

AD-756 900

PRESSURE VESSELS

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March 1963

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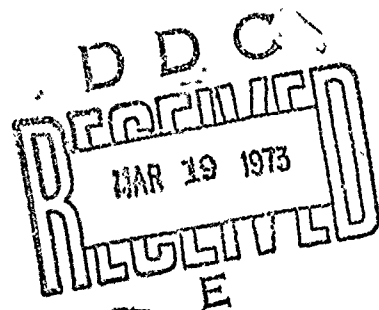
PRESSURE VESSELS

A DDC BIBLIOGRAPHY

DDC-TAS-73-17

MARCH 1973

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* Pressure Vessels * Bibliographies * Rocket Cases - Filament Wound Construction - Laminates - Tanks(Containers) - Material Forming - Maraging Steels - Deep Submergence - Welding - Titanium Alloys - Arc Welding - Radiation Damage - Submarine Hulls - Rolling(Metallurgy) - Underwater Vehicles - Structural Shells - Elastic Shells - Hydrostatic Tests - Impact Tests - Containment Vessels - Diaphragms(Mechanics) - Anechoic Chambers - Nuclear Reactors - Mechanical Properties - Structural Properties						

1b

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PRESSURE VESSELS

A DDC BIBLIOGRAPHY

January 1963-September 1972

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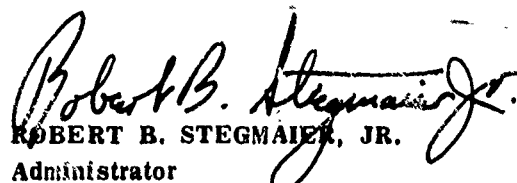
F O R E W O R D

This bibliography consists of 148 unclassified and unlimited reports on *Pressure Vessels*. These references were selected from entries processed into the Defense Documentation Center's data bank during the period of January 1953 through December 1972. This bibliography supersedes AD-702 600, DDC-TAS-70-22-1, dated March 1970.

Entires are sequenced by AD number. Computer generated indexes of Corporate Author-Monitoring Agency, Subject, Title and Personal Author are provided.

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Administrator

Defense Documentation Center

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PERSONAL AUTHOR.....	P-1

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-295 424

AEROJET-GENERAL CORP AZUSA CALIF

STUDY OF THE EFFECTS OF THICKNESS ON THE PROPERTIES
OF LAMINATED FOR UNDERWATER PRESSURE VESSELS. (U)

JAN 63 1V SAUNDERS, R.D.; SMITH, R.L.;
REPT. NO. 0623 01 3
CONTRACT: NOBS86406

UNCLASSIFIED REPORT

DESCRIPTORS: *LAMINATES, *PRESSURE VESSELS, HEAT,
MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, PLASTICS,
REINFORCING MATERIALS, TEMPERATURE, THERMAL STRESSES,
THICKNESS, UNDERWATER (U)

CONTINUING RESEARCH ON THE STUDY OF THE EFFECTS OF THICKNESS
ON THE MECHANICAL AND PHYSICAL PROPERTIES OF
FIBER-REINFORCED PLASTIC LAMINATES FOR CREEP SUBMERSIBLE
EXTERNAL PRESSURE VESSELS.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-402 636

AVCO LYCOMING DIV STRATFORD CONN.

METASTABLE AUSTENITIC FORMING OF HIGH STRENGTH
PRESSURE VESSELS.

(U)

DESCRIPTIVE NOTE: SEMIANNUAL INTERIM TECHNICAL PROGRESS
REPT. NO. 2, 1 SEP 62-30 MAR 63.

APR 63 IV RAYMER, J.M.;

CONTRACT: AF33 657 7955

UNCLASSIFIED REPORT

DESCRIPTORS: *ROCKET CASES, *PRESSURE VESSELS,
*STEEL, STAINLESS STEEL, TOOL STEEL, HOT
WORKING, AUSTENITE, HYDROSTATIC PRESSURE, TESTS,
MECHANICAL PROPERTIES, MATERIALS, MATERIAL
FORMING, METAL SPINNING.

(U)

IDENTIFIERS: H-11 STEEL, AM355 STAINLESS
STEEL, 18NICOMO (330) STEEL.

(U)

THREE SELECTED ALLOYS: TYPE H-11 TOOL STEEL,
AM 355 SEMIAUSTENITIC STAINLESS STEEL, AND
18NICOMO (300) MARAGING STEEL, WERE
FABRICATED INTO BIAXIAL PRESSURE VESSEL TEST
SPECIMENS. FOR THE FABRICATION OF THE BIAXIAL
PRESSURE VESSEL TEST SPECIMENS, DESIGNED EXPERIMENTS
WERE UTILIZED TO EVALUATE A VARIETY OF PROCESSING AND
HEAT TREAT VARIABLES. THE FABRICATED PRES SURE
VESSELS (I.E. TUBES) WERE TESTED TO FAILURE IN A
HYDROSTATIC TEST FACILITY AND EVALUATED FOR SELECTION
OF AN OPTIMUM MATERIAL AND ASSOCIATED FABRICATION
PROCESS FOR A HIGH PERFORMANCE, INTEGRAL ROCKET MOTOR
CASE. BASED ON THESE STUDIES THE 18NICOMO
(300) MARAGING STEEL AND A SPECIFIC PROCESSING
SCHEDULE WERE SELECTED FOR PHASE II AND III
EVALUATION. AN INTERMEDIATE SIZE CYLINDRICAL TEST
SPECIMEN AND AN INTEGRAL SUBSCALE ROCKET MOTOR CASE
WERE DESIGNED FOR PHASE II INVESTIGATION OF
OPTIMIZED FABRICATION TECHNIQUES FOR THE MANUFACTURE
OF AN INTEGRAL MOTOR CASE FROM 18NICOMO
(300) MATERIAL. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-403 122

VERMONT UNIV BURLINGTON

ON THE STRENGTH DEGRADATION OF FILAMENT WOUND
PRESSURE VESSELS SUBJECTED TO A HISTORY OF LOADING,

(U)

APR 63 9P OUTWATER, JOHN O.; SEIBERT,
WILLARD J.;
REPT. NO. TM196
CONTRACT: NONR321901
PROJ: 62R05 19A

UNCLASSIFIED REPORT

DESCRIPTORS: *PRESSURE VESSELS, DEGRADATION,
LOADING (MECHANICS), FIBERS, STRESSES, T,
MATHEMATICAL ANALYSIS, EQUATIONS, TESTS,
MATHEMATICAL PREDICTION, FILAMENT WOUND
CONSTRUCTION.

(U)

IF IT IS ASSUMED THAT THE RATE OF GROWTH OF A
GRIFFITH CRACK THAT CONTROLS THE STRENGTH OF A
FIBER IS PROPORTIONAL TO A POWER OF THE STRESS ON
THAT FIBER WE CAN PREDICT THAT THE ULTIMATE STRENGTH
OF A FILAMENT WOUND PRESSURE VESSEL DECREASES
LINEARLY WITH THE TIME AT A GIVEN LOAD AND ALSO THAT
THE TIME TO FAILURE WHEN THE VESSEL IS HELD AT A
GIVEN LOAD WILL INCREASE LOGARITHMICALLY. BOTH
THESE OBSERVATIONS ARE CONFIRMED EXPERIMENTALLY AND
FORM THE BASIS FOR A SIMPLE METHOD OF PREDICTING THE
LIFE OF A VESSEL AT ONE LOAD AFTER IT HAS BEEN HELD
FOR A GIVEN TIME AT ANOTHER. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-403 459

ARDE-PORTLAND INC PARAMUS N J

CRYOGENIC STRETCH-FORMING OF SOLID-PROPELLANT ROCKET CASES. (U)

DESCRIPTIVE NOTE: QUARTERLY TECHNICAL REPT. NO. 3, 1 DEC 62 1 MAR 63,

JAN 63 16P CLAFFY, GEORGE I

CONTRACT: DA30 0690RD3501

UNCLASSIFIED REPORT

DESCRIPTORS: *ROCKET CASES. *STRETCH FORM ING, *PRESSURE VESSELS, *MANUFACTURING METHODS, COLD WORKING, CYLIDRICAL BODIES, CONFIGURATION, WELDS, HYDROFORMING (MECHANICAL), HIGH PRES SURE RESEARCH, INDUSTRIAL EQUIPMENT, PROGRAM MING, DESIGN, ANALYSIS. (U)

FIVE VESSEL CONFIGURATIONS (TOTAL OF TEN VESSELS) WERE CRYOGENICALLY STRETCHED PRIOR TO THE OCCUR RENCE OF A BREAKDOWN IN THE STRENGTH FACILITY. TWO OF THE CONFIGURATIONS INCORPORATED DOG-BONE COMPONENTS AND WERE STRETCHED AS PART OF THE PROGRAM TO DEVELOP THE ELLIPTICAL HEAD. A SIMPLE VESSEL INCORPORATING A THRUST SKIRT, AND TWO CONFIGURATIONS FOR PRODUCING HIGH-STRENGTH DOMES, WERE ALSO STRETCHED. TESTING WAS INTERRUPTED DUE TO A GROSS FAILURE OF THE CRYOGENIC PUMP OF THE STRETCH FACILITY. THE COMPUTER PROGRAM, FOR ANALYTICALLY DETERMINING THE FINAL SHAPE TO BE ACHIEVED BY CRYOGENICALLY STRETCHING A GIVEN PRE FORM VESSEL, WAS CHECKED AGAINST ACTUAL DATA FROM A STRETCHED VESSEL. THE RESULTS INDICATE THAT THE PLASTICITY EQUATIONS AND THE COMPUTER PRO GRAM ARE CAPABLE OF PREDICTING THE STRETCHED SHAPE WITH A HIGH DEGREE OF ACCURACY. THE FIRST SIMPLE, FULL-SIZE VESSEL WAS ASSEMBLED DURING THIS REPORT PERIOD AND REJECTED FOR BAD WELDS. THE PROBLEM PROVED TO BE ONE OF DIMENSIONAL TOL ERANCE ON THE HEAD DIAMETER. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM07

AD-404 182

REPUBLIC AVIATION CORP MINEOLA N Y

EVALUATION OF HIGH-STRENGTH LIGHTWEIGHT LAMINATED
PRESSURE VESSELS OF LAP-JOINT CONSTRUCTION. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPORT NO. 4, 1
OCT TO 31 DEC 62

JAN 63 20P CITRIN, G. I
CONTRACT: DA30 069ORD3440
PROJ: 59332008
MONITOR: TR766 2 3 3

UNCLASSIFIED REPORT

DESCRIPTORS: *PRESSURE VESSELS, *ROCKET CASES,
*BONDED JOINTS, JOINTS, BONDING, COBALT ALLOYS,
MOLYBDENUM ALLOYS, SHEETS, PROCESSING, SPECI
FICATIONS, RINGS, PRODUCTION, RUPTURE, TESTS,
TENSILE PROPERTIES, STEEL, THICKNESS, BRAZING,
WELDING, HYDROSTATIC PRESSURE, HEAT TREATMENT,
METAL JOINTS, AGING (MATERIALS), HIGH TEMPERA
TURE RESEARCH, DESIGN, FRACTURE (MECHANICS),
METALLURGY, LAMINATES, ADHESIVES, NICKEL
ALLOYS. (U)
IDENTIFIERS: LAP-JOINT CONSTRUCTION. (U)

THE PRODUCTION SHEET METAL MATERIAL WAS EVALUATED
AGAINST SPECIFICATION REQUIREMENTS. RINGS WERE
FABRICATED OF THE 0.021-IN. THICK MAR-AGING STEEL
MATERIAL FOR THE FIRST 3 PRESSURE VESSELS. THE
FIRST PRESSURE VESSEL WAS ASSEMBLED AND TESTED
SUCCESSFULLY PRODUCING A BURST STRENGTH 7.9%
GREATER THAN THAT INDICATED BY UNIAXIAL TENSILE TESTS
OF THE PARENT SHEEL. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-406 622

PICATINNY ARSENAL DOVER N J FELTMAN RESEARCH LABS

THE DEPENDENCE OF DYNAMIC STRENGTH OF CYLINDRICAL
PRESSURE VESSELS ON GEOMETRICAL PARAMETERS, (U)

MAY 63 10P MACKENZIE ,A. IDALRYMPLE,E.

REPT. NO. PA-TM-1206

PROJ: DA-502-05-021

UNCLASSIFIED REPORT

DESCRIPTORS: *PRESSURE VESSELS, *CYLINDRICAL
BODIES, CONTAINERS, PRESSURE, RUPTURE, GEO
METRIC FORMS, DESIGN, EXPERIMENTAL DATA, THEORY,
CHARGES (EXPLOSIVE). (U)

EXPERIMENTAL INFORMATION WAS OBTAINED BY DETONATING SPHERES OF C4 EXPLOSIVE CENTRALLY LOCATED IN CYLINDRICAL CONTAINERS. SLIGHTLY DIFFERENT RESULTS WOULD BE EXPECTED FOR OTHER EXPLOSIVES. END CAPPING WAS ACCOMPLISHED BY PLACING THE PIPE IN A VERTICAL POSITION, STANDING ON A STEEL PLATE. ANOTHER THICK STEEL PLATE WAS PLACED OVER THE OPEN TOP END OF THE CYLINDER AND THE ASSEMBLY WAS LOADED DOWN WITH ABOUT 500 LBS OF LEAD. WITH THIS SYSTEM, EXPLOSIVE SPHERES OF DIFFERENT MASSES WERE DETONATED INSIDE THE CYLINDERS TO DETERMINE THE MAXIMUM AMOUNT OF EXPLOSIVE THAT COULD BE CONTAINED WITHOUT RUPTURE. INSIDE VARIOUS CYLINDERS, ONLY ONE SHOT WAS FIRED IN EACH CYLINDER. THE TECHNIQUES OF END CAPPING IN THIS EXPERIMENT IS NOT CRITICAL IF THE CYLINDERS HAVE A LENGTH OF 5 OR 6 TIMES THE INSIDE DIAMETER. THE SIDE WALL OF THE CYLINDER RECEIVES THE FIRST IMPULSE BEFORE THE END PLATES EXPERIENCE ANY DISTURBANCE. HIGH-SPEED PHOTOGRAPHS WERE TAKEN OF AN EXPANDING ALUMINUM PIPE LOADED WITH 12 GMS OF EXPLOSIVE. THE OUTSIDE DIAMETER WAS 3 INCHES AND THE WALL THICKNESS 1/4 INCH. THE EXPANSION TOOK PLACE IN ABOUT 50 MICROSEC. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-407 432

WATERTOWN ARSENAL LABS MASS

TRANSITIONAL BEHAVIOR OF HIGH-STRENGTH STEEL
PRESSURE VESSELS,

(U)

MAY 63 30P INGRAHAM, JOHN M.

PROJ: IHU 24401A111

MONITOR: WAL TRIID 9 1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON MATERIALS FOR SOLID
PROPELLANT ROCKET MOTORS.

DESCRIPTORS: *PRESSURE VESSELS, *STEEL, DEN
SITY, BRITTLINESS, TOUGHNESS, TENSILE PROPER
TIES, MICROSTRUCTURE, LOW-TEMPERATURE RESEARCH,
HARDNESS, CHROMIUM ALLOYS, MOLYBDENUM ALLOYS,
TRANSITION TEMPERATURE, IMPACT SHOCK, THICKNESS,
TESTS, FRACTOGRAPHY, SPHERES, HYDROSTATIC PRES
SURE, FRACTURE (MECHANICS).

(U)

IDENTIFIERS: STRENGTH TO WEIGHT RATIO, AISI 4340,
VISCOJET 1000 STEEL.

(U)

PRESSURE VESSELS OF NEARLY SPHERICAL GEOMETRY WERE
HYDROSTATICALLY TESTED TO FAILURE AT VARIOUS
TEMPERATURES TO DETERMINE THE FRACTURE TRANSI TIONAL
BEHAVIOR OF THE MATERIALS. A COMPARISON OF THE
FRACTURE SURFACE MARKINGS WAS MADE WITH THOSE OF
TENSILE TEST SPECIMENS FRACTURED AT SIMILAR TEST
TEMPERATURES. NOTCH STRENGTH TO TENSILE STRENGTH
RATIOS WERE DETERMINED USING BOTH ROUND AND FLAT
TENSILE SPECIMENS FROM THE SAME ALLOYS. IT WAS
CONCLUDED THAT THE FRACTURE TRANSITIONAL BEHAVIOR, IN
PRESSURE VESSELS FAB RICATED FROM HIGH-STRENGTH H11
STEEL AND LOWER STRENGTH AISI 4340 STEEL, COULD BE
PREDICTED WITH REASONABLE CERTAINTY FROM FRACTURE
SURFACE EVAL UATIONS OF TENSILE SPECIMENS OF THE TYPE
USED TO DETERMINE THE NOTCH STRENGTH TO TENSILE
STRENGTH RATIOS. (AUTHOR)

(U)

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AD-408 278

REPUBLIC AVIATION CORP FARMINGDALE N Y

EVALUATION OF HIGH-STRENGTH LIGHTWEIGHT LAMINATED
PRESSURE VESSELS OF LAP-JOINT CONSTRUCTION, (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 5, 1 JAN-
31 MAR 63,

APR 63 57P CITRIN, G. ;
MONITOR: WAL REPT. NO. TR766 2 3 4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, MATERIALS), STEEL,
LAMINATES, BONDING, BRAZING, ADHESIVES, CERAMIC
MATERIALS, SHEETS, CYLINDRICAL BODIES, WELDING, ROCKET
CASES, BONDED JOINTS, WELDS, MANUFACTURING METHODS (U)
IDENTIFIERS: MAR-AGING STEEL, INCO 250 KSI NICOMO,
INCO 300 KSI NICOMO, LAP-JOINT CONSTRUCTION, 1963 (U)

FIVE PRESSURE VESSELS WERE ASSEMBLED AND TESTED TO
FAILURE. THEY WERE FABRICATED OF THREE NOMINAL
THICKNESSES OF MATERIAL, 0.025-, 0.040-, AND 0.064-
IN.-THICK MAR-AGING STEEL. AN ANALYSIS OF THE
RESULTS OF THESE TESTS INDICATED THE FEASIBILITY OF
THE LIGHTWEIGHT LAMINATED PRESSURE VESSELS OF LAP-
JOINT DESIGN AND SHOWED THE DIFFICULTY OF
DEMONSTRATING A REPRODUCIBLE CONFIDENCE LEVEL WITH
REUSABLE HEADER CLOSURES THAT HAD SUSTAINED SOME
DEFORMATION DURING HYDROSTATIC TESTS TO HIGH-ENERGY
LEVELS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-412 933

BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH

A LINEARIZED ANALYSIS OF THE PRESSURE WAVES IN A TANK
UNDERGOING AN ACCELERATION. (U)

JUL 63 9P EHLERS, F. EDWARD ;
REPT. NO. MATHEMATICAL NOTE NO. 308

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: ALSO AVAILABLE FROM THE AUTHOR.

DESCRIPTORS: (*PRESSURE VESSELS, FLUID FLOW),
(*TANKS (CONTAINERS), ANALYSIS), ACCELERATION,
EQUATIONS, ROCKET MOTOR NOZZLES, PRESSURE,
TIME, FUNCTIONS, SOUND, VELOCITY. (U)
IDENTIFIERS: 1963. (U)

THE RAPID ACCELERATION EXPERIENCED BY A ROCKET WITH
A HIGH THRUST TO WEIGHT RATIO INFLUENCES THE RATE OF
FLOW THROUGH THE NOZZLE, THEREBY ALTERING THE THRUST.
TO OBTAIN SOME INSIGHT INTO THE EFFECTS OF
ACCELERATION ON FLUID FLOWS, THE LINEARIZED
EQUATIONS FOR THE ONE-DIMENSIONAL FLOW IN A CLOSED
TANK ARE SOLVED FOR THE ACCELERATION PRESCRIBED AS A
KNOWN FUNCTION OF TIME. THE WAVE PATTERN IS
DESCRIBED IN DETAIL FOR THE FLOW INDUCED BY AN
INSTANTANEOUS CONSTANT ACCELERATION BEGINNING AT
TIME. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM07

AD-419 356

ARMY MATERIALS RESEARCH AGENCY WATERTOWN MASS

ANALYTICAL STUDY FOR A HYDRODYNAMIC TEST SYSTEM,

(U)

SEP 63 25P

SEMPLE, CHARLES W. I

PROJ: 1C542718D387

MONITOR: AMRA

TR63 12

UNCLASSIFIED REPORT

DESCRIPTORS: (*HYDRODYNAMICS, TESTS), (*PRESSURE VESSELS, DESIGN), LOADING (MECHANICS), ANALYSIS, MEASUREMENT, COMPRESSIBLE FLOW, DENSITY, PRESSURE, FITTINGS, NUMERICAL ANALYSIS, FLUID FLOW, EQUATIONS.

(U)

IDENTIFIERS: ACCUMULATORS, 1963.

