATION FOR CUSHION TESTING ARE
DESCRIBED. THE NORMAL SYSTEM COMPRISES THE ACCELEROMETER,
CATHODE FOLLOWER AND PEAK-READING METER. THE PHILOSOPHY HAS
BEEN TO USE SEVERAL METHODS OF CALIBRATING COVERING AS MUCH
OF THE SYSTEM AS POSSIBLE AT ACCELERATION LEVELS THAT OCCUR
IN PRACTICE.

SPACE ENVIRONMENTS

SANDSTROM JD JPL

SAN7002P

PHOTOVOLTAIC SUPPORTING DEVELOPMENT
=TEST ENG VOL.18,P.32-35 AUG.1967 8FIG

1.INFORMATION 2.FACILITY 3.SPACE 4.NOMINAL 5.SINGLE,COMBINED
7.SOLAR-CELL,RADIATION-SOURCE 8.ENVIRO-EFFECTS 9.SOLAR,HI-VAC

BRIEFLY DESCRIBES THE FACILITIES AVAILABLE AT THE PHOTOVOLTAIC
LABORATORY AT JET PROPULSION LABORATORY WHICH ENABLES PERFORM-
ING TESTS ON AN INDIVIDUAL CELL OR MATRICES OF CELLS AT TEST
CONDITIONS THAT SIMULATE THE ACTUAL TEMPERATURES,SOLAR INTEN-
SITIES,AND SPACE ENVIRONMENT TO WHICH THE PANEL WILL BE EX-
POSED.

SMITH DA DOUGLAS AIRCRAFT
DESCRIPTION OF ORBITAL HEAT TRANSFER MECHANISM BASED ON
S-IVB-203 FLIGHT DATA EVALUATION
=IES PROC.1967,P.513-524 15REF 20FIG

SMI7001P

1.STUDY 2.EFFECTS 3.SPACE 4.NOMINAL 5.COMBINED 7.CRYO-LIQUID,
SATURN 8.ENVIRO-EFFECTS 9.SUB-GRAVITAL,LO-TEMP,HI-TEMP

THE DATA AVAILABLE ARE SUFFICIENT TO SUBSTANTIATE THE CONCLUSION THAT IS DERIVED--THE OVERALL HEAT TRANSFER COEFFICIENT IN A REDUCED GRAVITY FIELD IS A VARIABLE AND IT HAS A DECREASING TENDENCY WITH TIME FOR QUIESCENT STAGNANT FLUID SYSTEM AT THE LOWER REGIONS OF NUCLEATE BOILING.

HIGH TEMPERATURE AND UNSPECIFIED TEMPERATURE

GRIFF N NAVAL APPL SCI LAB
IMAGE FURNACE FOR LOW YIELD NUCLEAR WEAPONS EFFECTS SIMULATION
=REV.SCI.INSTR VOL.38,P.1217-1220 SEPT.1967 7REF 6FIG

GRI7002R

1.EVALUATION 2.FACILITY 3.INDUCED 4.NOMINAL 5.SINGLE 7.ARC-LAMP,OPTICAL-INSTR,WEAPONS 8.ENVIRO-MEAS 9.BLAST-TEMP

THE SYSTEM,WHICH CONSISTS OF A HIGH PERFORMANCE SERVO-DRIVEN SHUTTER IN A CARBON ARC IMAGING FURNACE,CAN SIMULATE THERMAL RADIATION PULSES FROM ATMOSPHERIC DETONATIONS WITH YIELDS OF FROM 10 KT TO THE LARGEST DEVICES. IT CAN DELIVER A MAXIMUM IRRADIANCE OF 190 J CM TO THE MINUS 2 SEC TO THE MINUS 1 OVER AN EFFECTIVE SPOT DIAMETER OF APPROXIMATELY 17 MM USING A SINGLE ELLIPSOIDAL MIRROR. WITH THE ADDITION OF A SECOND MIRROR,A MAXIMUM IRRADIANCE OF OVER 850 J CM TO THE MINUS 2 SEC TO THE MINUS 1 CAN BE OBTAINED WITH AN EFFECTIVE SPOT DIAMETER OF ABOUT 4 MM. ARBITRARY PULSE SHAPES CAN ALSO BE DELIVERED. PROVISION IS MADE TO RECORD IRRADIANCE HISTORIES AND SOURCE CHARACTERISTICS DURING EACH EXPOSURE WITHOUT APPRECIABLY INTERFERING WITH SAMPLE IRRADIATION.