(U)

ANALYTICAL EQUATIONS RELATING SPECIMEN PRESSURE TO RISE TIME WERE DEVELOPED FOR SPECIMENS SUBJECTED TO INTERNAL PRESSURE BY A HYDRODYNAMIC LOADING SYSTEM. RISE TIME MEASUREMENTS WERE MADE DURING DYNAMIC PRESSURIZATION OF A PRESSURE VESSEL, AND THE EXPERIMENTAL AND ANALYTICAL RESULTS COMPARED. THE EFFECTS OF VARIOUS SYSTEM PARAMETERS ON RISE TIME WERE ESTABLISHED FROM THE ANALYTICAL EQUATIONS. DESIGN GUIDE LINES ARE OUTLINED FOR THE CONSTRUCTION OF SIMILAR HYDRODYNAMIC SYSTEMS. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-420 977

GOODYEAR AEROSPACE CORP AKRON OHIO

STUDY OF THE EFFECTS OF MECHANICAL DAMAGE ON THE
PERFORMANCE OF FILAMENT-WOUND MOTOR CASES. (U)

DESCRIPTIVE NOTE: PROGRESS REPT. NO. 3, 1 AUG-30 SEP
63,

OCT 63 19P BURKLEY, R. A. ; BOLLER, T. J.
; BUTCHER, I. R. ;
REPT. NO. GER-111548
CONTRACT: NOW-63-0449

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ROCKET CASES, FAILURE, (MECHANICS)),
(*FILAMENT WOUND CONSTRUCTION, FAILURE (MECHANICS)),
(*FAILURE (MECHANICS), PRESSURE VESSELS), (*PRESSURE
VESSELS, FAILURE (MECHANICS)), WIRE-WINDING MACHINES,
MANUFACTURING METHODS, GUIDED MISSILES (UNDERWATER-TO-
SURFACE), GUIDED MISSILES (SURFACE TO SURFACE), NAVY,
GLASS TEXTILES, MECHANICAL PROPERTIES, HIGH PRESSURE
RESEARCH, TEST EQUIPMENT, TEST METHODS (U)
IDENTIFIERS: 1963, POLARIS (U)

THIS REPORT DISCUSSES THE CONCLUSION OF THE
FABRICATION, MACHINE FLAWING, AND TESTING OF SIX-INCH
DIAMETER FILAMENT-WOUND BOTTLES. IT WAS FOUND THAT
THE BURST PRESSURE IS REDUCED BY A FLAW; HOWEVER, IT
APPEARED THAT THE INTERSPERSED WINDING METHOD
IMPROVED THE ABILITY OF THE CASE TO RESIST THESE
FLAWS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM07

AD-422 866

VERMONT UNIV BURLINGTON

THE EFFECT OF REPEATED LOADING ON FILAMENT WOUND
INTERNAL PRESSURE VESSELS.

(U)

DESCRIPTIVE NOTE: TECHNICAL MEMO.

SEP 63 18P OUTWATER, JOHN O. I

REPT. NO. NOLC-TM-43-14

CONTRACT: NONR321901

PROJ: 62R05 19A

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, FILAMENT WOUND
CONSTRUCTION), (*LOADING (MECHANICS), PRESSURE VESSELS),
FATIGUE (MECHANICS), ACOUSTIC PROPERTIES, FAILURE
(MECHANICS), LARMINATES, GLASS TEXTILES, TEST METHODS,
STRESSES, TENSILE PROPERTIES, HYDROSTATIC PRESSURE (U)
IDENTIFIERS: 1963 (U)

BY SUBJECTING THIN FILAMENT WOUND INTERNAL PRESSURE
VESSELS TO REPEATED LOADS WITH DIFFERENT RATES OF
LOADING, LOAD RANGES, AND DURATION OF PEAK LOADS; WE
CONCLUDE THAT THE PRINCIPLE FACTOR INVOLVED IN THE
FATIGUING OF THE VESSELS IS THE TOTAL DURATION UNDER
LOAD. THE LIFE OF A VESSEL UNDER CYCLIC LOADING IS
ABOUT THE SAME AS MIGHT BE EXPECTED WERE THE VESSEL
TO BE HELD AT THE MAXIMUM LOAD UNTIL FAILURE THROUGH
STATIC FATIGUE. AN EXPLANATION FOR THIS BEHAVIOR IS
MADE QUALITATIVELY BY EXAMINING THE ACCOUSTICAL
BEHAVIOR OF A VESSEL UNDER REPEATED LOADING.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-423 216

GENERAL DYNAMICS/FORT WORTH TEX

PRELIMINARY REPORT ON FABRICATION AND TESTS OF AN
ELECTRODEPOSITED PRESSURE BOTTLE, (U)

NOV 63 12P MOONEY, C. H. , JR. ?
REPT. NO. SR D6112
CONTRACT: AF33 657 11214

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, ELECTRODEPOSITION),
(*ELECTRODEPOSITION, PRESSURE VESSELS), PROCESSING,
SURFACES, PREPARATION, NITROGEN, BOILING, TIME, THERMAL
CONDUCTIVITY, HEAT TRANSFER, PRESSURE, MEASUREMENT, TEST
METHODS (U)
IDENTIFIERS: 1963 (U)

A DESCRIPTION IS GIVEN OF THE FABRICATION AND
EVALUATION OF AN ELECTRODEPOSITED PRESSURE BOTTLE.
THE TYPE OF MANDREL, SURFACE PREPARATION,
ELECTRODEPOSITING SOLUTION, AND CURRENT ARE DISCUSSED
PERTAINING TO FABRICATION. PRESSURE PROOF TESTS TO
ESTABLISH STRUCTURAL CAPABILITY AND THERMODYNAMIC
TESTS TO DETERMINE HEAT TRANSFER COEFFICIENTS ARE
ALSO DISCUSSED IN THE REPORT. ASSOCIATED PROBLEMS
AND RECOMMENDATIONS FOR FUTURE IMPROVEMENT ARE
INCLUDED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-423 526

NAVAL RESEARCH LAB WASHINGTON D C

NEUTRON EMBRITTLEMENT OF REACTOR PRESSURE VESSEL
STEELS,

(U)

OCT 63 36P STEELE, L. C. HAWTHORNE, J. R.

REPT. NO. NRL-5984

PROJ: RRJ07 01 46 5409 ,SR007 01 01

TASK: D858

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, RADIATION DAMAGES), (*REACTOR
MATERIALS, STEEL), (*PRESSURE VESSELS, STEEL), NEUTRONS,
HEAT TREATMENT, NEUTRON BEAMS, DUCTILITY, NUCLEAR
REACTORS, EXPERIMENTAL DATA, NUCLEAR POWER PLANTS (U)

IDENTIFIERS: 1963, NEUTRON EMBRITTLEMENT, HY 80
STEEL (U)

THIS REPORT PRESENTS THE STATUS OF OBSERVATIONS AT
THE U. S. NAVAL RESEARCH LABORATORY ON THE
EMBRITTLEMENT OF STEELS WHICH ARE COMMONLY USED FOR
THE PRIMARY PRESSURE CONTAINMENT VESSELS OF NUCLEAR
POWER PLANTS. THE DEMONSTRATED CRITERION OF NIL
DUCTILITY TRANSITION (NDT) TEMPERATURE PROVIDES THE
BASIS FOR MEANINGFUL ANALYSIS OF NEUTRON-INDUCED
EMBRITTLEMENT IN REACTOR STEELS. RESULTS TO DATE
INDICATE THAT THE DEGREE OF EMBRITTLEMENT DEPENDS
UPON THE MATERIAL, THE NEUTRON EXPOSURE, AND THE
TEMPERATURE DURING IRRADIATION. THESE SAME
VARIABLES ALSO AFFECT THE DEGREE OF NOTCH DUCTILITY
RECOVERY EFFECTED BY POSTIRRADIATION HEAT TREATMENT.
IN ADDITION, THE TIME AND TEMPERATURE OF HEAT
TREATMENT HAVE BEEN SHOWN TO PLAY AN IMPORTANT ROLE
IN ESTABLISHING THE RECOVERY PATTERN. THE VALIDITY
OF THESE EXPERIMENTAL OBSERVATIONS ARE BEING TESTED
THROUGH CORRELATIONS WITH DATA FROM REACTOR
SURVEILLANCE PROGRAMS AND FROM SPECIMENS OF THE SL-
1 REACTOR PRESSURE VESSEL. PRELIMINARY DATA FROM
DOSIMETRY IN THE SM-1A REACTOR PERMIT THE
EXTENSION OF EXPERIMENTAL DATA TO PREDICT THE
INCREASE IN NDT OF THE REACTOR PRESSURE VESSEL.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-425 162

NAVAL ORDNANCE LAB WHITE OAK MD

REVERSE YIELDING OF A FULLY AUTOFRETTAGED TUBE OF
LARGE WALL RATIO, (U)

AUG 63 27P DAWSON, VICTOR C. D. ; SEIGEL,
ARNOLD E. ;
REPT. NO. NOLTR-63-123

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CYLINDRICAL BODIES, MECHANICAL
PROPERTIES), (*PRESSURE VESSELS, STRESSES), CREEP,
HYDROSTATIC PRESSURE, MATHEMATICAL ANALYSIS, STRAIN
(MECHANICS), ELASTICITY, PLASTICITY, EQUATIONS (U)
IDENTIFIERS: 1963, AUTOFRETTAGE (U)

THE EQUATIONS ARE DEVELOPED FOR THE CASE OF A
REVERSE YIELDED THICK-WALLED CYLINDER. IT IS
ASSUMED THAT A CYLINDER IS SUBJECTED TO AN INTERNAL
PRESSURE WHICH CAUSES PLASTIC FLOW THROUGHOUT THE
WALL; THE SIZE OF THE CYLINDER IS SUCH THAT THE
RESIDUAL STRESSES DEVELOPED DURING PRESSURE RELEASE
CAUSE THE CYLINDER TO REYIELD IN COMPRESSION. THE
STRESS EQUATIONS FOR THE SUBSEQUENT REAPPLICATION OF
PRESSURE TO THE REYIELDED CYLINDER ARE ALSO
DEVELOPED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-425 196

AEROJET-GENERAL CORP SACRAMENTO CALIF

RESEARCH AND DEVELOPMENT IN SUPPORT OF THE POLARIS
PROGRAM. TASK I. INVESTIGATION OF FILAMENT WINDING
PATTERNS.

(U)

DESCRIPTIVE NOTE: BI-MONTHLY PROGRESS REPT. NO. 3, 24
AUG-24 OCT 63,

NOV 63 6P BRADLEY ,W. ;ZICKEL ,J. ;
TONN ,G. H. ;SMITH ,K. W. ;GALUZEVSKI,R.
A. ;

REPT. NO. AGC-062713

CONTRACT: NOW-63-0627

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, FILAMENT WOUND
CONSTRUCTION), (*FILAMENT WOUND CONSTRUCTION,
CONFIGURATION), STRUCTURAL PROPERTIES, RELIABILITY,
GUIDED MISSILES (UNDERWATER-TO-SURFACE), GUIDED MISSILES
(SURFACE-TO-SURFACE), NAVY, ROCKET CASES, HYDROSTATIC
PRESSURE, STRESSES, DEFLECTION, DESIGN, ANALYSIS (U)
IDENTIFIERS: 1963, POLARIS (U)

THIS IS THE THIRD OF A SERIES OF BIMONTHLY REPORTS
DESCRIBING PROGRESS IN A PROGRAM CONDUCTED TO
INCREASE THE UNDERSTANDING OF THE INTERRELATION
BETWEEN CHAMBER WINDING PATTERNS AND CHAMBER
BEHAVIOR. ALL SIX OF THE ISOTENSOID UNITS REQUIRED
FOR THIS PROGRAM HAVE BEEN FABRICATED. THREE OF THE
FOUR UNITS TESTED HYDROSTATICALLY RUPTURED AT
PRESSURES EXCEEDING THE DESIGN BURST PRESSURE. THE
DATA ARE BEING ANALYZED. AN ANALYSIS THAT TAKES
INTO CONSIDERATION THE STRENGTH OF THE RESIN IN
DESIGNING ISOTENSOID FILAMENT-WOUND PRESSURE VESSELS
HAS BEEN DEVELOPED AND PROGRAMMED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07.

AD-425 729

MELLON INST PITTSBURGH PA

A STUDY OF THE BEHAVIOR OF SMALL PRESSURE VESSELS
UNDER BIAXIAL STRESS CONDITIONS AND IN THE PRESENCE
OF SURFACE CRACKS. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
JUN 63 165P BHAT,G. K. ;
REPT. NO. TM242
CONTRACT: NONR376400
PROJ: MI4396

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, FAILURE (MECHANICS)),
(*STEEL, PRESSURE VESSELS), (*FAILURE (MECHANICS),
PRESSURE VESSELS); (*STRESSES, PRESSURE VESSELS),
FRACTURE (MECHANICS), FATIGUE (MECHANICS), HYDROSTATIC
PRESSURE, SHEETS, HEAT TREATMENT, MANUFACTURING
METHODS, TENSILE PROPERTIES, TABLES, STRAIN
(MECHANICS) (U)
IDENTIFIERS: 1963, MARAGING 18 NI STEEL, HYDROBURST
TESTS, BIAXIAL STRESSES (U)

RESULTS ARE PRESENTED OF A STUDY OF SMALL,
SEAMLESS, THIN-WALL PRESSURE VESSELS OF SEVERAL
ULTRAHIGH STRENGTH STEELS TESTED UNDER BIAXIAL STRESS
CONDITIONS AND ALSO IN THE PRESENCE OF SURFACE
FATIGUE CRACKS OF PREDETERMINED SIZES INSERTED ON THE
EXTERIOR SIDEWALL OF THE VESSELS, PERPENDICULAR TO
THE HOOP DIRECTION. BEHAVIOR OF THE TEST VESSELS
UNDER BIAXIAL STRESS CONDITIONS IS CORRELATED TO THAT
OF FLAT SHEET SPECIMENS, CONTAINING APPROXIMATELY
SAME SIZE FATIGUE CRACKS, BUT TESTED UNDER UNIAXIAL
STRESS. FLAWS APPEARED TO AFFECT THE PERFORMANCE OF
THE MEDIUM CARBON (0.30 TO 0.35%) CONSTRUCTIONAL
STEELS, AISI 4130, AMS 6434, MX-2 TO A LESSER
DEGREE THAN HIGHER CARBON (0.40% AND HIGHER)
AND HIGHER ALLOY CONSTRUCTIONAL STEELS. UNDER
BIAXIAL STRESS CONDITIONS CRACKS HAVE A MORE POTENT
INFLUENCE IN REDUCING THE STRESS CAPABILITY THAN
UNDER UNIAXIAL STRESS FOR ALL MATERIALS, EXCEPT THE
MARAGING 18NI STEELS WHICH EXHIBITED LOW CRACK
SENSITIVITY. FRACTURE CONTROL MODE IN THE PRESENCE
OF FLAWS IN ALL EXCEPT THE MARAGING 18NI STEEL
PRESSURE VESSELS WAS K SUB IC INITIATED.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-426 431

NAVAL RESEARCH LAB WASHINGTON D C

PRACTICAL CONSIDERATIONS IN APPLYING LABORATORY
FRACTURE TEST CRITERIA TO THE FRACTURE-SAFE DESIGN OF
PRESSURE VESSELS, (U)

NOV 63 32P PELLINI, W. S. ; PUZAK, P. P. ;
REPT. NO. NRL-6030
PROJ: RRU07 01 46 5414 ,SR007 01 01 0850 0854

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, DESIGN), (*FRACTURE
(MECHANICS), TESTS), STEEL, MATERIALS, TEST METHODS,
PRESSURE, TEMPERATURE, METAL PLATES (U)
IDENTIFIERS: 1963 (U)

TRENDS IN PRESSURE VESSEL APPLICATIONS INVOLVING
HIGHER PRESSURES, LOWER SERVICE TEMPERATURES, THICKER
WALLS, NEW MATERIALS, AND CYCLIC LOADING REQUIRE THE
DEVELOPMENT OF NEW BASES IN THE SUPPORTING SCIENTIFIC
AND TECHNOLOGICAL AREAS. THIS REPORT PRESENTS A
"BROAD LOOK" ANALYSIS OF THE OPPORTUNITIES TO APPLY
NEW SCIENTIFIC APPROACHES TO FRACTURE-SAFE DESIGN IN
PRESSURE VESSELS AND OF THE NEW PROBLEMS THAT HAVE
ARISEN IN CONNECTION WITH THE UTILIZATION OF HIGHER
STRENGTH STEELS. THESE OPPORTUNITIES FOLLOW FROM
THE DEVELOPMENT OF THE FRACTURE ANALYSIS DIAGRAM
WHICH DEPICTS THE RELATIONSHIPS OF FLAW SIZE AND
STRESS LEVEL FOR FRACTURE IN THE TRANSITION RANGE OF
STEELS WHICH HAVE WELL-DEFINED TRANSITION TEMPERATURE
FEATURES. THE REFERENCE CRITERIA FOR THE USE OF THE
FRACTURE ANALYSIS DIAGRAM IS THE NIL-DUCTILITY
TRANSITION TEMPERATURE OF THE STEEL, AS DETERMINED
DIRECTLY BY THE DROP-WEIGHT TEST OR INDIRECTLY BY
CORRELATION WITH THE CHARPY V TEST. POTENTIAL
DIFFICULTIES IN THE CORRELATION USE OF THE CHARPY
V TEST ARE DEDUCED TO REQUIRE ENGINEERING
INTERPRETATION OF CHARPY V TEST DATA RATHER THAN
TO INVOLVE BASIC BARRIERS TO THE USE OF THE TEST.
THE RAPID EXTENSION OF PRESSURE VESSEL FABRICATION
TO QUENCHED AND TEMPERED STEELS IS EXPECTED TO
PROVIDE NEW PROBLEMS OF FRACTURE-SAFE DESIGN.
(AUTHOR) (U)

UNCLASSIFIED

DDC PORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-428 856

NAVAL ORDNANCE LAB WHITE OAK MD

DESIGN METHOD FOR DOUBLE-WALLED EXTERNAL PRESSURE
VESSELS,

(U)

OCT 63 1V CHURCHILL, M. V.;
REPT. NO. NOLTR-63-249

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, DESIGN), (*STRUCTURAL
SHELLS, STIFFENED CYLINDERS), EQUATIONS, UNDERWATER
ORDNANCE, STRESSES, ASPECT RATIO, STABILITY, ELASTICITY,
OPTIMIZATION, LOADING (MECHANICS), ELASTIC SHELLS, BEAMS
(STRUCTURAL) (U)

IDENTIFIERS: 1963

(U)

BY PURSUING THE ANALOGY WHICH EXISTS BETWEEN THE
REINFORCED PRESSURE VESSEL AND THE BEAM ON AN ELASTIC
FOUNDATION, AND BY SYSTEMATIC APPLICATION OF THE
PRINCIPLE OF BALANCED DESIGN, A SET OF EQUATIONS IS
DERIVED BY WHICH OPTIMUM VALUES FOR WALL THICKNESS,
REINFORCEMENT SIZE AND SPACING CAN BE CALCULATED
DIRECTLY FROM THE SHELL RADIUS, THE DESIGN PRESSURE,
AND THE MECHANICAL PROPERTIES OF THE MATERIAL. THE
ELEMENT OF TRIAL AND ERROR IS VIRTUALLY ELIMINATED
AND THE USE OF ITERATIVE METHODS IS RESTRICTED TO A
FEW CASES IN WHICH CONVERGENCE IS QUITE RAPID. THE
EFFECT OF RIGID END BULKHEADS IS DISCUSSED AND A
MEANS OF MINIMIZING SECONDARY STRESSES FROM THAT
SOURCE IS PROPOSED. A SAMPLE CALCULATION IS GIVEN
AND A COMPARISON MADE WITH DESIGNS PRODUCED BY OTHER
METHODS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-428 905

PENNSYLVANIA STATE UNIV UNIVERSITY PARK ORDNANCE RESEARCH
LAB

SOLID GLASS AND CERAMIC EXTERNAL-PRESSURE VESSELS,

(U)

JAN 64 IV STACHIW, J. D. ;
CONTRACT: NOW-63-0209

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, MATERIALS), (*CERAMIC
MATERIALS, PRESSURE VESSELS), (*GLASS, PRESSURE
VESSELS), UNDERWATER, BRITTLINESS, COMPRESSIVE
PROPERTIES, WEIGHT, CREEP, FATIGUE (MECHANICS),
UNDERWATER EXPLOSIONS, HYDROSTATIC PRESSURE, IMPACT
SHOCK, PROTECTIVE TREATMENTS, ELASTICITY, STRESSES,
ALUMINUM COMPOUNDS, OXIDES, STIFFENED CYLINDERS, JOINTS,
MODEL TESTS, SHOCK RESISTANCE, ALUMINUM ALLOYS,
OCEANOGRAPHIC VESSELS, SUBMARINES, DEFLECTION, PRESSURE,
STRAIN (MECHANICS) (U)

IDENTIFIERS: 1964, PYROCERAM, ALUMINUM OXIDE,
ALUMINUM ALLOY (U)

SOLID GLASS OR CERAMIC HULLS PROVIDE THE MAXIMUM
BUOYANCY AND INTERNAL USEFUL VOLUME FOR UNDERWATER
VEHICLES. THIS MATERIAL DISPLAYS LOW CREEP
CHARACTERISTICS AND WITHSTANDS EXTERNAL PRESSURE
CYCLING AND MILD UNDERWATER DYNAMIC PRESSURES.
SCRATCHES ON THE EXTERIOR SURFACES DO NOT DECREASE
APPRECIABLY THE COMPRESSIVE AND ELASTIC STRENGTH OF
SUCH VESSELS WHEN EXPOSED TO EITHER STATIC OR CYCLING
PRESSURE. CONNECTORS HAVE BEEN DEvised THAT ENABLE
GLASS CYLINDERS TO BE JOINED INTO A MONOLITHIC
STRUCTURE THAT IS RESISTANT TO BOTH PRESSURE AND
FLEXURE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-429 031

LOCKHEED PROPULSION CO REDLANDS CALIF

DESIGN, FABRICATION AND HYDROTESTING OF A 120 INCH
DIAMETER PRESSURE VESSEL USING 18 PERCENT NICKEL
MARAGING STEEL. (U)

DESCRIPTIVE NOTE: RESEARCH CONTRACT STATUS REPT. NO.

8, 10 OCT 12 NOV 63,

JUN 63 67P COLBERT, L. ;

REPT. NO. 609 P8

CONTRACT: AF04 611 8525

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, STEEL), (*STEEL,
PRESSURE VESSELS), HYDROSTATIC PRESSURE, FRACTURE
(MECHANICS), NICKEL ALLOY, MARTENSITE, AGING
(MATERIALS), AUSTENITE, DESIGN, FAILURE (MECHANICS),
STRESSES, FRACTOGRAPHY, MICROSTRUCTURE, CORROSION,
TENSILE PROPERTIES, MICROSCOPY, ELECTRON MICROSCOPY (U)
IDENTIFIERS: 1963, MARAGING STEEL (U)

THE DETAILED METALLURGICAL ANALYSIS WORK PERFORMED
IN ORDER TO DETERMINE THE CAUSE OF CLOSURE PLATE
FRACTURE DURING HYDROBURST TESTING OF THE LOCKHEED-
EXCELCO 120-IN. DIAMETER, MARAGING 18% NICKEL
STEEL PROTOTYPE BOOSTER CASE IS DESCRIBED. THE
METALLOGRAPHIC AND MECHANICAL STRENGTH DATA PRESENTED
HAS LED TO THE BELIEF THAT DELAMINATION OF THE PLATE
WELDED TO THE RING FORGING IS LARGELY RESPONSIBLE FOR
THE FAILURE OF THE CLOSURE PLATE AT AROUND HALF THE
DESIGNED MEMBRANE STRESS. THE DELAMINATION ITSELF
SEEMS TO HAVE BEEN TRIGGERED BY THE YIELDING OF THE
RETAINED AUSTENITE AND CRACKING OF CARBIDES AND
NITRIDES IN THE BANDED AREAS OF THE PLATE, LEADING TO
THE FORMATION OF A CHAIN OF SMALL CRACKS FOLLOWED BY
INTERPLANAR SEPARATION IN THE PLATE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-431 706

AEROSPACE CORP EL SEGUNDO CALIF

STRESSES IN THIN VESSELS UNDER INTERNAL PRESSURE,

(U)

JAN 64 186P AU,NORMAN N. I
REPT. NO. TDR269 4304 5
CONTRACT: AFO4 695 269
MONITOR: SSD TDR63 367

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, STRESSES),
(*CYLINDRICAL BODIES, STRESSES), STRUCTURAL SHELLS,
JOINTS, MATHEMATICAL ANALYSIS, LOADING (MECHANICS),
ELASTICITY, STEEL, ALUMINUM, ELLIPSOIDS, HYDROSTATIC
PRESSURE

(U)

IDENTIFIERS: 1964, HEAD CLOSURES

(U)

ELASTIC STRESSES ARE PRESENTED FOR THIN SHELLS OF
REVOLUTION UNDER THE ACTION OF INTERNAL PRESSURE.
THE FORMULAS GIVEN ARE DEVELOPED ON THE BASIS OF
LOVE'S CLASSICAL SHELL THEORY. THE PRESSURE
VESSEL CONFIGURATIONS UNDER CONSIDERATION CONSIST OF
VARIOUS COMMONLY ENCOUNTERED HEAD CLOSURE DESIGNS
INTEGRALLY JOINED TO CIRCULAR CYLINDRICAL SHELL
SECTIONS. IN ADDITION TO THE MEMBRANE STRESSES,
THE BENDING STRESSES RESULTING FROM FORCES AND
MOMENTS AT THE JUNCTURES OF THE HEADS AND CYLINDERS
ARE ALSO PRESENTED. THE CONCEPT OF EDGE INFLUENCE
NUMBERS IS USED WHERE CONVENIENT TO EXPRESS THE
DISCONTINUITY FORCES AND MOMENTS AT THE JUNCTION.
MANY IMPORTANT PARAMETERS ARE EXPRESSED IN
GRAPHICAL FORMS TO FACILITATE ANALYSIS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-438 009

AVCO LYCOMING DIV STRATFORD CONN

METASTABLE AUSTENITIC FORMING OF HIGH STRENGTH
PRESSURE VESSELS.

(U)

DESCRIPTIVE NOTE: SEMIANNUAL REPT. NO. 3, 1 APR-SEP
63,

OCT 63 54P RAYMER, J. M. ;
CONTRACT: AF33 657 7955

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, MATERIAL FORMING),
(*MATERIAL FORMING, METAL SPINNING), MARAGING STEEL,
STAINLESS STEEL, TOOL STEEL, PROCESSING, METALLOGRAPHY,
HEAT TREATMENT, DEFORMATION, HYDROSTATIC PRESSURE,
STATISTICAL ANALYSIS, MECHANICAL PROPERTIES, CYLINDRICAL
BODIES, ROCKET CASES, AUSTENITE, MARTENSITE,
MICROSTRUCTURE, AGING (MATERIALS), TEMPERATURE, TIME (U)
IDENTIFIERS: FACTORIAL DESIGN (U)

DETAILED ANALYSIS OF THE EFFECTS OF THE VARIOUS
PROCESSING PARAMETERS EMPLOYED DURING PHASE I
EFFORT WAS COMPLETED. MOST INFORMATION WAS
OBTAINED FROM THE FULL FACTORIAL EXPERIMENT OF THE
18NICOMO (300) MARAGING STEEL, WHERE
PARAMETRIC AND NON-PARAMETRIC ANALYSES WERE CARRIED
OUT. FROM THESE ANALYSES, AN OPTIMUM COMBINATION OF
PROCESSING PARAMETERS WAS DERIVED, AND INCORPORATED
IN THE PROCESSING SCHEDULE OF THE INTERMEDIATE SIZE
CYLINDRICAL TEST SPECIMEN. ALL NECESSARY FORGINGS
IN 18 NICOMO (300) MARAGING STEEL AND
TOOLING FOR FABRICATION WERE OBTAINED AND TWO 14.5
IN. DIAMETER CYLINDRICAL TEST BOTTLES WERE SPUN TO
VERIFY THE RESULTS OBTAINED DURING PHASE I.
EFFORT WAS MADE IN EVALUATING THE BACKUP APPROACH TO
EFFECT CLOSURE OF THE AFT END BY A SHRINKING
OPERATION. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-443 851

GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF

PHYSICAL AND MECHANICAL PROPERTIES OF PRESSURE VESSEL
MATERIAL FOR APPLICATION IN A CRYOGENIC
ENVIRONMENT. (U)

DESCRIPTIVE NOTE: YEARLY SUMMARY REPT., 15 MAY 63-15
MAY 64,

MAY 64 126P

CHRISTIAN, J. L. ; YANG, C. T.

; WITZELL, W. E. ;

REPT. NO. 63 0818 3

CONTRACT: AF33 657 11289

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, MATERIALS), (*WELDS,
TOUGHNESS), (*ALLOYS, MECHANICAL PROPERTIES), LOW-
TEMPERATURE RESEARCH, CRYOGENICS, FATIGUE (MECHANICS),
ALUMINUM ALLOYS, NICKEL ALLOYS, MARAGING STEELS,
STAINLESS STEEL, TITANIUM ALLOYS, SPACE VEHICLES, ROCKET
CASES, SHEETS, FRACTURE (MECHANICS), EXPERIMENTAL DATA,
TABLES, STATISTICAL ANALYSIS, CHEMICAL ANALYSIS (U)
IDENTIFIERS: ALUMINUM ALLOY 7039-T6, STEEL 18NI,
HASTELLOY (ALLOYS), INCONEL (ALLOYS), FRACTURE
TOUGHNESS, STAINLESS STEEL 304, RENE 41 (ALLOY),
TITANIUM ALLOY 6AL 4V, STAINLESS STEEL 310, ALUMINUM
ALLOY 2219-T81 (U)

THE OBJECTIVES OF THIS INVESTIGATION ARE A
DISCUSSION OF THE TEST PROGRAM AND SELECTION OF TEST
MATERIALS; A BRIEF DESCRIPTION OF TEST SPECIMENS AND
APPARATUS IS GIVEN. TEST RESULTS ARE DISCUSSED.
TEST DATA INCLUDE TENSILE, NOTCHED TENSILE, WELD
TENSILE, AXIAL FATIGUE, AND CRACK PROPAGATION
PROPERTIES OF 7039-T6 ALUMINUM ALLOY, 18% NICKEL
MARAGING STEEL, HASTELLOY B, AND 718 NICKEL BASE
ALLOY FROM 75 TO -423 F. PLANS FOR FUTURE WORK,
ARE GIVEN. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-458 251

THOMPSON (H I) FIBER GLASS CO GARDENA CALIF

INVESTIGATION OF ADVANCED DESIGN CONCEPTS FOR DEEP
SUBMERSIBLES. (U)

DESCRIPTIVE NOTE: FINAL REPT., 8 JAN 64-8 FEB 65,

FEB 65 1V ABILDSKOV, D. ; DAINES, J. ;

CONTRACT: NOBS90180

PROJ: R007 03 04 ,KITCOPROJ. 231292

TASK: 1008

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SUBMARINE HULLS, DESIGN), (*PRESSURE
VESSELS, FILAMENT WOUND CONSTRUCTION), (*FILAMENT WOUND
CONSTRUCTION, MECHANICAL PROPERTIES), STIFFENED
CYLINDERS, SANDWICH CONSTRUCTION, GLASS TEXTILES,
COMPOSITE MATERIALS, LAMINATES, EPOXY PLASTICS, EXPANDED
PLASTICS, BUCKLING, BONDING, BONDED JOINTS, MODEL TESTS,
HYDROSTATIC PRESSURE, CYLINDRICAL BODIES, STRUCTURAL
SHELLS, STRESSES, MATHEMATICAL ANALYSIS, MATERIAL
FORMING, STRUCTURES (U)

THIS PROGRAM INVESTIGATED DESIGN CONCEPTS OF
FILAMENT-WOUND DEEP-DIVING SUBMERSIBLE VEHICLES.
SMALL SCALE CYLINDRICAL SHELL MODELS WERE DESIGNED,
FABRICATED AND TESTED UNDER HYDROSTATIC EXTERNAL
PRESSURE. MODEL CONFIGURATIONS EVALUATED INCLUDE
RING-STIFFENED CYLINDERS WITH BOTH CONSTANT AND
VARIABLE WALL THICKNESS BETWEEN RING STIFFENERS,
SANDWICH-WALL AND BILAYER DESIGNS. THE TARGET
COLLAPSE PRESSURE WAS 13,333 PSI. PROBLEMS OF
MAJOR CONCERN WERE DEVELOPMENT OF ANALYTICAL
TECHNIQUES TO PREDICT STRESS LEVELS AND BUCKLING
PRESSURES, DISCONTINUITY LOADS AT THE MODEL ENDS,
ADHESIVE BONDS IN THE SANDWICH-WALL MODELS, OBTAINING
HOLLOW GLASS WITH THE DESIRED HOLLOWNESS RATIO AND
DEFINING MATERIAL PROPERTIES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-467 730

PICATINNY ARSENAL DOVER N J FELTMAN RESEARCH LABS

DESIGN OF PRESSURE VESSELS FOR CONFINING
EXPLOSIVES.

(U)

DESCRIPTIVE NOTE: TECHNICAL MEMO.,

JUL 65 25P

MACKENZIE, A. ; DALRYMPLE, E.

W. ; SCHWARTZ, F. ;

PROJ: IC10501A07

MONITOR: PA TM-1643

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•PRESSURE VESSELS, DESIGN),
MATERIALS, ALLOYS, ALUMINUM ALLOYS, STAINLESS
STEEL, LEAD, METAL PLATES, DETONATION WAVES,
SHOCK WAVES, EXPLOSION EFFECTS, ATTENUATION

(U)

IDENTIFIERS: ALUMINUM ALLOY 7075, STAINLESS STEEL
304, ALUMINUM ALLOY 2024, ALUMINUM ALLOY 6061,
ALUMINUM ALLOY 5456, ALUMINUM ALLOY 5086

(U)

FACTORS WHICH MUST BE CONSIDERED IN DESIGNING
PRESSURE VESSELS TO WITHSTAND, IN A RADIATION
ENVIRONMENT, HIGH, RAPIDLY APPLIED DYNAMIC IMPULSES
(SUCH AS EXPLOSIONS) ARE DEFINED AND DISCUSSED.
OF VARIOUS METALS TESTED FOR USE IN THE WALLS OF
SUCH VESSELS, SEVERAL ALUMINUM ALLOYS WERE FOUND MOST
PROMISING. SMALL AMOUNTS OF EXPLOSIVE WERE
INITIATED INSIDE CYLINDERS MADE OF VARIOUS METALS
(ALUMINUM ALLOYS, STAINLESS STEEL, AND LEAD), THE
CYLINDERS BEING CLOSED AT THE ENDS BY BEING PLACED
VERTICALLY ON A STEEL PLATE AND TOPPED WITH A SECOND
STEEL PLATE HELD IN PLACE WITH A 500-POUND LEAD
WEIGHT. CYLINDER LENGTH WAS VARIED FROM 18 TO 24
INCHES, DIAMETER FROM 3 TO 12 INCHES, AND WALL
THICKNESS FROM 1/8 TO 1 INCH. AS AN XPLOSIVE,
SPHERICAL CHARGES OF C4 WERE USED. THE WALL
MATERIALS TESTED WERE 6061-T6, 2024-T4, 5086-
H32, 5456-H323, AND 7075-T6 ALUMINUM ALLOYS;
304 STAINLESS STEEL; AND LEAD. THE REPORT CONTAINS
SPECIAL SECTIONS ON THE DESIGN OF END CLOSURES, SHOCK
ATTENUATION, PROVIDING FOR ELECTRICAL LEAD-THROUGHS
NEEDED FOR INSTRUMENTATION, AND THE USE OF A THIN
WINDOW IN THE VESSEL (NEEDED FOR IRRADIATION
EXPERIMENTS). FROM THIS INFORMATION A PRESSURE
VESSEL FOR A PARTICULAR APPLICATION CAN BE DESIGNED.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-600 215

WHITTAKER CORP SAN DIEGO CALIF NARMCO RESEARCH AND
DEVELOPMENT DIV

FILAMENT-WOUND PRESSURE VESSELS.

(U)

DESCRIPTIVE NOTE: FINAL REPT., 5 SEP 62-5 DEC 63,
DEC 63 103P WILSON, FRANK;
CONTRACT: AF34 601 14053

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, FILAMENT WOUND
CONSTRUCTION), (*FILAMENT WOUND CONSTRUCTION, PRESSURE
VESSELS), AIRCRAFT EQUIPMENT, GAS CYLINDERS, COMPOSITE
MATERIALS, GLASS TEXTILES, WINDING, GEOMETRIC FORMS,
PERFORMANCE (ENGINEERING), STANDARDS, HIGH-PRESSURE
RESEARCH

(U)

AIR PRESSURE STORAGE VESSELS ARE REQUIRED IN HIGH-
PERFORMANCE AIRCRAFT TO PERFORM VARIOUS EMERGENCY
FUNCTIONS. GLASS FILAMENT-WOUND BOTTLES AFFORD A
SUBSTANTIAL WEIGHT SAVINGS OVER STEEL, AND ARE LESS
SUBJECT TO CORROSION PROBLEMS. HOWEVER, THEY HAVE
BEEN SUBJECT TO FATIGUE FAILURES BECAUSE OF THE
STRESSES IMPOSED ON THE RELATIVELY WEAK RESIN BINDER
SYSTEM. BY REDESIGNING THE SPHERICAL BOTTLE TO A
CYLINDRICAL SHAPE HAVING ISOTENSOID DOME ENDS, AND BY
USING THE MULTISHELL METHOD OF FABRICATION, A
WEIGHT SAVINGS OF 10% TO 15% COUPLED WITH AN
INCREASE IN ULTIMATE BURST PRESSURES OF 15% TO
30% HAS RESULTED. THIS REDESIGNING TAKES
ADVANTAGE OF THE UNIDIRECTIONAL STRENGTH
CHARACTERISTICS OF THE GLASS FILAMENT AND REDUCES THE
STRESS ON THE RESIN BINDER SYSTEM TO AN ACCEPTABLE
LEVEL. RESULTS OF COMPARATIVE TESTING ON THE
REDESIGNED VESSELS AND ON GOVERNMENT FURNISHED
VESSELS INDICATE THAT THE SPECIFICATIONS FOR VESSEL
PERFORMANCE SHOULD BE MATERIALLY UPGRADED. CHANGES
IN MIL-T-25363B TO REDUCE COSTS AND INCREASE
RELIABILITY ARE RECOMMENDED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-600 336

DAVID TAYLOR MODEL BASIN WASHINGTON D C

AN EXPERIMENTAL INVESTIGATION OF CLOSURES AND
PENETRATIONS FOR PRESSURE VESSELS OF COMPOSITE
CONSTRUCTION, (U)

FEB 64 38P

KIERNAN, THOMAS J. ; KRENZKE,

MARTIN A. ;

REPT. NO. DTM8-1732

PROJ: S FO13 01 03

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, COMPOSITE MATERIALS),
(*PRESSURE VESSELS, PENETRATION), STEEL, REINFORCING
MATERIALS, CYLINDRICAL BODIES, HEMISPHERICAL SHELLS,
STRAIN (MECHANICS), FATIGUE (MECHANICS), OCEANOGRAPHIC
VESSELS, HIGH-PRESSURE RESEARCH, SUBMARINE HULLS (U)

AN EXPERIMENTAL INVESTIGATION WAS MADE OF CLOSURES
AND PENETRATIONS FOR PRESSURE VESSELS OF COMPOSITE
CONSTRUCTION DESIGNED FOR DEEP DEPTHS. A METHOD IS
PRESENTED FOR DESIGNING REINFORCEMENT FOR
PENETRATIONS THROUGH HEMISPHERICAL CLOSURES TO
PROVIDE MEMBRANE BOUNDARIES. TEST RESULTS INDICATE
THAT NO SERIOUS DIFFICULTY IS INVOLVED IN CLOSING AS
WELL AS PENETRATING CYLINDRICAL HULLS OF COMPOSITE
CONSTRUCTION. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM07

AD-602 048

MARQUARDT CORP VAN NUYS CALIF

RAMJET TECHNOLOGY PROGRAM, 1963. SECTION XIV.
AEROTHERMAL CAPABILITY OF PLASMA HEATERS. SECTION
XV. HIGH PRESSURE AIR GENERATION. (U)

DESCRIPTIVE NOTE: FINAL SUMMARY REPT., VOL. 11, 25 JAN
63-28 FEB 64,

JUN 64 85P TOTTEN, J. K. ;
REPT. NO. 25 116
CONTRACT: AF33 657 12146

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*RAMJET ENGINES, ENGINE AIR SYSTEMS
COMPONENTS), (*PLASMA JETS, HIGH-PRESSURE RESEARCH),
(*PRESSURE VESSELS, ENGINE AIR SYSTEMS COMPONENTS), JET
ENGINES, HEATERS, PLASMA PHYSICS, ELECTRIC ARCS,
SUPERSONIC FLOW, THERMAL RADIATION, ENTHALPY,
ELECTRODES, MAGNETIC FIELDS, CRYOGENICS, GAS GENERATING
SYSTEMS, FEASIBILITY STUDIES (U)

THE OBJECTIVE OF THE PLASMA ARC HEATER PROGRAM WAS
BASICALLY TO DESIGN, FABRICATE, AND TEST PLASMA
HEATERS CAPABLE OF OPERATING AT PRESSURE LEVELS
BEYOND THE CURRENT STATE-OF-THE-ART. ONE
PARTICULARLY OUTSTANDING TEST RUN WITH AIR AT 2800
PSIA PRODUCED A GAS ENTHALPY LEVEL OF 3150 BTU/LB
AT A 0.135 LB/SEC FLOW RATE WITH AN ARC POWER OF 1.12
MW. ANOTHER EXPERIMENTAL ARC HEATER WAS
SUCCESSFULLY OPERATED AT 7600 PSIA OR APPROXIMATELY
200 ATMOSPHERES. THIS PLASMA HEATER DEMONSTRATED
THE FEASIBILITY OF ARC HEATERS AT EXTREMELY HIGH
PRESSURES. THE PURPOSE OF THE HIGH PRESSURE AIR
GENERATION PROGRAM WAS TO DEMONSTRATE THE
PRACTICABILITY OF CREATING EXTREMELY HIGH PRESSURES
UTILIZING THE PRINCIPLE OF HEATING A CRYOGENIC FLUID
IN A CONSTANT VOLUME VESSEL. THE NUMERICAL GOAL OF
PRESSURE LEVELS IN EXCESS OF 50,000 PSIA WAS
SUCCESSFULLY MET WHEN ONE TEST RUN ATTAINED A
PRESSURE LEVEL OF 62,800 PSIA, AT A FLUID TEMPERATURE
OF 790R. IN ADDITION, A METHOD FOR OBTAINING AND
DOCUMENTING PRESSURE, VOLUME, AND TEMPERATURE DATA AT
PRESSURES IN EXCESS OF CURRENTLY AVAILABLE
INFORMATION WAS SUCCESSFULLY DEMONSTRATED.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-603 694

BATTELLE MEMORIAL INST COLUMBUS OHIO

DESIGN, PERFORMANCE, FABRICATION, AND MATERIAL
CONSIDERATIONS FOR HIGH-PRESSURE VESSELS, (U)

MAR 64 286P MILLS, E. J. ; ATTERBURY, T. J. ;
CASSIDY, L. M. ; EIBER, R. J. ; DUFFY, A. R. ;
CONTRACT: DAO1 021AMC203Z
MONITOR: RSIC , 173

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, MANUFACTURING METHODS),
(*WELDING, PRESSURE VESSELS), STRUCTURES, DESIGN,
PERFORMANCE (ENGINEERING), LOADING (MECHANICS), CARBON
ALLOYS, STEEL, STAINLESS STEEL, MARAGING STEELS,
MATHEMATICAL ANALYSIS, TITANIUM ALLOYS, ALUMINUM ALLOYS,
NICKEL ALLOYS, CLADDING, WELDS, AIRBORNE, MECHANICAL
PROPERTIES, STRESSES, RADIOGRAPHY, BIBLIOGRAPHIES, NON-
DESTRUCTIVE TESTING (U)

BOTTLES AND TANKS FOR HIGH PRESSURES OF 5000 POUNDS
PER SQUARE INCH AND ABOVE ARE DISCUSSED UNDER THE
CLASSIFICATIONS OF DESIGN, PERFORMANCE, FABRICATION,
AND MATERIAL CONSIDERATIONS. SINGLE-WALLED,
MULTILAYERED, AND Banded PRESSURE VESSELS ARE
CONSIDERED TOGETHER WITH MANUFACTURING METHODS.
TEST PROCEDURES AND FRACTURE INITIATION AND
PROPAGATION ARE DISCUSSED AND ANALYZED.
CONSIDERATION IS ALSO GIVEN TO MATERIALS AND
SPECIFICATIONS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-606 696

NAVAL RESEARCH LAB WASHINGTON D C

IN-DEPTH EMBRITTLEMENT TO A SIMULATED PRESSURE VESSEL
WALL OF A302-B STEEL, (U)

SEP 64 22P SERPAN, C. Z., JR.; STEELE, L.