RANDOM VIBRATION AND UNSPECIFIED VIBRATION

HAMMOND TH HUGHES AIRCRAFT
A THRESHOLD DETECTING G LIMITER
=IES PROC.1967,P.503-504 3FIG

HAM7001T

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

THE DEVICE DESCRIBED GIVES POSITIVE PROTECTION OF EXPENSIVE AND OFTEN INVALUABLE TEST ITEMS. IT PROVIDES A RAPID SHUT DOWN OF VIBRATION TEST EQUIPMENT WHEN A PRESET G LIMIT IS REACHED ON ANY OF THREE ACCELEROMETERS.

KATZ L VIBR INSTR CO

KAT7001T

APPLICATION OF A CORRELATION TYPE TRACKING FILTER TO THE
DETECTION AND ANALYSIS OF VIBRATION SIGNALS
=IES PROC.1967,P.565-570 1REF 4FIG

1.EVALUATION 2.INSTRUMENT 3.INDUCED 4.NOMINAL 5.SINGLE
7.FILTER,SPECTRUM-ANALYZER 8.ENVIRO-MEAS 9.RDM-VIBR

CONTAINS A BRIEF MATHEMATICAL ANALYSIS OF THE TRACKING FILTER
AND ITS THEORETICAL PERFORMANCE FOLLOWED BY SEVERAL APPLICA-
TIONS TO THE TRACKING AND MEASUREMENT OF CHANGING PERIODIC
SIGNALS ENCOUNTERED IN VIBRATION ANALYSIS. EQUATIONS ARE GIVEN
WHICH PERMIT THE ENGINEER TO APPLY THE CORRELATION TYPE TRACK-
ING FILTER TO A NUMBER OF COMMON PROBLEMS.

OVERTON JA UNIV OF BIRMINGHAM

OVE7001T

SOME USES OF ELECTRO-HYDRAULIC VIBRATORS IN THE DEVELOPMENT
OF ROAD VEHICLES
=ENVIR.ENG NO.28,P.21-25 SEPT.1967 4REF 15FIG

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

THE PERFORMANCE CHARACTERISTICS OF ELECTRO-HYDRAULIC VIBRATORS
ARE DISCUSSED TOGETHER WITH THE FACTORS WHICH AFFECT THEIR
PERFORMANCE. MEASURED FREQUENCY RESPONSE DATA ARE GIVEN BOTH
FOR SINUSOIDAL AND RANDOM EXCITATION. FINALLY THE RESULTS OF
SOME EXPERIMENTAL STUDIES USING A FOUR RAM INSTALLATION AND A
COMPLETE VEHICLE SYSTEM ARE GIVEN.

TRUBERT M JPL

TRU7001T

STRUCTURAL AND ELECTROMECHANICAL INTERACTION IN THE MULTIPLE-
EXCITER TECHNIQUE FOR RANDOM VIBRATION TESTING
=ACOUST.SOC.AM.JL VOL.41,P.1185-1192 MAY 1967 6REF 18FIG

1.THEORY 2.SIMULATION 3.INDUCED 4.NOMINAL 5.SINGLE 7.SHAKER,
STRUCTURE 8.ENVIRO-CONTROL 9.RDM-VIBR

A MATHEMATICAL ANALYSIS WHICH INCLUDED THE MECHANICAL AND
ELECTRICAL PROPERTIES OF THE EXCITERS AND LEADS TO A SYSTEM OF
DIFFERENTIAL EQUATIONS REPRESENTING A MULTIPLE INPUT/OUTPUT
INTERACTING ELECTROMECHANICAL SYSTEM.