E. ;

REPT. NO. NRL-6151

CONTRACT: AT49 5 2110

PROJ: RR007 01 46 S409, SR007 01 01

TASK: 0858

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: LEGIBILITY OF THIS DOCUMENT IS IN PART
UNSATISFACTORY. REPRODUCTION HAS BEEN MADE FROM BEST
AVAILABLE COPY.

DESCRIPTORS: (*PRESSURE VESSELS, REACTOR SYSTEM
COMPONENTS), (*REACTOR MATERIALS, STEEL), (*STEEL,
BRITTLINESS), (*RADIATION DAMAGE, REACTOR MATERIALS),
DUCTILITY, POWER REACTORS, TRANSITION TEMPERATURE,
THICKNESS, MANGANESE ALLOYS, NICKEL ALLOYS, CHROMIUM
ALLOYS, MOLYBDENUM ALLOYS (U)
IDENTIFIERS: STEEL A302-B (U)

BECAUSE OF THE SELF SHIELDING AND ATTENUATION
PROPERTIES OF THE VESSEL MATERIAL, A NUCLEAR REACTOR
PRESSURE VESSEL WILL HAVE A NEUTRON FLUX AND SPECTRUM
VARIATION ACROSS ITS THICKNESS. AS A RESULT OF
THIS VARIATION, A PRESSURE VESSEL SHOULD SHOW VARIOUS
DEGREES OF NEUTRON-INDUCED EMBRITTLEMENT THROUGHOUT
ITS THICKNESS, AND THAT IT IS POSTULATED THAT THE
EMBRITTLEMENT WILL BE GREATEST AT THE INNER WALL AND
LEAST AT THE OUTER WALL. THIS PHENOMENON HAS BEEN
INVESTIGATED BY THE IRRADIATION OF A LARGE BLOCK OF
A302-B STEEL AT THE CORE FACE OF A POOL REACTOR
IN A POSITION SIMULATING THE LOCATION OF AN ACTUAL
PRESSURE VESSEL. THE STEEL BLOCK, 6 IN. THICK, WAS
MADE TO ACCOMMODATE FIVE EQUALLY SPACED ASSEMBLIES OF
CHARPY V-NOTCH SPECIMENS WHICH, IN TURN,
REPRESENTED THE VESSEL MATERIAL AT COMPARABLE
POSITIONS. THE NOTCH DUCTILITY TEST RESULTS OF THE
IRRADIATED SPECIMENS DEMONSTRATE A SIGNIFICANT DEGREE
OF EMBRITTLEMENT AS WELL AS A SIGNIFICANT DECREASE IN
THE DEGREE OF EMBRITTLEMENT THROUGH THE SIMULATED
PRESSURE VESSEL WALL. HOWEVER, THE OBSERVED
DECREASE IS SMALL WHEN RELATED TO THE RESPECTIVE
VARIATION IN NEUTRON DOSAGE.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-606 773

NAVAL RESEARCH LAB WASHINGTON D C

IN-REACTOR STUDIES OF LOW CYCLE FATIGUE PROPERTIES OF
A NUCLEAR PRESSURE VESSEL STEEL. (U)

DESCRIPTIVE NOTE: FINAL REPT.,

JUL 64 30P HAWTHORNE, J. R. ; STEELE, D. E.

REPT. NO. NRL-6127

CONTRACT: AT 49 5 2110

PROJ: RR007 01 46 5409 , SR007 01 01

TASK: 0858

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH THE
NAVY BUREAU OF SHIPS AND THE U. S. STEEL CORP.
LEGIBILITY OF THIS DOCUMENT IS IN PART UNSATISFACTORY.
REPRODUCTION HAS BEEN MADE FROM BEST AVAILABLE COPY.

DESCRIPTORS: (*PRESSURE VESSELS, REACTOR SYSTEM
COMPONENTS), (*REACTOR MATERIALS, STEEL), (*STEEL,
REACTOR MATERIALS), (*RADIATION DAMAGE, STEEL),
(*FATIGUE (MECHANICS), REACTOR MATERIALS), HEAT
TREATMENT, MANGANESE ALLOYS, NICKEL ALLOYS, CHROMIUM
ALLOYS, MOLYBDENUM ALLOYS, METAL PLATES, POWER REACTORS,
TEST EQUIPMENT (U)

IDENTIFIERS: STEEL A 302-B (U)

AN EXPERIMENTAL IRRADIATION ASSEMBLY AND ASSOCIATED
INSTRUMENTATION WHICH HAVE BEEN DEVELOPED AND
SUCCESSFULLY UTILIZED FOR THE PERFORMANCE OF DYNAMIC
IN-REACTOR LOW CYCLE FATIGUE TESTS OF REACTOR
PRESSURE VESSEL STEELS ARE DESCRIBED. THE
EQUIPMENT PROVIDES FOR THE SIMULTANEOUS REVERSE BEND
TESTING OF AS MANY AS FIFTEEN SHEET TYPE SPECIMENS
REPRESENTING A RANGE OF STRAIN AMPLITUDES AT
CONTROLLED TEMPERATURES IN THE RANGE 300 TO 700F.
THE RESULTS OF AN EXPLORATORY INVESTIGATION ON THE
FATIGUE RESISTANCE OF ASYM TYPE A302-B STEEL
DURING IRRADIATION AT 500F ARE PRESENTED AND
COMPARED WITH DATA FROM OUT-OF-REACTOR CONTROL TESTS.
THESE PRELIMINARY DATA DO NOT INDICATE ANY
PRONOUNCED DIFFERENCE IN THE FATIGUE STRENGTH OF
IRRADIATED VERSUS UNIRRADIATED STEEL. EXPLORATORY
INVESTIGATIONS ARE CONTINUING. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-609 565

NAVAL RESEARCH LAB WASHINGTON D C

YANKEE REACTOR PRESSURE VESSEL SURVEILLANCE:
EVALUATION OF SPECIMENS EXPOSED DURING THE SECOND
CORE, (U)

NOV 64 19P SERPAN, C. Z. , JR. ; WATSON
, H. E. ; HAWTHORNE , J. R. ; STEELE, L. E. ;
REPT. NO. NRL-6179
CONTRACT: AT49 5 2110
PROJ: PRO07 01 46 5409, SK007 01 01
TASK: 0858

UNCLASSIFIED REPORT

DESCRIPTORS: (*RADIATION DAMAGE, STEEL), (*STEEL,
RADIATION DAMAGE), (*PRESSURE VESSELS, STEEL), RADIATION
MEASUREMENT SYSTEMS, RADIATION MONITORS, NUCLEAR
REACTORS, TEST METHODS, FAST NEUTRONS, TRANSITION
TEMPERATURE, DUCTILITY, PHYSICAL PROPERTIES, HEAT
TREATMENT, NUCLEAR POWER PLANTS (U)
IDENTIFIERS: YANKEE ATOMIC POWER REACTOR (U)

PRESSURE VESSEL SURVEILLANCE SPECIMENS FROM FOUR
CAPSULES IN ACCELERATED IRRADIATION POSITIONS OF THE
YANKEE ATOMIC POWER REACTOR HAVE BEEN TESTED.
IN SPITE OF THE FACT THAT THE FOUR CAPSULES WERE
LOCATED IN PHYSICALLY IDENTICAL POSITIONS ABOUT THE
FUEL CORE, THEY WERE SUBJECT TO WIDELY DIFFERENT
NEUTRON EXPOSURES (>1 MEV). THE CHARPY-V
TRANSITION TEMPERATURE INCREASE OF THE YANKEE
PRESSURE VESSEL STEEL, WHICH WAS IRRADIATED TOGETHER
WITH A REFERENCE STEEL OF THE SAME NOMINAL
COMPOSITION IN THE SAME CAPSULES, WAS SOMEWHAT LARGER
THAN THE INCREASE OF THE REFERENCE STEEL. THE DATA
FROM THE REFERENCE STEEL FOLLOWED CLOSELY THE TREND
LINE OF TRANSITION TEMPERATURE INCREASE VERSUS TOTAL
NEUTRON EXPOSURE PREVIOUSLY ESTABLISHED BY NRL FOR
540F IRRADIATIONS, BUT THAT FOR THE YANKEE VESSEL
STEEL WAS DISPLACED ALMOST 100F HIGHER THAN THE
REFERENCE STEEL. POSTIRRADIATION ANNEALING WAS
BENEFICIAL FOR THE THREE HEAT TREATMENT CONDITIONS
STUDIED, AND, IN ONE CASE, ESSENTIALLY COMPLETE
RECOVERY OF INITIAL PROPERTIES WAS OBSERVED. THE
STUDY DEMONSTRATED THE USEFULNESS OF ACCURATE
DOSIMETRY DATA FOR EACH SURVEILLANCE SPECIMEN AND THE
IMPORTANCE OF MEASUREMENTS OF THE NEUTRON DOSAGE TO
WHICH THE MONITORED REACTOR COMPONENT IS EXPOSED.
(AUTHOR)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-609 708

NAVAL RESEARCH LAB WASHINGTON D C

A NAVY ANALYSIS OF GLASS REINFORCED PLASTICS FOR
HYDROSPACE APPLICATIONS,

(U)

NOV 64 39P KIES, J. A. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PRESENTED AT NORTHEASTERN STATES
NAVY RESEARCH AND DEVELOPMENT CLINIC,
PHILADELPHIA, PA. NOV. 19, 1964.

DESCRIPTORS: (*GLASS TEXTILES, REINFORCING MATERIALS),
(*PLASTICS, FILAMENT WOUND CONSTRUCTION), (*PRESSURE
VESSELS, COMPOSITE MATERIALS), (*COMPOSITE MATERIALS,
PRESSURE VESSELS); (*FILAMENT WOUND CONSTRUCTION,
PRESSURE VESSELS); FIBERS, FATIGUE (MECHANICS), TENSILE
PROPERTIES, FRACTURE (MECHANICS), SHEAR STRESSES,
MOISTURE, POROSITY, BUBBLES, REVIEWS (U)
IDENTIFIERS: DEEP-SUBMERGENCE VESSELS (U)

RECENT ADVANCES AND REMAINING PROBLEMS IN THE STUDY
OF FILAMENT-WOUND GLASS REINFORCING PLASTICS ARE
REVIEWED. AREAS CONSIDERED ARE FATIGUE STUDIES,
SHEAR AND TENSILE CRACKING, EQUAL TENSIONING OF
FIBERS, PORT REINFORCEMENT, LAY-UP PATTERNS, MOISTURE
EFFECTS, FIBER PROPERTIES, MECHANICAL DAMAGE, AND
EFFECTS OF POROSITY OR BUBBLES IN THE RESIN.
EMPHASIS IS GIVEN TO APPLICATION TO SHELLS FOR
MANNED DEEP SUBMERGENCE VEHICLES. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-610 081

BUDD CO PHILADELPHIA PA

MANUFACTURE AND HYDROTEST OF THREE 20 INCH DIAMETER
MAR-AGING STEEL PRESSURE VESSELS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. FOR 16 MAY 63-16
OCT 64,

OCT 64 52P HAUCK, W. J. I
CONTRACT: DA36 0340RD3296
PROJ: OMS5010 1180800 51 03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, MARAGING STEELS),
(*MARAGING STEELS, PRESSURE VESSELS), NICKEL ALLOYS,
TITANIUM ALLOYS, MOLYBDENUM ALLOYS, CARBON ALLOYS,
WELDING, HEAT TREATMENT, AGING (MATERIALS), DEFORMATION,
TENSILE PROPERTIES, ROCKET CASES, CYLINDRICAL BODIES,
FRACTURE (MECHANICS) (U)
IDENTIFIERS: MARAGING STEELS 18NI (U)

THE FABRICATION OF THREE PRESSURE VESSELS AND THE
HYDROTEST OF TWO CONFIRMS THE VALIDITY OF THE DESIGN
CONCEPT AND THE MATERIAL SELECTED. THE USE OF 18%
NICKEL MAR AGING STEEL STRIP AT A YIELD STRENGTH
APPROACHING 300,000 PSI IS POSSIBLE IN A ROCKET CASE.
TEST RESULTS INDICATE THAT THE PROCESSING
TECHNIQUES ARE PRACTICAL AND THAT CONSISTENCY CAN BE
OBTAINED. SIMPLICITY OF FABRICATION AND HEAT
TREATMENT SHOULD BE A FAVORABLE ECONOMIC RESULT EVEN
THOUGH THE BASIC MATERIAL COST OF THE MAR-AGING STEEL
IS SOMEWHAT HIGHER THAN THE LOWER ALLOY STEELS
CURRENTLY USED IN ROCKET MOTORS. IT IS BELIEVED
THAT UTILIZING THE FULL PROPERTIES AVAILABLE IN THE
MAR-AGING STEEL AND THE PROCESSING TECHNIQUES
DEVELOPED, THAT TENSILE STRENGTHS SUBSTANTIALLY IN
EXCESS OF 300,000 PSI ARE FEASIBLE FOR METAL ROCKET
CASES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-611 782

ARIZONA UNIV TUCSON

THE DESIGN OF RESEARCH APPARATUS FOR CONSTANT-VOLUME
COMBUSTION PROCESSES. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,

64 66P ANDERSON, EVERETT E. ;

CONTRACT: AF33 608 1038

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COMBUSTION CHAMBERS, DESIGN),
(*LABORATORY EQUIPMENT, COMBUSTION), (*PRESSURE VESSELS,
COMBUSTION CHAMBERS), CONTROL, TEMPERATURE, PRESSURE,
IGNITION, WATER VAPOR, FLAME PROPAGATION, SAFETY, STEEL,
GLASS, IGNITERS, PHOTOGRAPHIC RECORDING SYSTEMS,
MATHEMATICAL ANALYSIS, STRESSES, SPHERES (U)

A DESIGN FOR THE CONSTRUCTION AND SELECTION OF
APPARATUS FOR CONSTANT-VOLUME COMBUSTION PROCESSES
RESEARCH IS PRESENTED. A DISCUSSION OF THE DESIGN
CRITERIA AND CALCULATIONS WITH REGARD TO TEMPERATURE,
PRESSURE, MATERIAL, ETC., IS MADE. COMPLETE
ENGINEERING DRAWINGS AND MATERIAL LISTINGS ARE
INCLUDED IN ORDER THAT THIS PAPER MAY BE USED IN THE
ACTUAL CONSTRUCTION OF A CONSTANT-VOLUME SPHERICAL
BOMB AND SELECTION OF THE ASSOCIATED EQUIPMENT.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-612 872

SOUTHWEST RESEARCH INST SAN ANTONIO TEX

EXPERIMENTAL STRESS ANALYSIS OF A ONE-SIXTH SCALE
MODEL OF AN ANECHOIC PRESSURE VESSEL. (U)

DESCRIPTIVE NOTE: FINAL REPT.,

MAY 64 40P SCHMIDT, W. R. PICKETT, A. G. ;
CONTRACT: NONR370400
PROJ: 03 1178

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ANECHOIC CHAMBERS, MODEL TESTS),
(*STRESSES, MATHEMATICAL ANALYSIS), (*PRESSURE VESSELS,
ANECHOIC CHAMBERS), MODEL TESTS, SPHERES, EXPERIMENTAL
DATA, DESIGN (U)

AN EXPERIMENTAL STRESS ANALYSIS WAS MADE TO CONFIRM
THE DESIGN FEASIBILITY OF A DOUBLE WALL 40-FOOT
DIAMETER SPHERICAL PRESSURE VESSEL TO BE USED AS AN
ANECHOIC CHAMBER. ELECTRICAL RESISTANCE STRAIN
GAGES WERE USED TO MEASURE STRAINS ON THE SURFACE OF
THE TEST ARTICLE; A ONE-SIXTH SCALE MODEL OF THE
ANECHOIC VESSEL, FOR SEVERAL POSSIBLE COMBINATIONS OF
INTERNAL PRESSURE, ANNULUS PRESSURE AND DEAD WEIGHT
LOADS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-613 552

NAVAL RESEARCH LAB WASHINGTON D C

TENSILE STRESSES ON THE SURFACE OF AN ELLIPSOIDAL
CAVITY IN COMPRESSIVE LOADING SITUATIONS, (U)

DESCRIPTIVE NOTE: INTERIM REPT.,

MAR 65 13P MULVILLE, D. R. IKIES, J. A. ;

REPT. NO. NRL-6210

PROJ: WWO41

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, COMPRESSIVE
PROPERTIES), BRITTLINESS, SOLIDS, BUBBLES, ELLIPSOIDS,
TENSILE PROPERTIES, STRESSES, HYDROSTATIC PRESSURE,
FAILURE (MECHANICS), SUBMARINE HULLS (U)

THE STRESSES ON THE WALLS OF EMBEDDED CAVITIES HAVE
BEEN INVESTIGATED, PARTICULARLY FOR COMPRESSIVE
LOADING SITUATIONS CORRESPONDING TO THOSE FOR SHELLS
FOR DEEP SUBMERGENCE. THE DISCREPANCY BETWEEN
THEORETICAL AND MEASURED COMPRESSIVE STRENGTH OF
BRITTLE SOLIDS IS ONE MOTIVATING FACTOR FOR EXTENDING
THIS INVESTIGATION. THE MAXIMUM TENSILE STRESS
COMPONENTS ARE EQUAL NUMERICALLY TO THE APPLIED
COMPRESSIVE STRESS. THE MAXIMUM TENSILE STRESSES
DEPEND ON THE SHAPE OF THE CAVITY, POISSON'S RATIO,
AND THE ORIENTATION OF THE CAVITY IN THE SHELL. IT
IS RECOMMENDED THAT THE WORK CONTINUE WITH THE AIM OF
SHOWING THE EFFECTS OF CAVITIES ON STRENGTH. ONE
APPROACH RECOMMENDED IS TO CALCULATE THE EFFECTS OF
CRACKS IN THE WALLS OF THE CAVITIES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-614 591

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF
ENGINEERING MECHANICS

CASCADE ARRANGEMENT IN SPHERICAL PRESSURE VESSEL
DESIGN FOR NUCLEAR POWER REACTORS, (U)

JAN 65 29P HU.L. W. ISCHUTZLER, J. C. :
CONTRACT: AF AFOSR127 64
MONITOR: AFOSR , 65-0315

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, CASCADE STRUCTURES),
(*PRESSURIZED WATER REACTORS, PRESSURE VESSELS),
STRESSES, SPHERES, REACTOR COOLANTS, NUMERICAL
ANALYSIS (U)

A CASCADE ARRANGEMENT OF PRESSURE VESSELS IS
SUGGESTED FOR NUCLEAR POWER REACTOR DESIGN. THE
STRESS ANALYSIS AND A PROCEDURE FOR THE MINIMUM
WEIGHT DESIGN OF CASCADE SPHERICAL SHELLS ARE
PRESENTED. A NUMERICAL EXAMPLE OF TWO STAGE
SPHERICAL SHELLS IS GIVEN TO DEMONSTRATE THE
PROCEDURES DEVELOPED AS WELL AS THE NEED OF SUCH
PRESSURE VESSELS IN NUCLEAR POWER REACTOR DESIGN.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM07

AD-615 022

FRANKFORD ARSENAL PHILADELPHIA PA

FRACTURE TOUGHNESS AND PRESSURE VESSEL PERFORMANCE. (U)

AUG 63 12P CARMAN, CARL M. ; ARMIENTO,
DOMENIC F. ; MARKUS, HAROLD ;
REPT. NO. A63-24
PROJ: 1H024401A111

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. PREPARED FOR PRESENTATION AT THE
WINTER ANNUAL MEETING OF THE AMERICAN SOCIETY OF
MECHANICAL ENGINEERING, PHILADELPHIA, PA., 17-22
NOV 63. ASME PAPER NO. 63-WA-138 PUB. IN JOURNAL
OF BASIC ENGINEERING P1-7 1963 (COPIES NOT AVAILABLE
TO DDC OR CLEARINGHOUSE CUSTOMERS).

DESCRIPTORS: (*PRESSURE VESSELS, FRACTURE (MECHANICS)),
(*FRACTURE (MECHANICS), PRESSURE VESSELS),
METALLOGRAPHY, IRON ALLOYS, TOUGHNESS, FATIGUE
(MECHANICS), FAILURE (MECHANICS), STRESSES, STRAIN
(MECHANICS), FRACTOGRAPHY (U)

CRITERIA FOR PREDICTING PRESSURE VESSEL PERFORMANCE
BASED ON FRACTURE TOUGHNESS ARE REVIEWED IN GENERAL
TERMS. EXPERIMENTAL STUDIES OF SMALL PRESSURE
VESSELS FABRICATED OF HIGH TOUGHNESS, HIGH STRENGTH
STEEL 4330V (MOD + SI) ARE DESCRIBED. DATA
PRESENTED INCLUDE FATIGUE LIFE IN PRESENCE OF A SMALL
PART-THROUGH-CRACK AND BURST PROPERTIES OF THE
FATIGUE CRACKED CYLINDERS. INTERPRETATION OF THE
FATIGUE DATA IS BASED ON PARIS' RELATIONSHIP $DA/$
 $DN = K$ TO 4TH POWER/M. THE FAILURE STRESSES
ARE DISCUSSED IN RELATION TO THE STRESS ELEVATING
EFFECT OF LOCAL BULGING ON THE APPARENT FRACTURE
TOUGHNESS. THE BEHAVIOR OBSERVED IN TESTING FULL
SCALE HIGH STRENGTH PRESSURE VESSELS FABRICATED FROM
MATERIALS HAVING INTERMEDIATE FRACTURE TOUGHNESS,
NAMELY, D6A STEEL AT 200,000-PSI YIELD STRENGTH
AND 300M STEEL AT 230,000-PSI YIELD STRENGTH AND
MATERIALS HAVING LIMITED FRACTURE TOUGHNESS, NAMELY,
TWENTY PERCENT NICKEL MARAGING STEEL AT 280,000-PSI
YIELD STRENGTH, ARE DISCUSSED IN RELATION TO THE
RATIO OF FRACTURE TOUGHNESS TO PLANE-STRAIN FRACTURE
TOUGHNESS BASED ON THE PART-THROUGH-CRACK MODEL.
PRECAUTIONS NECESSARY FOR FABRICATION AND
INSPECTION TO INSURE RELIABLE PERFORMANCE ARE
DISCUSSED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-615 415

ALLIED RESEARCH ASSOCIATES INC CONCORD MASS

PHOTOELASTIC INVESTIGATION OF STRESSES IN A
PENETRATED HEMISPHERE.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,

DEC 64 35P

HAMILTON, HAROLD ; BECKER,

HERBERT ;

REPT. NO. ARA-F-271-5

CONTRACT: NOBS90363

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PHOTOELASTICITY, PRESSURE VESSELS),
(*PRESSURE VESSELS, STRESSES), (*STRESSES, MATHEMATICAL
ANALYSIS), HEMISPHERICAL SHELLS, PLASTICS, LOAD
DISTRIBUTION, FRICTION, SURFACE PROPERTIES, PENETRATION,
MODEL TESTS, STEEL, SPHERES, PRESSURE, ACRYLIC RESINS,
EPOXY PLASTICS, POLARISCOPES (U)

A PHOTOELASTIC STUDY WAS MADE TO DETERMINE THE
INFLUENCE OF SEAT CONDITIONS ON THE STRESS
DISTRIBUTION IN A REPRESENTATIVE PLASTIC WINDOW OF A
BATHYSCAPH PRESSURE VESSEL. FRICTION MEASUREMENTS
WERE MADE FOR COMPARISON OF MATERIALS AND SURFACE
FINISHES. TWODIMENSIONAL TESTS ESTABLISHED THE
GENERAL CHARACTER OF THE STRESS DISTRIBUTIONS IN THE
WINDOW, AND THREEDIMENSIONAL TESTS REVEALED THE
STRESSES IN A SCALE MODEL OF THE PROTOTYPE. IT WAS
FOUND THAT THE THREEDIMENSIONAL STRESS DISTRIBUTION
IN THE REGION OF THE INNER FACE OF A PLASTIC WINDOW,
WHEN TESTED IN A STEEL SPHERE AND LOADED UNDER
EXTERNAL PRESSURE, WAS SIMILAR TO STRESSES IN THE
TWO-DIMENSIONAL MODELS IN THAT SAME REGION. THE
RATIO OF MAXIMUM STRESS TO APPLIED PRESSURE WAS FOUND
TO BE 0.85 IN THE THREE-DIMENSIONAL WINDOW MODEL,
WHICH WOULD ALSO PERTAIN TO THE PROTOTYPE. THIS
REPORT INCLUDES A RECAPITULATION OF THE DATA OBTAINED
ON PREVIOUS STUDIES OF THE STRUCTURAL BEHAVIOR OF
EXTERNALLY PRESSURIZED SPHERICAL VESSELS WITH WINDOW
AND HATCH PENETRATIONS, THE REMAINING WINDOW
PROBLEMS ARE IDENTIFIED AND DISCUSSED, AND
RECOMMENDATIONS ARE MADE FOR FUTURE PROJECTS.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-617 890

ILLINOIS UNIV URBANA DEPT OF THEORETICAL AND APPLIED
MECHANICS

PHOTOELASTIC STUDY OF THE STRESSES NEAR OPENINGS IN
PRESSURE VESSELS, (U)

MAR 65 101P TAYLOR, C. E. ILIND, N. C. ;
REPT. NO. T/AM-270
CONTRACT: NOBS72069 , NOBS86112

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PHOTOELASTICITY, PRESSURE VESSELS),
(*PRESSURE VESSELS, STRESSES), (*STRESSES,
PRESSURE VESSELS), MODEL TESTS, EXPERIMENTAL DATA,
MATHEMATICAL ANALYSIS, LOAD DISTRIBUTION, NOZZLES,
TEST METHODS, STRUCTURES, SPHERES, CYLINDRICAL
BODIES, STRUCTURAL SHELLS, SURFACE PROPERTIES (U)

THE REPORT DESCRIBES THE EXPERIMENTAL TECHNIQUES
USED IN THE STUDY, PRESENTS THE RESULTS, AND
DISCUSSES THE PROBABLE ACCURACY. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-617 902

NAVAL APPLIED SCIENCE LAB BROOKLYN N Y

DEVELOPMENT OF WELDING TECHNIQUES FOR FABRICATING A
THICK PLATE TITANIUM PRESSURE BOX. (U)

DESCRIPTIVE NOTE: TECHNICAL MEMO.

64 17P

REPT. NO. 6377-4 ,TM-7

PROJ: SFD13 01 03 ,SRO07 01 02

TASK: 0216 ,0704

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TITANIUM ALLOYS, WELDING),
(*WELDING, TITANIUM ALLOYS), (*PRESSURE VESSELS,
TITANIUM ALLOYS), TITANIUM, METAL PLATES,
THICKNESS, WELDS, CONTAINERS, SURFACE
PROPERTIES, CONTAMINATION, TESTS, HYDROSTATIC
PRESSURE, ALUMINUM ALLOYS, VANADIUM ALLOYS (U)
IDENTIFIERS: TITANIUM ALLOY 6 AL 4 V (U)

SUITABLE OUT-OF-CHAMBER, MANUAL AND SEMI-AUTOMATIC
WELDING TECHNIQUES HAVE BEEN DEVELOPED FOR THE
FABRICATION OF A TITANIUM ALLOY PRESSURE BOX OF THE
TYPE REQUIRED FOR LOW CYCLE FATIGUE STUDIES AT THE
MARINE ENGINEERING LABORATORY. THESE
TECHNIQUES MAY ALSO BE USED FOR FABRICATING COMPLEX
STRUCTURAL ELEMENTS OF HEAVY PLATE TITANIUM.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-621 281

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE MARSEILLE
(FRANCE)

PRESSURE CHAMBER FOR MICROELECTROPHYSIOLOGICAL
TECHNIQUES (CAISSON DE COMPRESSION POUR TECHNIQUES
MICROELECTROPHYSIOLOGIQUES), (U)

OCT 64 13P CHAGNEUX, ROGER ;
CONTRACT: AF-EOAR-114-63, PHS-NB-03337
PROJ: AF-9777
TASK: 977701
MONITOR: AFOSR , 65-1294

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN BULL INST OCEANOGR
MONACO V61 N1287 P1-8 1964 (COPIES AVAILABLE ONLY TO
DDC USERS). TEXT IN FRENCH WITH SUMMARY IN
ENGLISH.

DESCRIPTORS: (*PRESSURE VESSELS, LABORATORY
EQUIPMENT), (*BIOLOGICAL LABORATORIES, PRESSURE
VESSELS), PRESSURE, REMOTE CONTROL SYSTEMS, HIGH-
PRESSURE RESEARCH, GASES, NERVE CELLS, NERVOUS
SYSTEM, PHYSIOLOGY, MARINE BIOLOGY (U)
IDENTIFIERS: ELECTROPHYSIOLOGY (U)

THIS RESEARCH PROGRAM ON THE EFFECT OF HYPERBAR
GASES ON ISOLATED NERVE CELLS OF 'APLYSIA' HAS
INVOLVED THE STUDY AND CONSTRUCTION OF A PRESSURE
CHAMBER. THE CHAMBER IS MAINLY COMPOSED OF A
CYLINDRICAL TUBE, WITH 2 GLASS PORTHOLES ALLOWING THE
ILLUMINATION AND OBSERVATION OF THE BIOLOGICAL
PREPARATIONS, AND 2 MOVEABLE DOORS WITH A
QUICKCLOSING SYSTEM WHICH PERMIT MICROMANIPULATION.
ELECTRICAL CONNECTIONS ASSURE ALL THE VARIOUS
REMOTE CONTROLS. TWO TAPS, PURGE AND STOP, A
MANOMETER AND A SAFETY VALVE COMPLETE THE EQUIPMENT
OF THE CHAMBER. THE EQUIPMENT MEETS THE
REQUIREMENTS OF MICROELECTROPHYSIOLOGICAL TECHNIQUES
AND CAN SUBMIT THE PREPARATIONS TO CONSTANT PRESSURES
OF AS MUCH AS 6 BARS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-621 911

DIRECTORATE OF SCIENTIFIC INFORMATION SERVICES OTTAWA
(ONTARIO)

REPAIRING THICK-WALLED HIGH-PRESSURE VESSELS BY
ELECTRIC ARC WELDING, (U)

DEC 64 7P FARBER, G. KH. INIKITIN, D. G.

REPT. NO. T-418-R

MONITOR: TT , 65-40732

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF KHIMICHESKOE
MASHINOSTROENIE (USSR) V5 N4 P29-32 1963. ALSO
AVAILABLE FROM NRC AS C-5161.

DESCRIPTORS: (*ARC WELDING, PRESSURE VESSELS),
(*PRESSURE VESSELS, ARC WELDING), (*STEEL, ARC
WELDING), USSR, MAINTENANCE, THICKNESS, CHROMIUM
ALLOYS, NICKEL ALLOYS, MOLYBDENUM ALLOYS, HEAT
EXCHANGERS, WELDING RODS (U)

A WELDING TECHNIQUE IS DESCRIBED FOR WELD BUILD-UP
OF DAMAGED AREAS IN THICK-WALLED VESSELS AND TO
RESTORE REACTION COLUMNS AND HEAT EXCHANGERS.
THREE COLUMNS AND A HEAT-EXCHANGER WERE KEPT UNDER
OBSERVATION DURING ONE OPERATING YEAR. THE
EQUIPMENT WORKED AT A PRESSURE OF 280-300 ATMOSPHERES
AND A TEMPERATURE OF 350-390C INSIDE THE REACTION
COLUMNS AND 200-350C IN THE HEATEXCHANGERS.
ACCORDING TO THE READINGS OF SURFACE THERMOCOUPLES
THE TEMPERATURE OF THE OUTER WALLS OF THE APPARATUS
FLUCTUATED WITHIN THE LIMITS 160-220C. ONLY IN
SOME UNITS WAS THERE OBSERVED A LOCAL OVERHEATING TO
TEMPERATURES 250-300C. VISUAL EXAMINATIONS SHOWED
THAT NO VISIBLE DEFECTS WHATEVER HAD DEVELOPED IN THE
REPAIRED AREAS ON THE VESSEL WALLS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-623 166

NAVY ELECTRONICS LAB SAN DIEGO CALIF

PRESSURE VESSEL FOR CALIBRATING SONAR TRANSDUCERS.
ACOUSTICALLY TRANSPARENT FIBER GLASS CAPSULE PERMITS
TESTING AT PRESSURES TO 800 PSIG. (U)

DESCRIPTIVE NOTE: RESEARCH AND DEVELOPMENT REPT. FOR OCT
64-MAR 65,

JUL 65 21P GREEN, C. E. I

REPT. NO. NEL-1301

PROJ: SF101 03 18

TASK: 8049

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, TEST FACILITIES),
(*GLASS TEXTILES, PRESSURE VESSELS), (*SONAR
EQUIPMENT, CALIBRATION), (*TRANSDUCERS, SONAR
EQUIPMENT), PRESSURE, ACOUSTIC EQUIPMENT, SOUND
TRANSMISSION, HIGH-PRESSURE RESEARCH, ACOUSTIC
IMPEDANCE (U)

ACOUSTICALLY TRANSPARENT VESSEL HOUSES A SINGLE
TRANSDUCER FOR TESTING UNDER PRESSURE TO 800 PSIG.
TESTS OF B24FA TRANSDUCER INDICATE MARKED
DIFFERENCE IN TRANSMITTING RESPONSE AT DEPTH.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-625 950 14/2 8/10 13/8
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

THE CONVERSION OF 16-INCH PROJECTILES TO PRESSURE
VESSELS. (U)

DESCRIPTIVE NOTE: TECHNICAL NOTE,
JUN 65 67P GRAY, K. O. ; STACHIW, J. D. ;
REPT. NO. NCEL-TN-755
PROJ: Y-F-015-01-07-001

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROJECTILES, PRESSURE VESSELS),
(*PRESSURE VESSELS, UNDERWATER EQUIPMENT), DESIGN,
MANUFACTURING METHODS, PROCESSING, TESTING,
OCEANOGRAPHIC EQUIPMENT, SEALS (STOPPERS),
MECHANICAL DRAWING, DEEP SUBMERGENCE (U)

PRESSURE VESSELS FOR USE WITH FRESH WATER AND SEA
WATER AT PRESSURES UP TO 20,000 PSI HAVE BEEN
FABRICATED FROM MODIFIED 16-INCH HIGH CAPACITY
NAVAL PROJECTILES. DETAILS FOR MODIFICATION OF
PROJECTILES AND THE FABRICATION OF SUPPORTING
EQUIPMENT ARE PRESENTED. PROOF TESTING PROCEDURE
AND DATA ARE DESCRIBED AND DISCUSSED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-628 877 13/8 13/4
GIBBS LAB YALE UNIV NEW HAVEN CONN

TECHNIQUE FOR FORMING PRESSURE WINDOWS FROM THIN
METAL SHEETS.

(U)

DESCRIPTIVE NOTE: REVISED ED.,
SEP 65 2P CLELAND, W. E. ; PREPOST, R. ;

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN REVIEW OF SCIENTIFIC
INSTRUMENTS V36 N12 P1881-3 1965. COPIES TO DDC USERS
ONLY.

SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT RECEIVED 15
MAR 65. PREPARED IN COOPERATION WITH HIGH ENERGY
PHYSICS LAB., STANFORD UNIV., CALIF., REPT. NO.
HEPL-427. RESEARCH SUPPORTED IN PART BY AFOSR, ARPA
AND NONR.

DESCRIPTORS: (*PRESSURE VESSELS,
DIAPHRAMS(MECHANICS)), (*DIAPHRAMS(MECHANICS),
SHEETS), (*MATERIAL FORMING,
DIAPHRAMS(MECHANICAL)), ALUMINUM ALLOYS,
STAINLESS STEEL, THICKNESS,
FRACTURE(MECHANICS)

(U)

REPRINT: TECHNIQUE FOR FORMING PRESSURE WINDOWS FROM
THIN METAL SHEETS.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-629 881 18/10 18/9
NAVAL RESEARCH LAB WASHINGTON D C

RADIATION DAMAGE SURVEILLANCE OF POWER REACTOR
PRESSURE VESSELS.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,

JAN 66 23P SERPAN, C. Z. ,JR.; STEELE, I.
E. ; HAWTHORNE, J. R. ;
REPT. NO. NRL-6349,
CONTRACT: AT(49-5)-2110,
PROJ: RR-007-01-46-5409 ,SR-007-01-01
TASK: 0858,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*RADIATION DAMAGE, PRESSURE VESSELS),
(*PRESSURE VESSELS, RADIATION DAMAGE), (*POWER
REACTORS, PRESSURE VESSELS), NEUTRON FLUX, LIFE
EXPECTANCY, TRANSITION TEMPERATURE, NUCLEAR POWER
PLANTS, MECHANICAL PROPERTIES, REACTOR SAFETY
SYSTEMS, REACTOR SYSTEM COMPONENTS

(U)

THE DELETERIOUS EFFECT OF HIGH ENERGY NEUTRONS UPON
THE MECHANICAL PROPERTIES OF REACTOR PRESSURE VESSEL
STEELS HAS PROMPTED THE EMPLOYMENT OF MATERIAL
SURVEILLANCE PROGRAMS IN MANY NUCLEAR POWER PLANTS.
THESE PROGRAMS PROVIDE FOR THE EXPOSURE OF TEST
SPECIMENS REPRESENTATIVE OF THE REACTOR PRESSURE
VESSEL AT IN-REACTOR LOCATIONS, WHEREIN THEY WILL
EXPERIENCE THE SAME THERMAL AND RADIATION DAMAGE
HISTORY AS THE VESSEL ITSELF. EVALUATION OF THESE
SPECIMENS, WHICH REVEALS THE PROGRESSIVE CHANGES IN
THE MECHANICAL PROPERTIES OF THE VESSEL, PROVIDES A
BASIS UPON WHICH OPERATIONAL PROCEDURES AND MAXIMUM
LIFETIME EXPOSURE MAY BE FORMULATED FOR THE PLANT.
A REVIEW AND AN ANALYSIS OF SEVERAL INSTANCES OF
SHORTCOMINGS IN SURVEILLANCE PROGRAMS ARE PRESENTED
ALONG WITH A SET OF RECOMMENDATIONS FOR CONSIDERATION
IN PLANNING NEW SURVEILLANCE PROGRAMS. IN
UTILIZING THESE RECOMMENDATIONS, PRESSURE VESSEL
SURVEILLANCE PROGRAMS CAN BE MADE TO PROVIDE VALUABLE
INFORMATION FOR USE IN DETERMINING PLANT OPERATIONS;
AT THE SAME TIME RESULTS FROM THESE PROGRAMS MAY ADD
TO THE GENERAL KNOWLEDGE OF RADIATION EFFECTS IN
PRESSURE VESSEL STEELS OR OTHER MATERIALS SUBJECT TO
RADIATION. RECOGNITION OF THE VALUE OF
SURVEILLANCE PROGRAMS AND THEIR CONSCIENTIOUS
APPLICATION SHOULD FURTHER THE PUBLIC ACCEPTANCE OF
NUCLEAR REACTORS AS SAFE ALTERNATIVE POWER SYSTEMS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-631 443 16/4.2 21/8.1
BENDIX MISHAWAKA DIV BENDIX CORP IND

DEVELOPMENT OF A HERMETIC SEALED NITROGEN STORAGE
SYSTEM FOR THE TALOS RIM-8E FUEL PRESSURIZATION
SYSTEM.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
FEB 66 67P CLAXTON, W. B. ;
REPT. NO. BXM-5930,
CONTRACT: NOW-65-0289

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*GUIDED MISSILE COMPONENTS, PRESSURE
VESSELS), (*FUEL SYSTEMS, *PRESSURE VESSELS),
(*TANKS(CONTAINERS), FUEL SYSTEMS), NITROGEN,
STORAGE, GUIDED MISSILES(SURFACE-TO-AIR),
SHIPBORNE, HERMETIC SEALS, RELEASE MECHANISMS,
VALVES, EXPLOSIVES INITIATORS, PRESSURE
GAGES

(U)

IDENTIFIERS: FUEL PRESSURIZATION SYSTEMS,
TALOS

(U)

THE REPORT DESCRIBES A METHOD USED TO PROVIDE A
2150 PSI NITROGEN STORAGE SYSTEM THAT RETAINS
OPERATIONAL PRESSURE FOR A MINIMUM PERIOD OF THREE
YEARS WITHOUT INTERIM SERVICING. A HERMETIC TANK
SEAL AND A SQUIB OPERATED RELEASE MECHANISM WERE
DEVELOPED FOR THIS PURPOSE. THE RELEASE MECHANISM
UTILIZES A NOTCHED RELEASE TUBE THAT, WHEN IMPACTED
BY A SQUIB OPERATED PISTON, RUPTURES PROVIDING A
CONTAMINATION FREE PATH TO A PRESSURE REGULATOR.
EMPHASIS WAS GIVEN TO METHODS THAT WOULD PERMIT
RETROFIT OF AN EXISTING STORAGE SYSTEM. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-632 092

13/4

UNITED STATES RUBBER CO MISHAWAKA IND

LINERS FOR HIGH PRESSURE AIR STORAGE VESSELS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 5, 1 JAN-
1 APR 66,

APR 66 37P

UHLIG, E. C. ; FALKENAU, V. A.

; KOHRN, R. C. ;

CONTRACT: N08S-92150,

PROJ: SR-007-03-04,

TASK: 1008,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FILAMENT WOUND CONSTRUCTION, *STORAGE
TANKS), (*PRESSURE VESSELS, STORAGE TANKS), AIR,
LAMINATES, FEASIBILITY STUDIES (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-636 385 13/8 13/5 13/1
INTERNATIONAL INST OF WELDING

COMMISSION XI: PRESSURE VESSELS, BOILERS AND PIPE
LINES.

(U)

DESCRIPTIVE NOTE: ANNUAL REPT.
JUL 65 10P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*WELDING, SYMPOSIA), (*PRESSURE
VESSELS, WELDING), (*BOILERS, WELDING), (*PIPES,
WELDING), WELDS, STRESSES, STEEL, HEAT
TREATMENT, NON-DESTRUCTIVE TESTING

(U)

ANNUAL REPORT OF COMMISSION XI CONCERNING
WELDING OF PRESSURE VESSELS, BOILERS, AND PIPE LINES.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-636 963 13/4 13/7 14/2 11/6
AUBURN RESEARCH FOUNDATION ALA

MECHANISMS OF METALLIC FAILURE: FLAW INITIATION
TECHNIQUES AND MEASUREMENTS IN THIN-WALL PRESSURE
VESSELS.

(U)

JUN 66 27P MAYNOR, HAL W. ; JR. ;
BUSCH, COURTNEY C. ;
REPT. NO. 5,
CONTRACT: DA-01-021-AMC-12521(Z),

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: AN INSTRUMENTED HYDRAULIC SYSTEM FOR
THE INTRODUCTION OF CRACKS TO AND BURST TESTING OF HIGH-
STRENGTH STEEL PRESSURE VESSELS.