TUSTIN W TUSTIN INST OF TECH

TUS7007T

VIBRATION AND SHOCK TESTS DO NOT DUPLICATE SERVICE ENVIRONMENT
=TEST ENG VOL.18,P.18+ AUG.1967 2REF 2FIG

1.PHILOSOPHY 2.ENGR-PRACTICE 3.INDUCED 4.NOMINAL 5.SINGLE
6.MIL-STD-810A 7.SHAKER 8.ENVIRO-CONTROL 9.VIBR,RDM-VIBR

IN STRIVING TO SWEEP FREQUENCY AND MAINTAIN MOTION ACCORDING
TO A PATTERN IN SINUSOIDAL VIBRATION TESTING AND TO EQUALIZE
IN RANDOM VIBRATION TESTING,WE WANT THE RESULTS OF THE TEST TO
BE THE SAME AS THE RESULTS OF SERVICE. ALSO,WE WANT SIMILAR
RESULTS TO BE OBTAINED BY DIFFERENT TESTING LABORATORIES.

YU P AD-YU ELECTRONICS

YU 7001T

A CONTINUOUS SWEEP TIME DELAY
=JL.ENVIR.SCI VOL.10,P.27-30 OCT.1967 8REF 12FIG

1.STUDY 2.INSTRUMENT 3.INDUCED 4.NOMINAL 5.SINGLE 7.WAVE-
ANALYZER,ELECTR-CIRCUIT,TEST-EQUIP 8.ENVIRO-MEAS 9.RDM-VIBR

DESCRIBES THE OPERATING PRINCIPLES AND APPLICATIONS FOR AN
INSTRUMENT FOR PERFORMING ACCURATE CORRELATION OF RANDOM
SIGNALS,PARTICULARLY WITH ACCURATE CONTINUOUSLY VARIABLE
TIME DELAY.

SINUSOIDAL VIBRATION

COLLOPY FH ITEK CORP

COL6001U

DAMPED VIBRATIONS OF ELASTICALLY SUPPORTED RIGID BODY WITH
COUPLING BETWEEN TRANSLATION AND ROTATION
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,36TH OCT.1966 PT.7,P.135-144 4REF 15FIG

1.THEORY 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE 7.OPTICAL-
INSTR 8.ENVIRO-MEAS 9.DAMPING

THE CURVES PRESENTED ILLUSTRATE THE INTERDEPENDENCE OF THE
FOLLOWING PARAMETRIC QUANTITIES--MASS,MASS MOMENT OF INERTIA,
TRANSLATIONAL AND ROTATIONAL SPRING RATES AND DAMPING CON-
STANTS,AND THE DISTANCE BETWEEN THE CENTER OF GRAVITY OF THE
SYSTEM AND THE EXCITATION. THE CURVES ARE NOT DRAWN FOR ALL
POSSIBLE COMBINATIONS OF THE PARAMETERS,BUT ARE READILY OB-
TAINABLE FROM THE EQUATIONS PRESENTED.

HOOPER WE BOEING

H006001U

SELF-ADAPTIVE VIBRATION BALANCING DEVICE FOR HELICOPTERS
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,36TH,OCT.1966 PT.7,P.113-127 5REF 17FIG

1.EVALUATION 2.MITIGATION 3.INDUCED 4.NOMINAL 5.SINGLE 7.AIR-
CRAFT,INERTIAL-DEVICE 8.ENVIRO-EFFECTS 9.VIBR

THE DEVICE BALANCES OUT THE EXCITING FORCES AT THE POINT AT
WHICH IT IS SITUATED AND KEEPS THAT POINT NODAL IN THE PRES-
ENCE OF VIBRATION EMANATING FROM ANY OTHER POINT. IT IS SELF-
ADAPTIVE TO CHANGES IN EXCITATION FROM ZERO TO MAXIMUM AND HAS
A VERY RAPID RESPONSE TIME. THE DEVICE TAKES ITS DRIVE FROM
THE ROTATING SYSTEM AND IS AS LIGHT AS AN INERTIAL BALANCING
SYSTEM CAN BE. IT REQUIRES NO EXTERNAL POWER SUPPLIES IN THE
FORM OF HYDRAULICS OR ELECTRICS,AND ONCE INSTALLED WOULD BE
SEALED FOR LIFE.

OHARA GJ NAVAL RES LAB

OHA7001U

MECHANICAL IMPEDANCE AND MOBILITY CONCEPTS
=ACOUST.SOC.AM.JL VOL.41,P.1180-1184 MAY 1967 3REF 2TABLES

1.THEORY 2.MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE 7.STRUC-
TURE-LINEAR 8.ENVIRO-MEAS 9.IMPEDANCE,MOBILITY

THE EQUATIONS USED IN THE FORMULATION OF THE FUNDAMENTAL CON-
CEPTS OF IMPEDANCE AND MOBILITY ARE EXAMINED FOR MEANING AND
CONTENT. IT IS DEMONSTRATED FOR ANY PRESCRIBED STRUCTURE THAT
EVERY POSSIBLE OBSERVED MOBILITY ELEMENT IS INDEPENDENT OF THE
NUMBER AND LOCATION OF THE OTHER MEASUREMENT POINTS,AND EVERY
POSSIBLE OBSERVED MECHANICAL IMPEDANCE ELEMENT IS NOT. THE
EFFECTS UPON THE MOBILITY AND IMPEDANCE ARRAYS ARE DISCUSSED
FOR SIMPLE EXPANSIONS AND CONTRACTIONS OF THE TENSOR. NUMERI-
CAL EXAMPLES ARE USED TO ILLUSTRATE SOME OF THESE POINTS.

RUBIN S AEROSPACE CORP

RUB7001U

MECHANICAL IMMITTANCE- AND TRANSMISSION-MATRIX CONCEPTS
=ACOUST.SOC.AM.JL VOL.41,P.1171-1179 MAY 1967 7REF 6FIG
=1TABLE

1.THEORY 2. MEASUREMENT 3.INDUCED 4.NOMINAL 5.SINGLE 7.STRUC-
TURE-LINEAR,ISOLATOR 8.ENVIRO-MEAS 9.IMPEDANCE,MOBILITY

THE CONCEPT OF IMMITTANCE (IMPEDANCE OR ADMITTANCE) AND TRANS-
MISSION MATRICES FOR APPLICATION TO THE VIBRATION OF MECHANICAL
SYSTEMS IS REVIEWED. THE PROPERTIES AND INTERRELATION-
SHIPS OF THE FORMULATIONS ARE PRESENTED. THE EXPERIMENTAL
MEASUREMENT OF THE ELEMENTS OF THE MATRICES IS EXPLORED FROM
A CONCEPTUAL STANDPOINT. INCLUDED IS A DISCUSSION OF THE
CORRECTION OF THE DATA TAKEN UNDER OTHER THAN IDEAL CONDI-
TIONS OF CONSTRAINT. SOME GENERAL APPLICATIONS OF THE MATRICES
ARE ILLUSTRATED.

SCHULZ MW GENERAL ELEC

SCH6005U

DETECTION OF LOOSE PARTS AND FREE OBJECTS IN SEALED CON-
TAINERS
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,36TH,OCT.1966 PT.6,P.73-81 7FIG

1.EVALUATION 2.METHOD 3.INDUCED 4.NOMINAL 5.SINGLE
7.ELECTRONIC 8.NONDESTRUC-TEST 9.LF-VIBR

DESCRIBES THE USE OF THE MECHANICAL SIGNATURE OBTAINED DURING
A VIBRATION TEST TO DETECT THE PRESENCE OF LOOSE PARTS OR FREE
OBJECTS WITHOUT BREAKING THE SEAL OF THE ELECTRONIC PACKAGE.
IN TESTS OF PACKAGES WEIGHING ABOUT 15 LB AND OF THE ORDER OF
20 INCH MAXIMUM DIMENSION,IT HAS BEEN POSSIBLE TO DETECT LOOSE
PARTICLES WEIGHING ONLY 2 MG AND LOOSE SCREWS ONLY 1/2 TURN
FROM COMPLETELY TIGHT.