DESCRIPTORS: (*PRESSURE VESSELS,
*FRACTURE(MECHANICS)), (*HYDRAULIC SYSTEMS, TEST
EQUIPMENT), RUPTURE, MARAGING STEELS, NICKEL
ALLOYS, FAILURE(MECHANICS), MODEL TESTS,
TOUGHNESS, STEEL, STRESSES

(U)

A HYDRAULIC SYSTEM WAS DESIGNED AND CONSTRUCTED FOR
THE PURPOSE OF INTRODUCING SURFACE OR PART-THROUGH-
THE-THICKNESS CRACKS TO THIN-WALL (0.065-IN.)
SCALE-MODEL PRESSURE VESSELS. THE HOOP STRESSES
RESULTING FROM INTERNAL PRESSURE, IN THE RANGE 4000
TO 5000 PSI, WILL BE APPLIED AS PRESSURE PULSES AT
FREQUENCIES UP TO 160 CYCLES PER MINUTE FOR NUMBERS
OF CYCLES REQUIRED TO GROW CRACKS OF PREDETERMINED
LENGTHS. THE SYSTEM CONSISTS ESSENTIALLY OF A
MOTOR-DRIVEN HYDRAULIC PUMP, VALVES, FITTINGS, TUBING
AND APPROPRIATE INSTRUMENTATION. A COMPONENT OF THE
SYSTEM, A MANUALLY-OPERATED HYDRAULIC PUMP, WILL
AFFORD BURST PRESSURES UP TO 30,000 PSI TO TEST
VESSELS CONTAINING INDUCED CRACKS. SEVERAL VESSELS
WERE FABRICATED FROM 18 PER CENT NICKEL (250
GRADE) MARAGING STEEL. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-637 D13 20/11 13/4
CATHOLIC UNIV OF AMERICA WASHINGTON D C STRESS ANALYSIS
LABS

DISTRIBUTION OF STRESSES IN A PRESSURIZED HOLLOW
CYLINDER WITH A CIRCULAR HOLE. (U)

DESCRIPTIVE NOTE: FINAL REPT., APR 65-JUL 66.
JUL 66 37P DURELLI, A. J. ; DEL RIO, C. J. ;
PARKS, V. J. ; FENG, H. ;
CONTRACT: NONR-4886(00),
PROJ: S-F013-03-02, CUA-4.142.04
TASK: 19.54,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*STRESSES, *PRESSURE VESSELS),
CYLINDRICAL BODIES, STRUCTURAL SHELLS,
PHOTOELASTICITY, COATINGS (U)

THIS PAPER DEALS WITH AN EXPERIMENTAL DETERMINATION
OF STRESSES IN A PRESSURIZED THIN HOLLOW CYLINDER
WITH A CIRCULAR HOLE. BRITTLE COATING, MECHANICAL
AND ELECTRICAL STRAIN GAGES AND PHOTOELASTICITY WERE
USED FOR THE ANALYSIS. A COMPARISON WITH A
THEORETICAL DEVELOPMENT APPLIED TO A SIMILAR CASE IS
MADE. COMMENTS ON THE BEST EXPERIMENTAL PROCEDURES
TO BE FOLLOWED IN THE SOLUTION OF THIS KIND OF
PROBLEMS ARE MADE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-638 138 13/10 20/11
NAVAL ORDNANCE LAB WHITE OAK MD

STRESSES IN SHALLOW GLASS DOMES WITH CONSTRAINED
EDGES. (U)

JUN 66 65P PROCTOR, JAMES F. ;
REPT. NO. NOLTR-66-46
PROJ: NOL-889,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, DEEP SUBMERGENCE),
(*GLASS, STRESSES), STRUCTURAL SHELLS, HATCHES,
LOADING(MECHANICS), STRAIN(MECHANICS) (U)

STRESS-STRAIN RELATIONS DEVELOPED FOR ROTATIONALLY
SYMMETRIC BENDING AND STRETCHING OF SHALLOW SEGMENTS
OF THIN SPHERICAL SHELLS ARE EXTENDED TO EVALUATE THE
RESPONSE OF A GLASS DOME WITH EDGE CONSTRAINT TO A
UNIFORMLY APPLIED LOAD OVER A SMALL CIRCULAR AREA AT
THE APEX. THEORETICALLY DERIVED STRESS-STRAIN
CURVES FOR THE CONSTRAINED-EDGE CASE ARE COMPARED
WITH SIMILAR CURVES WITH EXPERIMENTAL RESULTS FROM
SEVERAL STATIC TESTS. ALSO THE EFFECTS OF DEGREE
OF EDGE CONSTRAINT AND LOCAL CONCENTRATION ARE
DEMONSTRATED AND DISCUSSED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM07

AD-638 925 13/4

DOUGLAS AIRCRAFT CO INC SANTA MONICA CALIF MISSILE AND
SPACE SYSTEMS DIV

STRESS ANALYSIS OF A 4-INCH DIAMETER PRESSURE VESSEL
DURING A 1:1 BIAXIAL BURST TEST. (U)

JUN 66 65P MCIVER, R. W. ;
REPT. NO. DAC-59500,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, STRESSES),
RUPTURE, TESTS, CYLINDRICAL BODIES (U)

THE INVESTIGATION WAS MADE TO DETERMINE THE
VARIATION OF STRESS RATIO IN THE TEST SECTION OF A 4-
INCH DIAMETER PRESSURE VESSEL. A 1:1 BIAXIAL
TEST WAS CONDUCTED BY APPLYING A COMBINATION OF
PRESSURE AND AXIAL LOAD AT AN ESSENTIALLY CONSTANT
RATIO TO THE TEST CYLINDER UNTIL FAILURE. THE
STRESS RATIO WAS DETERMINED AT EACH OF TWENTY-ONE
LOCATIONS FROM MEASURED PRINCIPAL STRAINS. THE
MAXIMUM VARIATION IN YIELD STRENGTH AT ANY OF THE
NINE CENTERMOST LOCATIONS IN THE TEST SECTION WAS
LESS THAN PLUS OR MINUS 1.5 PERCENT OF THEIR AVERAGE.
THIS SPECIMEN CONFIGURATION IS CONSIDERED
ACCEPTABLE FOR 1:1 BIAXIAL TESTS, PROVIDED THAT THE
THINNEST AREA OF THE SPECIMEN IS LOCATED CLOSE TO THE
AXIAL CENTER-LINE OF THE TEST SECTION. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-638 994 20/11
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA

DETERMINATION OF STRESSES AT NON-RADIAL OPENINGS IN
SPHERICAL PRESSURE VESSELS. (U)

MAR 66 35P LEVEN, M. M. ;
REPT. NO. 66-9D7-520-R1,
CONTRACT: N08S-90132,
PROJ: SF013-06,
TASK: 4218,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE VESSELS, *STRESSES),
SPHERES, EXPERIMENTAL DATA, MODEL TESTS (U)

AN ATTEMPT WAS MADE TO SIMULATE EXPERIMENTALLY THE THEORETICAL CASE OF AN OBLIQUE HOLE IN A PRESSURIZED SPHERICAL VESSEL. FOR THE CASE OF AN OPENING OF DIAMETER RATIO 0.129 AND AT 45 DEGREES TO THE RADIAL DIRECTION, SEVEN DIFFERENT CLOSURE SCHEMES WERE TRIED. THESE ARE LISTED AS WS-16B1, WS-16B1 A TO F, INCLUSIVE. RADICALLY DIFFERENT STRESSES WERE OBTAINED FOR EACH CLOSURE SCHEME, INDICATING A VERY SENSITIVE DEPENDENCE OF STRESS ON CLOSURE CONDITIONS. FOR 0 DEGREE SECTION (I.E., THE SECTION IN WHICH THE ACUTE ANGLE BETWEEN THE OPENING AND THE VESSEL IS AT THE INNER SURFACE) THE MAXIMUM STRESS VARIED FROM 2.55S TO 4.81S, S BEING THE NOMINAL STRESS IN THE SPHERICAL VESSEL. FOR THE 180 DEGREE SECTION, THE MAXIMUM STRESS VARIATION WAS FROM 3.06 TO 6.75S. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-639 160 14/2 11/6
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

ON THE METHOD OF TESTING METALS AT HIGH TEMPERATURE
AND PRESSURE VALUES. (U)

JUN 66 12P GORB, M. L. ;
REPT. NO. FTD-TT-65-1887,
MONITOR: TT 66-62286

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF
PRYKLADNA MEKHANIKA (USSR) V10 N6 P547-51 1964.

DESCRIPTORS: (*PRESSURE VESSELS, TEST EQUIPMENT),
(*METALS, TEST METHODS), USSR, HIGH-PRESSURE
RESEARCH, TEMPERATURE, MEASUREMENT, HIGH-
TEMPERATURE RESEARCH, THERMOCOUPLES (U)

THE CONSTRUCTION IS DESCRIBED OF A NEW VARIANT OF
CONICAL CYLINDRICAL HIGH PRESSURE CHAMBER. A
METHOD IS PROPOSED FOR MEASURING TEMPERATURES IN THE
HIGH PRESSURE CHAMBER, BASED ON THE PRINCIPLE OF A
NATURAL THERMOCOUPLE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-640 919 18/12 13/4
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF
ENGINEERING MECHANICS

CASCADE ARRANGEMENT IN SPHERICAL VESSEL DESIGN FOR
NUCLEAR POWER REACTORS, (U)

DEC 65 11P HU, L. W. ISCHUTZLER, J. C. ;
CONTRACT: AF-AFOSR-127-66,
PROJ: AF-9782,
TASK: 978202,
MONITOR: 66-1674

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN NUCLEAR ENGINEERING AND
DESIGN V3 P412-20 1966.

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH DOUGLAS
AIRCRAFT CO., INC., SANTA MONICA, CALIF.,
MISSILE AND SPACE SYSTEMS DIV.

DESCRIPTORS: (*PRESSURE VESSELS, CASCADE
STRUCTURES), (*POWER REACTORS, PRESSURE VESSELS),
PRESSURIZED WATER REACTORS, DESIGN (U)

THE USE OF PRESSURE VESSELS IN CASCADE ARRANGEMENT
INSTEAD OF THE CONVENTIONAL SINGLE SHELL VESSELS IS
PROPOSED FOR NUCLEAR POWER REACTOR DESIGN,
PARTICULARLY IN VIEW OF MEETING THE DEMAND OF
INCREASING PRESSURES AND TEMPERATURES FOR
PRESSURIZED-WATER REACTORS. THE STRESS ANALYSIS
AND A PROCEDURE FOR THE MINIMUM WEIGHT DESIGN OF
IRRADIATED CASCADE SPHERICAL SHELLS ARE PRESENTED.
A NUMERICAL EXAMPLE OF TWO STAGE SPHERICAL SHELLS
IS GIVEN TO DEMONSTRATE THE PROCEDURES DEVELOPED AS
WELL AS THE NEED FOR SUCH TYPE OF PRESSURE VESSELS IN
NUCLEAR REACTOR DESIGN. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-641 283 18/10 18/12
NAVAL RESEARCH LAB WASHINGTON D C

NEUTRON SPECTRAL CONSIDERATIONS AFFECTING PROJECTED
ESTIMATES OF RADIATION EMBRITTLEMENT OF THE ARMY SM-
1A REACTOR PRESSURE VESSEL. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
SEP 66 31P SERPAN, C. Z. , JR. ; STEELE, L. E.
;
REPT. NO. NRL-6474,
PROJ: USA-ERG-4-66,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*EMBRITTLEMENT, STEEL), (*PRESSURE
VESSELS, *PRESSURIZED WATER REACTORS), (*RADIATION
DAMAGE, *STEEL), REACTOR MATERIALS, NEUTRON
REACTIONS, POWER REACTORS, ARMY, ALASKA (U)
IDENTIFIERS: ARMY REACTORS(SM-1A) (U)

THE PRESSURE VESSEL OF THE ARMY SM-1A REACTOR
IS LOCATED CLOSE TO THE ACTIVE CORE IN SUCH A MANNER
THAT THE NEUTRON EXPOSURE IS RELATIVELY HIGH;
CONSEQUENTLY, THE PRESSURE VESSEL STEEL UNDERGOES A
RELATIVELY RAPID RISE IN THE DUCTILE-BRITTLE
TRANSITION TEMPERATURE. THE MAXIMUM PERMISSIBLE
DELTA NDT FOR THE SM-1A IS ESTABLISHED BY THE
ARMY AS 340F. SINCE IT IS PHYSICALLY IMPOSSIBLE
TO IRRADIATE SURVEILLANCE TEST SPECIMENS AT THE SM-
1A VESSEL WALL, ONLY THE NEUTRON FLUX WAS MEASURED
AT THE WALL, AND REPRESENTATIVE TEST SPECIMENS WERE
IRRADIATED IN A TEST REACTOR, THE LOW INTENSITY
TEST REACTOR (LITR). IN TRANSLATING THE DELTA
NDT VERSUS NEUTRON EXPOSURE DATA FROM THE LITR TO
THE CASE OF THE SM-1A REACTOR VESSEL WALL, THE
NEUTRON SPECTRA OF THE TWO REACTORS WERE USED TO
ADJUST BOTH THE SM-1A REACTOR VESSEL FLUX AND THE
LITR EXPOSURE VALUES IN TERMS OF $N/SQ\ CM < 1.0$,
 0.5 , AND $0.183\ MEV$. SINCE THE DISTRIBUTION OF
NEUTRONS BY ENERGY GROUPS WAS DIFFERENT WITHIN EACH
REACTOR AT THE SPECIFIC LOCATION OF INTEREST, THAT
IS, THE VESSEL WALL OF THE SM-1A AND AN IN-CORE
LOCATION OF THE LITR, THE DAMAGING POTENTIAL OF THE
SM-1A REACTOR SPECTRUM LOCATION WAS RELATED TO
THAT OF THE LITR. WITH DAMAGE EQUIVALENCE
ESTABLISHED BETWEEN THE TWO REACTORS, A CRITICAL
NEUTRON EXPOSURE ($N/SQ\ CM > 0.5\ MEV$) MAY BE
PROJECTED FOR PRODUCING THE MAXIMUM DELTA NDT ON
THE SM-1A REACTOR VESSEL WALL. BY RELATING.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM07

AD-641 875 13/10.1 11/2 13/13
DAVID TAYLOR MODEL BASIN WASHINGTON D C STRUCTURAL
MECHANICS LAB

AN EXPLORATORY STUDY OF THE FEASIBILITY OF GLASS AND
CERAMIC PRESSURE VESSELS FOR NAVAL APPLICATIONS. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
SEP 66 36P KIERNAN, THOMAS J. ;
REPT. NO. DTMB-2243
PROJ: S-F013-01-03
TASK: 0222

UNCLASSIFIED REPORT

DESCRIPTORS: (*SUBMARINE HULLS, DEEP SUBMERGENCE),
(*PRESSURE VESSELS, CERAMIC MATERIALS), GLASS,
SPHERES, ALUMINUM COMPOUNDS, OXIDES, STRUCTURAL
SHELLS, MODEL TESTS, LOADING(MECHANICS),
COMPRESSIVE PROPERTIES (U)

AN EXPLORATORY STUDY WAS CONDUCTED TO DETERMINE THE
FEASIBILITY OF USING GLASS AND CERAMIC MATERIALS FOR
DEEP-SUBMERGENCE PRESSURE HULLS. IN GENERAL, THE
STUDY CONFIRMED THE POTENTIAL USE OF THESE MATERIALS
IN PRESSURE HULLS CAPABLE OF WITHSTANDING PRESSURES
AT THE DEEPEST PART OF THE OCEAN WITH VERY LITTLE
STRUCTURAL WEIGHT. HOWEVER, THE STUDY ALSO SHOWED
THAT VERY LITTLE IS KNOWN ABOUT THE BEHAVIOR OF GLASS
AND CERAMIC STRUCTURES UNDER HIGH-COMPRESSIVE LOADING
AND THAT A GREAT DEAL OF BASIC DATA MUST BE GENERATED
BEFORE THIS POTENTIAL CAN BE ACHIEVED. THE USE OF
SIMPLE SPHERES OF GLASS AND CERAMIC MATERIALS FOR
PROVIDING BUOYANCY IS CONSIDERED TO BE THE MOST
PROMISING NEAR-FUTURE APPLICATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-644 556 21/2 13/12
 NAVAL RESEARCH LAB WASHINGTON D C

FLAMMABILITY IN UNUSUAL ATMOSPHERES. PART 1.
 PRELIMINARY STUDIES OF MATERIALS IN HYPERBARIC
 ATMOSPHERES CONTAINING OXYGEN, NITROGEN, AND/OR
 HELIUM.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.:
 OCT 66 28P JOHNSON, J. E. ; WOODS, F. J. ;
 REPT. NO. NRL-6470
 PROJ: RR-010-01-44-5850

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, *FIRE SAFETY),
 (*CONTROLLED ATMOSPHERES, *FLAMMABILITY),
 MATERIALS, TEXTILES, ELASTOMERS, LUBRICANTS,
 IGNITION, GASES, OXYGEN, NITROGEN, HELIUM,
 PRESSURE, SUBMARINE SIMULATORS, OXYGEN EQUIPMENT (U)
 IDENTIFIERS: DECOMPRESSION CHAMBERS, HYPERBARIC
 ATMOSPHERES (U)

A STUDY OF THE FLAMMABILITY OF FABRICS AND OTHER
 SOLIDS UNDER UNUSUAL ATMOSPHERIC CONDITIONS WAS
 INITIATED. THE MOST PROFOUND EFFECT ON BOTH EASE
 OF IGNITION AND LINEAR BURNING RATE WAS CAUSED BY
 OXYGEN ENRICHMENT. FOR EXAMPLE, MANY MATERIALS
 WHICH DID NOT IGNITE IN 21% OXYGEN IGNITED AND
 BURNED READILY AT 31% OR 41% OXYGEN. WITH A
 GIVEN ATMOSPHERE, INCREASE IN PRESSURE WAS OFTEN
 EFFECTIVE IN CAUSING IGNITION WHERE NO IGNITION
 OCCURRED AT LOWER PRESSURES. SUBSTITUTION OF
 HELIUM FOR NITROGEN IN MIXTURES WITH OXYGEN HAD TWO
 GENERALLY SIGNIFICANT EFFECTS. HELIUM DECREASED
 THE TENDENCY OF A MATERIAL TO IGNITE. THIS EFFECT
 WAS SHOWN TO BE DUE LARGELY TO THE HIGH THERMAL
 CONDUCTIVITY OF HELIUM. ONCE IGNITED, BURNING
 RATES WERE OFTEN MUCH FASTER IN HELIUM THAN NITROGEN.
 (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM07

AD-644 751 20/11
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF
ENGINEERING MECHANICS

TOROIDAL-TYPE SHELLS FREE OF BENDING UNDER UNIFORM
NORMAL PRESSURE, (U)

66 11P MURTHY, M. V. V. ; KIUSALAAS, J.
; MONITOR: AROD 5102:1

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN JOURNAL OF THE FRANKLIN
INSTITUTE V282 N4 P232-41 OCT 1966.

DESCRIPTORS: (*HYDROSTATIC PRESSURE, STRUCTURAL
SHELLS), (*PRESSURE VESSELS, HYDROSTATIC PRESSURE),
ELASTIC SHELLS, BENDING, STRESSES, HEMISPHERICAL
SHELLS, GEOMETRIC FORMS, INTEGRALS (U)

THE LINEAR MEMBRANE SOLUTION IS KNOWN TO BE
INADMISSIBLE IN THE CASE OF A TOROIDAL SHELL OF
CIRCULAR CROSS-SECTION UNDER UNIFORM HYDROSTATIC
PRESSURE, AS IT LEADS TO A SERIOUS VIOLATION OF THE
COMPATIBILITY CONDITION. THIS PAPER SHOWS THAT THE
COMPATIBILITY CAN BE RESTORED BY A SLIGHT CHANGE IN
THE MERIDIAN OF THE SHELL, RATHER THAN BY RESORTING
TO BENDING OR NON-LINEAR MEMBRANE THEORIES. EXACT
SOLUTIONS, WITHIN THE LINEAR SHELL THEORY, ARE GIVEN
FOR THE SHAPE OF THE MERIDIAN, STRESSES AND
DISPLACEMENTS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-645 787 13/8 13/4
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

NEW METHOD OF PRODUCTION OF CLAD PLATE ROLLED
PRODUCTS FOR PRESSURE VESSELS.

(U)

JUL 66 54P LUTSYUK-KHUDIN, V. A. ;
REPT. NO. FTD-MT-65-468
MONITOR: TT 67-60484

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MANCHINE TRANS. OF MONO.
NOVYI SPOSOB PROIZVODSTVA TOLSTOLISTOVOGO
DVUKHSLAINOGO PROKATA DLYA SOSUDOV VYSOKOGO
DAVLENIYA, KIEV, 1965 61P.

DESCRIPTORS: (*ROLLING(METALLURGY), CLADDING),
(*PRESSURE VESSELS, WELDING), (*STEEL,
*CLADDING), USSR, METAL PLATES, HEAT TREATMENT,
MANUFACTURING METHODS

(U)

CONTENTS: MANUFACTURE OF CLAD STEELS BY METHOD
OF LINING WITH SUBSEQUENT ROLLING; MANUFACTURE OF
CLAD STEELS BY PACK METHOD; MANUFACTURE OF PLATE
ROLLED STOCK WITH APPLICATION OF ELECTROSLAG WELDING;
TECHNOLOGY OF ELECTROSLAG WELDING OF CLAD BILLETS;
DIMENSIONS OF CLAD BILLETS UNDER ROLLING; HEATING
UNDER ROLLING AND ROLLING OF CLAD BILLETS; ADDITION
MATERIALS FOR WELDING OF CLAD BILLETS AND CONDITIONS
OF HEAT TREATMENT; PRODUCTION OF THICK-WALLED
WELDED PRESSURE VESSELS FROM CLAD STEELS;
TECHNOLOGY OF WELDING CLAD VESSELS; CONCERNING
THE QUESTION ON REJECTION OF HIGH-TEMPERATURE
TREATMENT OF WELDED VESSELS AND IMPROVEMENT OF
QUALITY OF METAL OF DURABLE CASING.

(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-646 882 13/13 13/10.1
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

WINDOWS FOR EXTERNAL OF INTERNAL HYDROSTATIC PRESSURE
VESSELS. PART I. CONICAL ACRYLIC WINDOWS UNDER
SHORT-TERM PRESSURE APPLICATION. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JAN 67 104P SYACHIW, J. D. IGRAY, K. O. ;
REPT. NO. NCEL-TR-512
PROJ: Y-F015-01-07-001

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSPARENT PANELS, ACRYLIC RESINS),
(*PRESSURE VESSELS, TRANSPARENT PANELS), CONICAL
BODIES, HYDROSTATIC PRESSURE, STRUCTURES,
UNDERWATER, LOADING(MECHANICS),
FAILURE(MECHANICS), STRUCTURAL PROPERTIES (U)

CONICAL ACRYLIC WINDOWS FOR FIXED OCEAN-FLOOR
STRUCTURES WERE PLACED UNDER SHORT-TERM LOADING
(PRESSURIZATION FROM ZERO TO FAILURE AT A FIXED
RATE). THE WINDOWS, OF DIFFERENT THICKNESSES AND
DIFFERENT INCLUDED CONICAL ANGLES, WERE SUBJECTED TO
VARIOUS APPLIED PRESSURES, AND THEIR SUBSEQUENT
BEHAVIOR WAS STUDIED. ACRYLIC WINDOWS, IN THE FORM
OF TRUNCATED CONES WITH INCLUDED ANGLES OF 30°, 60°,
90°, 120°, AND 150°, WERE TESTED TO DESTRUCTION AT
AMBIENT ROOM TEMPERATURE BY APPLYING HYDROSTATIC
PRESSURE TO THE BASE OF THE TRUNCATED CONE AT A
CONTINUOUS RATE OF 650 PSI/MIN. THE PRESSURE AT
WHICH THE WINDOWS FAILED AND THE MAGNITUDE OF
DISPLACEMENT THROUGH THE WINDOW MOUNTING AT DIFFERENT
PRESSURE LEVELS WERE RECORDED. THE ULTIMATE
STRENGTH OF THE CONICAL WINDOWS (DENOTED BY THE
CRITICAL PRESSURE AT WHICH ACTUAL FAILURE OCCURRED)
WAS FOUND TO BE RELATED BOTH TO THICKNESS AND
INCLUDED CONICAL ANGLE. GRAPHS ARE PRESENTED
DEFINING THE RELATIONSHIPS OF CRITICAL PRESSURE
VERSUS THICKNESS-TO-DIAMETER RATIO, AND PRESSURE
VERSUS MAGNITUDE OF DISPLACEMENT FOR THE WINDOWS.
NONDIMENSIONAL SCALING FACTORS FOR CRITICAL
PRESSURE AND DISPLACEMENT APPLICABLE TO LARGE-
DIAMETER WINDOWS ARE DISCUSSED AND PRESENTED IN
GRAPHIC FORM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-652 343 13/13 13/10.1
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

WINDOWS FOR EXTERNAL OR INTERNAL HYDROSTATIC PRESSURE
VESSELS. PART II. FLAT ACRYLIC WINDOWS UNDER SHORT-
TERM PRESSURE APPLICATION. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAY 67 84P STACHIW, J. D. ; DUNN, G.
M. ; GRAY, K. O. ;
REPT. NO. NCEL-TR-527
PROJ: Y-FO15-01-07-001

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-646 882, PART I.

DESCRIPTORS: (*PRESSURE VESSELS, TRANSPARENT
PANELS), (*TRANSPARENT PANELS, *ACRYLIC RESINS),
UNDERWATER, STRUCTURES, HYDROSTATIC PRESSURE,
LOADING(MECHANICS), DISKS,
FAILURE(MECHANICS) (U)

FLAT, DISK-SHAPED ACRYLIC WINDOWS OF DIFFERENT
THICKNESS-TO-DIAMETER RATIOS HAVE BEEN TESTED TO
DESTRUCTION UNDER SHORT-TERM HYDROSTATIC LOADING AT
ROOM TEMPERATURES, WHERE SHORT-TERM LOADING IS
DEFINED AS PRESSURIZING THE WINDOW HYDROSTATICALLY ON
ITS HIGH-PRESSURE FACE AT A 650-PSI/MINUTE RATE TILL
FAILURE OF THE WINDOW TAKES PLACE. CRITICAL
PRESSURES AND DISPLACEMENTS OF WINDOWS WITH THICKNESS
TO EFFECTIVE DIAMETER RATIOS LESS THAN 1.0 HAVE BEEN
RECORDED AND PLOTTED. THE CRITICAL PRESSURES
DERIVED FROM TESTING FLAT WINDOWS IN FLANGES WITH
1.5-INCH, 3.3-INCH, AND 4.0-INCH OPENINGS HAVE BEEN
FOUND APPLICABLE ALSO TO FLANGES WITH LARGER
OPENINGS, SO LONG AS THE LARGER WINDOWS ARE OF THE
SAME $T/D_{SUB I}$ AND $D_{SUB O}/D_{SUB I}$ RATIOS,
WHERE T IS THICKNESS OF THE WINDOW, $D_{SUB I}$ IS THE
CLEAR OPENING IN THE FLANGE AND THEREFORE THE
EFFECTIVE DIAMETER OF THE WINDOW EXPOSED TO AMBIENT
ATMOSPHERIC PRESSURE AND $D_{SUB O}$ IS OVERALL
DIAMETER OF THE WINDOW FACE EXPOSED TO HYDROSTATIC
PRESSURE. THE PERFORMANCE OF FLAT WINDOWS UNDER
SHORT-TERM HYDROSTATIC PRESSURE HAS BEEN FOUND TO BE
COMPARABLE TO THAT OF CONICAL WINDOWS WITH INCLUDED
ANGLE EQUAL TO, OR LARGER THAN 90 DEGREES.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-652 411 13/4 20/11 13/13
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA

PHOTOELASTIC ANALYSIS OF OPENINGS IN SPHERICAL AND
CYLINDRICAL VESSELS SUBJECTED TO INTERNAL PRESSURE. (U)

DESCRIPTIVE NOTE: RESEARCH REPT.,
JAN 64 26P LEVEN, M. M. ;
REPT. NO. RR-64-917-514-R1
CONTRACT: NOBS-78182
PROJ: SF-013-06

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, PHOTOELASTICITY),
SPHERES, CYLINDRICAL BODIES, STRESSES, PRESSURE,
TESTS, EXPERIMENTAL DATA (U)

THE PRESENT REPORT DEALS WITH TESTS INVOLVING
OPENINGS IN SPHERICAL VESSELS AND A TEST INVOLVING A
DOUBLE TAPER EXTERNALLY REINFORCED OPENING IN A THIN-
WALLED CYLINDRICAL VESSEL. THE DIMENSIONAL
PARAMETERS AND MAXIMUM STRESSES FOR THE TESTS ARE
LISTED. THE STRESS PATTERNS AND STRESS
DISTRIBUTIONS FOR THE TESTS ARE PRESENTED. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-653 749 13/10.1
ALLIED RESEARCH ASSOCIATES INC CONCORD MASS

PHOTOELASTIC INVESTIGATION OF STRESSES AT WINDOWS AND
HATCHES IN SPHERICAL PRESSURE VESSELS, (U)

DEC 63 25P HAMILTON, HAROLD ; BECKER,
HERBERT ;
REPT. NO. ARA-F-9250-3
CONTRACT: NOBS-88648

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, STRESSES),
(*UNDERWATER VEHICLES, STRESSES), SPHERES,
PHOTOELASTICITY, HATCHES, LOADING(MECHANICS),
MECHANICAL PROPERTIES (U)
IDENTIFIERS: WINDOWS (U)

THROUGH THREE-DIMENSIONAL PHOTOELASTICITY, STRESSES
WERE DETERMINED IN EXTERNALLY PRESSURIZED SPHERES
WITH SIMULATED HATCHES AND WINDOWS REPRESENTATIVE OF
BATHYSCAPH PRESSURE VESSEL CONSTRUCTION. STRESSES
WERE DETERMINED FOR VARIOUS SEAT CHAMFER ANGLES AND
MATERIAL COMBINATIONS. IN ADDITION, AN EXPLORATORY
STUDY WAS MADE OF THE EFFECT OF FRICTION UPON THE
STRESSES IN WINDOWS. A MAJOR RESULT OF THE STUDY
IS THE INDICATION THAT FOR HATCH CHAMFER ANGLES OF 15
DEGREES OR LESS NO LOCAL REINFORCEMENT IS REQUIRED
EITHER IN THE SPHERE OR IN THE HATCH. NO
CONCLUSIONS WERE REACHED CONCERNING SPHERE DESIGN
NEAR A WINDOW SINCE ADDITIONAL DATA ON EFFECTS OF
FRICTION ARE REQUIRED BEFORE THIS PROBLEM CAN BE
RESOLVED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM07

AD-657 080 13/4 20/11
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF LOCKHEED
PALO ALTO RESEARCH LAB

OPTIMUM THICKNESS TRANSITIONS FOR CYLINDRICAL
PRESSURE VESSELS WITH HEMISPHERICAL HEADS. (U)

DESCRIPTIVE NOTE: REVISED ED.,
MAR 67 4P TSUI, E. Y. ; BURNS, A.
BRUCE ;

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN JOURNAL OF SPACECRAFT
AND ROCKETS V4 N6 P716-9 JUN 1967.
SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT RECEIVED 11
OCT 66.

DESCRIPTORS: (*PRESSURE VESSELS, THICKNESS),
CYLINDRICAL BODIES, CONFIGURATION, DIFFERENTIAL
EQUATIONS, STRUCTURAL SHELLS,
LOADING(MECHANICS) (U)

AN ANALYSIS IS PRESENTED FOR TWO NEW THICKNESS
TRANSITION CONFIGURATIONS FOR CYLINDRICAL PRESSURE
VESSELS WITH HEMISPHERICAL HEADS. THESE
CONFIGURATIONS, WHICH EXTEND ON BOTH SIDES OF THE
JUNCTURE BETWEEN THE SHELLS, ARE THE VERSINE
VARIATION AND THE BILINEAR VARIATION. THE BILINEAR
TRANSITION IS SHOWN TO RESULT IN LIGHTER DESIGNS
WHILE HOLDING OVERSTRESS TO A NEGLIGIBLE AMOUNT.
NONDIMENSIONAL CURVES ARE PRESENTED WHICH SHOW THE
OVER-ALL VESSEL WEIGHT FOR BOTH TYPES OF TRANSITION.
RESULTS ARE OBTAINED BY SOLVING NUMERICALLY A
SYSTEM OF SECOND-ORDER DIFFERENTIAL EQUATIONS
APPLICABLE TO THIN ELASTIC ISOTROPIC SHELLS OF
VARIABLE THICKNESS, USING AN ESTABLISHED DECOUPLING
CRITERION FOR SPHERICAL AND CYLINDRICAL SHELLS UNDER
EDGE LOADS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-661 225 13/4 13/13
NAVAL ORDNANCE LAB WHITE OAK MD

HIGH PRESSURE CHAMBER DESIGN.

(U)

AUG 67 25P DAWSON, VICTOR C. D. ;
SEIGEL, ARNOLD E. ;
REPT. NO. NOLTR-67-121

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, HIGH-PRESSURE
RESEARCH), CYLINDRICAL BODIES, DESIGN, ELASTIC
SHELLS

(U)

THE PRESSURE CONTAINMENT CAPABILITY OF A MONOBLOC
CYLINDRICAL CHAMBER THAT REMAINS ELASTIC IS LIMITED
BY THE MECHANICAL STRENGTH OF THE CHAMBER MATERIAL TO
VALUES OF ABOUT 100,000 POUNDS PER SQUARE INCH.
HIGHER PRESSURES CAN BE CONTAINED BY USING A
SHRINK-FIT CONSTRUCTION OR AUTOFRETTAGE AND THESE
TECHNIQUES PROVIDE APPROXIMATELY TWICE THE PRESSURE
CONTAINMENT CAPABILITY THAT CAN BE OBTAINED WITH THE
MONOBLOC CONSTRUCTION. THIS REPORT DESCRIBES AND
ANALYZES A SEGMENTED CHAMBER THAT GREATLY EXTENDS THE
HIGH PRESSURE CAPABILITY OF A CYLINDRICAL CHAMBER IN
THE ELASTIC RANGE.

(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-663 203 11/6 13/4 20/11
NAVAL RESEARCH LAB WASHINGTON D C

FRACTURE DEVELOPMENT AND MATERIAL PROPERTIES IN PVRC-
PENN STATE PRESSURE VESSEL. (U)

DESCRIPTIVE NOTE: MEMORANDUM REPT.,
OCT 67 26P COOLEY, L. A. ILANGE, E.
A. ;
REPT. NO. NRL-MR-1827
PROJ: RR-007-01-46-5420, ENG-NAV-67-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, MECHANICAL PROPERTIES),
(*PRESSURE VESSELS, STEEL),
FRACTURE(MECHANICS), TENSILE PROPERTIES,
FAILURE(MECHANICS), CRACKS, TOUGHNESS,
FATIGUE(MECHANICS), TEMPERATURE (U)
IDENTIFIERS: STEEL A 212 A (U)

A CHARACTERIZATION OF MATERIALS WAS CONDUCTED IN
RELATION TO THE TERMINAL, BURST-TYPE, FAILURE OF A
PVRC PRESSURE VESSEL IN A212A STEEL AT 110F.
MATERIALS WERE CHARACTERIZED WITH RESPECT TO
CHEMICAL COMPOSITION, TENSILE PROPERTIES, FRACTURE
TOUGHNESS INCLUDING CHARPY-V AND TEAR
ENERGIES, DROP-WEIGHT NDT, MICROGRAPHY AND
ELECTRON FRACTOGRAPHY. THE INITIATION AND GROWTH
OF A 34-IN. LONG FATIGUE CRACK WAS SHOWN TO BE CAUSED
BY MECHANICAL ASPECTS RATHER THAN MATERIAL
DEFICIENCIES AND THE PLASTIC INSTABILITY BURST,
BRITTLE RUN, AND CRACK ARREST WERE IN COMPLETE ACCORD
WITH THE FRACTURE ANALYSIS DIAGRAM.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-663 879 18/10
NAVAL RESEARCH LAB WASHINGTON D C

AVAILABILITY OF DATA ON IRRADIATED MATERIALS AS
RELATED TO DESIGN REQUIREMENTS FOR WATER COOLED
REACTOR PRESSURE VESSELS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
AUG 67 31P HAWTHORNE, J. R. ; LOSS, F.
J. ;
REPT. NO. NRL-6625
PROJ: RR-007-01-46-5409, SF-020-01-05-0858

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, REACTOR SYSTEM
COMPONENTS), (*REACTOR MATERIALS, *STEEL),
RADIATION DAMAGE, FATIGUE(MECHANICS),
ANNEALING, TRANSITION TEMPERATURE,
FRACTURE(MECHANICS), BRITTLENESS, TEST
METHODS

(U)

NRL HAS COMPLETED A SURVEY OF KNOWN EXPERIMENTAL
PROGRAMS WHICH HAVE CONTRIBUTED TO AND ARE ATTEMPTING
TO SATISFY THE DATA REQUIREMENTS NECESSARY FOR THE
DEVELOPMENT OF NUCLEAR REACTOR PRESSURE VESSEL
SPECIFICATIONS AND OPERATIONS. DESIGNER
REQUIREMENTS HAVE BEEN SET FORTH IN THE REPORT
*PROPERTIES OF IRRADIATED MATERIALS NEEDED
FOR THE DESIGN OF REACTOR VESSELS, BY D.
W. MCLAUGHLIN WHICH WAS PRESENTED AS AN ASME
RESEARCH COMMITTEE REPORT TO THE 1966 ASTM
SYMPOSIUM ON EFFECTS OF RADIATION ON
STRUCTURAL METALS. THIS REPORT WAS THE PRIMARY
REFERENCE USED IN WEIGHING THE PRESENTATION OF DATA
AVAILABILITY AGAINST DESIGNER REQUIREMENTS. AN
ANALYSIS OF INDIVIDUAL MATERIAL PROPERTIES AND
PROBLEM AREAS IS PRESENTED RATHER THAN AN EXTENSIVE
DATA COMPILATION. THE AREAS CONSIDERED ARE LOW-
CYCLE AND HIGH-CYCLE FATIGUE, BRITTLE FRACTURE
RESISTANCE (TRANSITION TEMPERATURE CHARACTERISTICS
AND FRACTURE MECHANICS), STATIC LOAD STRENGTH, AND
RECOVERY OF ORIGINAL PROPERTIES. (AUTHOR)

(U)

AD-663 882 18/13 20/11
 NAVAL RESEARCH LAB WASHINGTON D C

BASIC ASPECTS OF CRACK GROWTH AND FRACTURE, (U)

NOV 67 82P IRWIN, G. R. ; KRAFFT, J.
 M. ; PARIS, P. C. ; WELLS, A. A. ;
 REPT. NO. NRL-6598

UNCLASSIFIED REPORT

DESCRIPTORS: (*NUCLEAR REACTORS, PRESSURE
 VESSELS), (*PRESSURE VESSELS,
 FRACTURE(MECHANICS)), CRACK PROPAGATION,
 DESIGN, CONTROL, SAFETY, TOUGHNESS,
 PLASTICITY, STRESS CORROSION, TEMPERATURE,
 STRESSES, MATHEMATICAL ANALYSIS, BRITTLENESS,
 FATIGUE(MECHANICS), METALS, DUCTILITY,
 MEASUREMENT, CRACKS (U)
 IDENTIFIERS: CRACK GROWTH (U)

A NEAR APPROACH TO ABSOLUTE FRACTURE SAFETY IN
 BOILING WATER (BW) AND PRESSURIZED WATER (PW)
 NUCLEAR REACTOR PRESSURE VESSELS REQUIRES A VERY
 CONSERVATIVE FRACTURE CONTROL PLAN. SUCH A PLAN
 MUST ASSUME THAT ANY PLAUSIBLE CRACKLIKE DEFECT,
 WHICH HAS NOT BEEN PROVED ABSENT BY INSPECTION, MAY
 EXIST IN THE VESSEL. REQUIREMENTS FOR DESIGN,
 MATERIALS, AND INSPECTION MAY THEN BE ESTABLISHED IN
 A CONSERVATIVE WAY RELATIVE TO ESTIMATES OF
 PROGRESSIVE CRACK EXTENSION BEHAVIOR. THESE
 ESTIMATES ARE ASSISTED BY ELASTIC AND PLASTIC METHODS
 OF ANALYSIS OF CRACKS IN TENSION. APPROXIMATE
 METHODS OF ASSIGNING $K_{sub LC}$ VALUES TO
 MEASUREMENTS OF CRACK TOUGHNESS IN TERMS OF A
 BRITTLE-DUCTILE TRANSITION TEMPERATURE ARE VALUABLE
 IN REVIEWING METHODS OF FRACTURE CONTROL WHICH HAVE
 RECEIVED TRIAL IN THE PAST, SUCH AS THE NRL
 FRACTURE ANALYSIS DIAGRAM AND THE LEAK-BEFORE-BREAK
 TOUGHNESS CRITERION. (AUTHOR) (U)

AD-664 460 11/6 18/13
 NAVAL RESEARCH LAB WASHINGTON D C

THE TENSILE PROPERTIES OF SELECTED STEELS FOR USE IN
 NUCLEAR REACTOR PRESSURE VESSELS. (U)

DESCRIPTIVE NOTE: PHASE I OF FINAL REPT.,
 DEC 67 59P Klier, EUGENE P.; HAWTHORNE,
 J. R.; STEELE, LENDELL E.;
 REPT. NO. NRL-6649
 PROJ: RR-007-01-46-5409, SF-020-01-05-0858

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, TENSILE PROPERTIES),
 (*NUCLEAR REACTORS, STEEL), (*PRESSURE VESSELS,
 NUCLEAR REACTORS), SHEAR STRESSES,
 FRACTURE(MECHANICS), STRAIN(MECHANICS),
 NEUTRONS, METALLOGRAPHY, BRITTLENESS,
 MICROSTRUCTURE, RADIATION DAMAGE, TRANSITION
 TEMPERATURE, FRACTOGRAPHY, DUCTILITY (U)
 IDENTIFIERS: STEEL A-212B, STEEL A-302B,
 STEEL A-350-LF1, STEEL A350-LF3, STEEL
 A353, STEEL T-1, STEEL HY-80 (U)

SEVEN STEELS NOW USED OR HAVING POTENTIAL FOR USE
 IN THE CONSTRUCTION OF NUCLEAR REACTOR CONTAINMENT
 VESSELS WERE EVALUATED IN UNIAXIAL TENSION AT 75F
 FOLLOWING IRRADIATION AT <250F. EXPERIMENT
 IRRADIATIONS INVOLVED NEUTRON FLUENCES UP TO 9.5×10
 TO THE 19TH POWER N/CM SQ. (> 1MEV). TENSILE
 PROPERTIES OF THE A212-B, A302-B, A350-
 LF1 (MODIFIED), A350-LF3, A353, T-1,
 AND HY-80 (NI-CR-MO) STEELS WERE DETERMINED
 AS CONVENTIONAL TENSILE AND YIELD STRENGTH AND
 PERCENT REDUCTION OF AREA. IN ADDITION, OBSERVED
 STRESS-STRAIN RELATIONSHIPS WERE PLOTTED USING BOTH
 NOMINAL STRESS-PERCENT REDUCTION OF AREA COORDINATES
 AND TRUE STRESS-NATURAL STRAIN COORDINATES. CURVES
 GIVEN IN THE LATTER COORDINATE SYSTEM WERE ALSO
 EXPRESSED IN SUITABLE ANALYTIC FORM. ALL
 INDIVIDUAL TENSILE DATA WERE COMPILED IN TABULAR
 FORM, AND STRESS-STRAIN CURVES WERE SUMMARIZED AS
 BANDS GIVING MAXIMUM AND MINIMUM PROPERTIES BEHAVIOR.
 LIMITED METALLOGRAPHIC AND FRACTOGRAPHIC DATA WERE
 OBTAINED TO ESTABLISH THE METALLURGICAL STRUCTURES OF
 THE STEELS AND TO DEPICT THE TRANSITION FROM A
 DUCTILE SHEAR FRACTURE TO A BRITTLE FLAT FRACTURE AT
 HIGH NEUTRON FLUENCES FOR THE MORE BRITTLE STEELS.
 (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-664 646 18/10
NAVAL RESEARCH LAB WASHINGTON D C