TATGE RB GENERAL ELEC

TAT7001U

FAILURE DETECTION BY MECHANICAL IMPEDANCE TECHNIQUES
=ACOUST.SOC.AM.JL VOL.41,P.1196-1200 MAY 1967 5REF 5FIG

1.EVALUATION 2.METHOD 3.INDUCED 4.NOMINAL 5.SINGLE 7.SHAKER,
FILTER,STRUCTURE,RELIABILITY 8.ENVIRO-EFFECTS 9.IMPEDANCE

FROM REFERENCE TO NETWORK THEORY,IT CAN BE SHOWN THAT CHANGES
IN THE RESONANT AND ANTIRESONANT FREQUENCIES ARE SENSITIVE IN-
DICATORS OF CHANGE IN A STRUCTURE AND THESE HAVE THE ADVANTAGE
OF BEING RELATIVELY EASY TO MEASURE WITH ACCURACY. THE LENGTH
OF TIME THAT THE STRUCTURE MUST BE EXCITED IN ORDER TO MAKE
THE NECESSARY MEASUREMENTS FOR SUCH A TEST CAN BE MINIMIZED BY
USING RANDOM-NOISE RATHER THAN SWEPT-SINE EXCITATION. WITH
PROPER INSTRUMENTATION,THE RESULTS OBTAINED WITH THE TWO ARE
EQUIVALENT.

TUSTIN W TUSTIN INST OF TECH
A SHAKER SYSTEM IS ONLY THE BEGINNING
=TEST ENG VOL.18,P.14-15 NOV.1967 1FIG

TUS7008U

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

SUGGESTS THE PROCEDURES A VIBRATION ENGINEER WOULD USE TO MAKE
RECOMMENDATIONS TO HIS MANAGEMENT FOR A VIBRATION TEST SYSTEM.
INCLUDES A LIST OF 23 ACCESSORIES TO BE CONSIDERED TO MAKE
SURE THE SYSTEM IS COMPLETE.

RELIABILITY

ROBERTS WH MARTIN CO
STRUCTURAL RELIABILITY--PANEL SESSION
=US DIRECTOR OF DEFENSE SHOCK,VIBRATION AND ASSOCIATED ENVI-
=RONMENTS,SYMPOSIUM,36TH,OCT.1966 PT.7,P.27-40 2FIG

ROB6004Y

1.PHILOSOPHY 2.ENGR-PRACTICE 3.GENERAL, 7.RELIABILITY,
STRUCTURE

A NEW APPROACH TO STRUCTURAL SAFETY PERMITS ONE TO DEAL WITH
MARGINS APPROPRIATE TO THE PROBABILITIES CONTAINED IN LOAD AND
STRENGTH. THE DIFFERENCE BETWEEN LOAD AND STRENGTH IS USED AS
WELL AS THE VARIANCE. A STUMBLING BLOCK IN THIS NEW CONCEPT IS
THE POSITION OCCUPIED BY DESIGN ERROR RELATIVE TO THE RELIA-
BILITY STATEMENT. SEVERAL GOOD POINTS WERE MADE. FIRST, IF A
RELIABILITY STATEMENT IS MADE IGNORING ERROR, IT IS NECESSARY
TO ADD OTHER INFORMATION TO INCLUDE THE EFFECT OF ERROR.
SECOND, IGNORANCE AND ERROR IN ENGINEERING MUST NOT PREVENT OUR
PUTTING A NUMBER ON RELIABILITY WHICH ASSUMES ERROR-FREE DE-
SIGN AND MANUFACTURE.

ENGINEERING PRACTICES

ESPENSCHADE PW IES
TECHNICAL EDUCATION, PROFESSIONAL DEVELOPMENT
=JL.ENVIR.SCI VOL.10,P.12-14 AUG.1967 3REF

ESP7002Z

1.PHILOSOPHY 2.ENGR-PRACTICE 7.ENGINEER, TRAINING

OUTLINES THE CRITICAL TASKS IN EDUCATION AND RECRUITING
TO WHICH THE MEMBERSHIP OF THE INSTITUTE OF
ENVIRONMENTAL SCIENCES SHOULD DIRECT ITSELF.