THE EFFECTS OF COUPLING NUCLEAR RADIATION WITH STATIC
AND CYCLIC SERVICE STRESSES AND OF PERIODIC PROOF
TESTING ON PRESSURE VESSEL MATERIAL BEHAVIOR. (U)

DESCRIPTIVE NOTE: PHASE I OF FINAL REPT.,
AUG 67 45P HAWTHORNE, J. R. ; LOSS, F.
J. ;
REPT. NO. NRL-6620
PROJ: RR-007-01-46-5409, SF-020-01-05-0858

UNCLASSIFIED REPORT

DESCRIPTORS: (*REACTOR MATERIALS, *STEEL),
(*PRESSURE VESSELS, *RADIATION DAMAGE),
STRUCTURAL PARTS, NUCLEAR RADIATION, STRESSES,
TEST METHODS, AGING(MATERIALS),
FATIGUE(MECHANICS), TRANSITION TEMPERATURE,
EMBRITTELEMENT, DUCTILITY, NEUTRON REACTIONS (U)
IDENTIFIERS: HYDRO-TESTING, STEEL A-302, STEEL
A-350 (U)

THE NUCLEAR SERVICE PERFORMANCE OF STRUCTURAL
STEELS AS INFLUENCED BY STATIC AND CYCLIC STRESS
APPLICATIONS DURING RADIATION EXPOSURE WAS EXAMINED
AND DOCUMENTED WITH EXPERIMENTAL RESULTS. THE
SIGNIFICANCE AND MERITS OF INITIAL AND SUBSEQUENT
PROOF TESTS OF LARGE STRUCTURAL COMPONENTS SUCH AS
THE HYDRO-TESTING OF NUCLEAR REACTOR PRESSURE VESSELS
WERE ALSO REVIEWED AND EVALUATED. PERFORMANCE
FOLLOWING PRELOAD IN THE FORM OF WARM PRESTRESSING AS
WELL AS AGING EMBRITTELEMENT WERE AMONG THOSE FACTORS
CONSIDERED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-667 834 13/4 20/11
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

PHOTOELASTIC INVESTIGATION OF STRESS CONCENTRATIONS
IN SPHERE-CYLINDER TRANSITION REGIONS: INCLUDING A
COMPARISON OF RESULTS FROM PHOTOELASTIC AND FINITE
ELEMENT ANALYSES. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUL 66-30 JUN 67,
APR 68 108P TAKAHASHI, S. K.; MARK, R. ;
REPT. NO. NCEL-TR-572
PROJ: Y-R009-03-01-005

UNCLASSIFIED REPORT

DESCRIPTORS: (*PHOTOELASTICITY, CYLINDRICAL
BODIES), (*PRESSURE VESSELS, STRESSES),
SPHERES, DIFFUSION, MATERIALS, LIGHT,
POLARISCOPES, MACHINING, BONDING, DESIGN,
MODELS(SIMULATIONS), EPOXY PLASTICS,
THICKNESS (U)

THE STUDY INVESTIGATES STRESS DISTRIBUTIONS IN
SPHERE-CYLINDER TRANSITION REGIONS OF EXTERNALLY
PRESSURIZED THICK-WALLED VESSELS; IT COMPARES DATA
DETERMINED BY TWO DIFFERENT APPROACHES:
PHOTOELASTIC ANALYSIS AND FINITE ELEMENT COMPUTER
PROGRAMS. THESE APPROACHES AFFORD A CAPABILITY FOR
ANALYZING COMPLICATED DEEP OCEAN STRUCTURES THAT ARE
OF CONSIDERABLE INTEREST TO THE U. S. NAVY.
TWO SMALL-SCALE EPOXY MODELS OF THE PROTOTYPE
STRUCTURES WERE LOADED BY 4- AND 10-PSI EXTERNAL
PRESSURE AT A CRITICAL TEMPERATURE (290F) AND
THEN THE STRESSES WERE FROZEN BY COOLING THE
MATERIAL. THE FIRST MODEL HAD RELATIVELY THIN
WALLS (CYLINDER DIAMETER-TO-WALL THICKNESS RATIO =
15), AND INCORPORATED 60% BALANCED OPENING
REINFORCEMENT AT THE TRANSITION. THE AMOUNT OF
REINFORCEMENT IS EXPRESSED AS A PERCENTAGE OF THE
MATERIAL REMOVED FROM THE VESSEL SHELL TO FORM THE
OPENING. THE REINFORCEMENT IS BALANCED WHEN EQUAL
AMOUNTS ARE PLACED ON THE INSIDE AND OUTSIDE OF THE
VESSEL. THE SECOND HAD A CYLINDER DIAMETER-TO-WALL
THICKNESS RATIO OF 4, AND 65% BALANCED OPENING
REINFORCEMENT. AFTER STRESS FREEZING, THE MODELS
WERE SLICED LONGITUDINALLY AND TRANSVERSELY AND THE
MERIDIONAL AND CIRCUMFERENTIAL STRESSES WERE
DETERMINED PHOTOELASTICALLY WITH A DIFFUSED-LIGHT
POLARISCOPE. THE PHOTOELASTIC SOLUTIONS WERE USED
TO VERIFY THE STRESSES CALCULATED BY FINITE ELEMENT
COMPUTER PROGRAMS. 76 (U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-671 094 18/8 11/6
NAVAL RESEARCH LAB WASHINGTON D C

IRRADIATION EFFECTS ON REACTOR STRUCTURAL
MATERIALS.

(U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. 1 FEB-30
APR 68,

MAY 68 41P STEELE, L. E. ; HAWTHORNE, J. R. ;
SERPAN, C. Z. ; JR. ; POTAPOVS, ULDIS ;

REPT. NO. NRL-MR-1872
PROJ: RRO07-01-40-5409

UNCLASSIFIED REPORT

DESCRIPTORS: (*NUCLEAR REACTORS, *STRUCTURAL
PARTS), (*RADIATION DAMAGE, *PRESSURE VESSELS),
STEEL, CHEMICAL PROPERTIES, NEUTRONS,
EMBRITTEMENT, ABSORPTION, DEPOSITS, MECHANICAL
PROPERTIES, NICKEL ALLOYS, CHROMIUM ALLOYS, WELDS,
MOLYBDENUM ALLOYS, NOTCH SENSITIVITY, DUCTILITY,
IRON ALLOYS

(U)

IDENTIFIERS: STEEL A302B, STEEL A533B,
STEEL A350

(U)

THE RESEARCH PROGRAM OF THE NRL METALLURGY
DIVISION, REACTOR MATERIALS BRANCH, IS
DEVOTED TO THE DETERMINATION OF THE EFFECTS OF
NUCLEAR RADIATION UPON THE PROPERTIES OF STRUCTURAL
MATERIALS. THE OVERALL PROGRAM IS SPONSORED BY THE
OFFICE OF NAVAL RESEARCH, THE U.S. ATOMIC
ENERGY COMMISSION, AND THE ARMY NUCLEAR
POWER PROGRAM. SINCE RESEARCH FINDINGS WHICH
APPLY TO THE OBJECTIVES OF ONE SPONSORING AGENCY ARE
ALSO OF INTEREST TO THE OTHERS, THE OVERALL PROGRAM
PROGRESS IS REPORTED HEREIN. THIS REPORT, COVERING
RESEARCH FOR THE PERIOD 1 FEBRUARY-30 APRIL 1968,
INCLUDES THE FOLLOWING: (1) CONTROLLING THE
RADIATION EMBRITTEMENT SENSITIVITY OF NI-CR-MO
WELD DEPOSITS BY VARYING THEIR CHEMICAL COMPOSITION,
(2) INFLUENCE OF PRIOR TEMPER EMBRITTEMENT ON
THE IRRADIATION RESPONSE OF NI-CR-MO STEEL,
(3) RELATIVE 550F IRRADIATION RESPONSE OF BASE
PLATE, WELD METAL, AND WELD HEAT AFFECTED ZONE OF A
7-1/2-IN.-THICK A533-B CLASS I PRODUCTION
WELDMENT, (4) DROP WEIGHT NDT VERSUS CHARPY-
V ENERGY ABSORPTION LEVEL IN 6-3/8-IN. TYPE
A533-B CLASS I AND II STEEL PLATE, AND
(5) MECHANICAL PROPERTIES EVALUATION OF PM-2A
REACTOR PRESSURE VESSEL STEEL. (AUTHOR)

(U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-671 807 18/8 18/9 13/4
NAVAL RESEARCH LAB WASHINGTON D C

NOTCH DUCTILITY PROPERTIES OF SM-1A REACTOR PRESSURE
VESSEL FOLLOWING THE IN-PLACE ANNEALING
OPERATION. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
MAY 68 31P POTAPOVS, ULDIS HAWTHORNE, J.
RUSSELL ISESPAN, CHARLES Z. , JR;
REPT. NO. NRL-6721
PROJ: USA-ERG-3-67, USA-ERG-19-66
TASK: M01-14

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, *RADIATION
DAMAGE), IMPACT TESTS, DUCTILE BRITTLE TRANSITION,
NUCLEAR INDUSTRIAL APPLICATIONS, NON-DESTRUCTIVE
TESTING, ANNEALING, MAPS, EMBRITTLEMENT, STEEL,
NOTCH TOUGHNESS (U)
IDENTIFIERS: GRAPHS(CHARTS), SM-1A REACTOR
VESSEL (U)

THE EMBRITTLEMENT CONDITION OF THE ARMY SM-1A
REACTOR PRESSURE VESSEL, AS MODIFIED BY THE RECENTLY
COMPLETED IN-PLACE ANNEAL, WAS ASSESSED AND AN
ANALYSIS WAS MADE OF THE REEMBRITTLEMENT BEHAVIOR OF
THE VESSEL STEEL WITH SUBSEQUENT RADIATION SERVICE.
EXPERIMENTAL RESULTS FROM THE REACTOR SURVEILLANCE
PROGRAM DEVELOPED THROUGH ONE COMPLETE IRRADIATION
AND ANNEALING CYCLE ARE PRESENTED, TOGETHER WITH A
SUMMARY OF EXPERIMENTAL INFORMATION ON THE ANNEALING
RESPONSE OF THE VESSEL STEEL (A350-LF1, MOD.)
FROM ACCELERATED IRRADIATION PROGRAMS. THESE DATA
INDICATE A 0 DEG F MAXIMUM PRESSURE VESSEL WALL
CHARPY-V 30 FT-LB TRANSITION TEMPERATURE AFTER
THE IN-PLACE ANNEAL VERSUS A -80 DEG F PRESERVICE
TRANSITION TEMPERATURE (BASED ON THE NOTCH-
DUCTILITY PROPERTIES OF A DUPLICATE RING FORGING).
THE MAXIMUM CHARPY-V 30 FT-LB TRANSITION
TEMPERATURE OF THE PRESSURE VESSEL BEFORE THE
ANNEALING OPERATION WAS ESTIMATED AT 190 DEG F.
A PROJECTION OF POSTANNEAL PRESSURE VESSEL LIFETIME
IN TERMS OF NEUTRON FLUENCE >0.5 MEV WAS DERIVED
FROM SPECTRA CALCULATIONS AND THE EXPERIMENTALLY
PREDICTED REIRRADIATION RESPONSE OF THE PRESSURE
VESSEL STEEL. THE MAXIMUM PERMISSIBLE VESSEL WALL
FLUENCE IS ESTIMATED AT 5.5×10 TO THE 19TH POWER N/SQ
CM >0.5 MEV. THIS IS COMPARABLE TO 124.7
MEGAWATT YEARS OF REACTOR OPERATION. (U)

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ODC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-672 890 18/13 13/4 20/11
NAVAL RESEARCH LAB WASHINGTON D C

NOTCH DUCTILITY AND TENSILE PROPERTY EVALUATION OF
THE PM-2A REACTOR PRESSURE VESSEL.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,
JUN 68 23P SERPAN, CHARLES Z. , JR;
REPT. NO. NRL-6739
PROJ: RR-007-01-46-5409

UNCLASSIFIED REPORT

DESCRIPTORS: (*NUCLEAR REACTORS, PRESSURE
VESSELS), (*PRESSURE VESSELS, MECHANICAL
PROPERTIES), NOTCH SENSITIVITY, REACTOR OPERATION,
TENSILE PROPERTIES, NEUTRONS, DOSIMETERS, LIGHT
WATER REACTORS, RADIATION DAMAGE, EMBRITTLEMENT,
THICKNESS, BRITTLINESS, NON-DESTRUCTIVE TESTING,
TRANSITION TEMPERATURE, STEEL,
DEFECTS(MATERIALS), FRACTURE(MECHANICS),
PRESSURIZATION

(U)

IDENTIFIERS: *FRACTURE TOUGHNESS

(U)

FOLLOWING THE PRESSURIZATION-TO-FAILURE TESTING OF
THE PM-2A REACTOR PRESSURE VESSEL, SEVERAL
SECTIONS OF STEEL WERE REMOVED FROM THE VESSEL WALL
IN A REGION ADJACENT TO THE ARTIFICIAL DEFECT.
CHARPY V-NOTCH AND TENSION TEST SPECIMENS
MACHINED FROM ONE OF THESE SECTIONS HAVE BEEN
EVALUATED. THE IRRADIATED-CONDITION 30 FT-LB
TRANSITION TEMPERATURES FOR THE 1/4-THICKNESS
(NEAREST TO THE CORE) AND 3/4-THICKNESS LOCATIONS
IN THE VESSEL WALL WERE +115F AND +55F,
RESPECTIVELY, FOR MEASURED FISSION-SPECTRUM FLUENCES
OF 7.3 AND 4.0 X 10 TO THE 18TH POWER N/SQ CM
(GREATER THAN 1 MEV). THE 1/4-THICKNESS
PROPERTIES AND FLUENCE MOST NEARLY REPRESENTED THOSE
AT THE TIP OF THE ARTIFICIAL DEFECT. THE 0.28
YIELD STRENGTH FOR THE 1/4-THICKNESS LOCATION WAS 97,
620 PSI AT -20F (FAILURE TEMPERATURE) AND 92,
200 PSI AT +72F (TEMPERATURE AT TIME OF ACID-
SHARPENING TREATMENT OF ARTIFICIAL DEFECT).
SIGNIFICANT UNIFORM ELONGATION, REDUCTION OF AREA,
AND ELONGATION PER 1 IN. WERE RETAINED BY THE STEEL.
AN ASSESSMENT OF THE STRESS, TEMPERATURE, AND FLAW-
SIZE CONDITIONS FOR THE PM-2A FAILURE, AS INDEXED
BY THE IRRADIATED-CONDITION MECHANICAL PROPERTIES,
INDICATES THAT THE FAILURE IS IN AGREEMENT WITH THE
GENERALIZED FRACTURE ANALYSIS DIAGRAM. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-680 402 18/10 11/6 13/5
NAVAL RESEARCH LAB WASHINGTON D C

THE EFFECT OF RESIDUAL ELEMENTS ON SSOF
IRRADIATION RESPONSE OF SELECTED PRESSURE VESSEL
STEELS AND WELDMENTS. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
NOV 68 33P POTAPOVS, ULDIS HAWTHORNE, J.
RUSSELL I
REPT. NO. NRL-6803
PROJ: RR-007-01-46-5409

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, RADIATION DAMAGE),
(*WELDS, RADIATION DAMAGE), (*RADIATION DAMAGE,
*PRESSURE VESSELS), NUCLEAR REACTORS,
EMBRITTEMENT, NUCLEAR RADIATION, IMPURITIES,
SENSITIVITY (U)
IDENTIFIERS: STEEL A-302-B, STEEL A-543 (U)

THE EFFECT OF VARIABLE RESIDUAL ELEMENT CONTENTS ON
SSOF RADIATION EMBRITTEMENT SENSITIVITY OF
PRESSURE VESSEL STEELS WAS EXAMINED. RESULTS
INDICATE THAT PHOSPHORUS AND COPPER CAN CONTRIBUTE
SIGNIFICANTLY TO THE SSOF RADIATION EMBRITTEMENT
SENSITIVITY OF TYPE A302-B STEEL. THE
RESULTS ALSO SHOW THAT VANADIUM MAY HAVE A SLIGHT
ADVERSE EFFECT AND THAT SULFUR IS NEUTRAL, ALTHOUGH
IT SERVES TO DECREASE THE FULL SHEAR ENERGY
ABSORPTION LEVEL OF THE STEEL. NITROGEN VARIATIONS
FROM APPROXIMATELY EQUAL TO 0.008% TO 0.015% IN
ALUMINUM DEOXIDIZED STEEL HAVE NO SIGNIFICANT EFFECT,
WHILE THE ADDITION OF ALUMINUM TO NI-CR-MO
STEEL WITH A GIVEN NITROGEN CONTENT MAY SLIGHTLY
PROMOTE IRRADIATION EMBRITTEMENT. THE PROGRAM
RESULTS DEMONSTRATE THAT APPARENT INSENSITIVITY TO
SSOF IRRADIATION EMBRITTEMENT CAN BE CONSISTENTLY
ACHIEVED WITH LABORATORY HEATS OF A NOMINAL A302-
B STEEL COMPOSITION BY MAINTAINING THE TOTAL
RESIDUAL ELEMENT CONTENTS AT A LOW LEVEL.
RADIATION EMBRITTEMENT SENSITIVITY OF WELDMENTS
WAS INVESTIGATED IN A PROGRAM AIMED AT THE
DEVELOPMENT OF LOW SENSITIVITY WELD FILLERS FOR
JOINING NI-CR-MO STEEL. DATA FROM THIS NEW
PROGRAM AGAIN POINT TO COPPER AS A DOMINATING FACTOR
IN DETERMINING RADIATION EMBRITTEMENT SENSITIVITY,
FURTHER VERIFYING THE RESULTS OBTAINED IN THE NRL-
USS A302-B STEEL INVESTIGATION.

(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-682 482 20/11
BROWN UNIV PROVIDENCE R I DIV OF ENGINEERING

ELASTIC-PLASTIC ANALYSIS OF PRESSURE VESSEL
COMPONENTS, (U)

JAN 69 25P MARCAL, PEDRO V. ;
MONITOR: ARPA E62

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PRESENTED AT PRESSURE VESSEL AND
PIPING CONFERENCE (1ST), USE OF THE COMPUTER IN
PRESSURE VESSEL ANALYSIS, ASME COMPUTER SEMINAR,
DALLAS, TEXAS, 20 SEP 68.

DESCRIPTORS: (*PRESSURE VESSELS, MECHANICAL
PROPERTIES), PROGRAMMING (COMPUTERS),
ELASTICITY, PLASTICITY, STRESSES,
STRAIN (MECHANICS), PRESSURIZATION, YIELD
POINT, STRAIN HARDENING, SPHERES, NOZZLES (U)
IDENTIFIERS: VON MISES RELATION (U)

THE REPORT PRESENTS A SURVEY ON THE USE OF DIGITAL
COMPUTERS FOR ELASTIC-PLASTIC ANALYSIS OF PRESSURE
VESSEL COMPONENTS. INCLUDED IS A REVIEW OF LINEAR
INCREMENTAL STRESS STRAIN RELATIONS FOR A STRAIN
HARDENING PRANDTL-REUSS MATERIAL WITH A VON
MISES YIELD CRITERION AND THE FORMATION OF
GENERALIZED STRESS STRAIN RELATIONS. CASE STUDIES
ARE GIVEN OF AXISYMMETRIC ELASTIC-PLASTIC ANALYSIS
OF A TORISPHERICAL PRESSURE VESSEL, A FLUSH
CYLINDRICAL NOZZLE IN A SPHERE AND A THICK-WALLED
CYLINDER UNDER INTERNAL PRESSURE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-684 067 18/8 11/6 20/11
NAVAL RESEARCH LAB WASHINGTON D C

USA STUDIES ON IRRADIATION EFFECTS TO ADVANCED
PRESSURE VESSEL MATERIALS.

(U)

DESCRIPTIVE NOTE: INTERIM REPT. 1967-1968,
DEC 68 SIP STEELE,LENDELL E. ;
REPT. NO. NRL-MR-1947
PROJ: RR-007-1-46-5409, SF-020-01-05-0858

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, REACTOR
MATERIALS), (*ALLOYS, *RADIATION DAMAGE),
STEEL, HYDROGEN EMBRITTLEMENT,
FATIGUE(MECHANICS), HEAT TREATMENT,
QUENCHING(COOLING), TENSILE PROPERTIES,
THERMAL STABILITY, PHASE STUDIES, NICKEL ALLOYS,
STAINLESS STEEL

(U)

IDENTIFIERS: NICKEL ALLOY INCONEL 718, STEEL
PH 13CR 8MO, STEEL 12N 5CR 3MO, STEEL
7.5N CR MO, NEUTRON EMBRITTLEMENT

(U)

RESEARCH PROGRAMS DISCUSSED INCLUDE THE
PREIRRADIATION EXAMINATION OF HIGH STRENGTH CANDIDATE
PRESSURE VESSEL MATERIALS, STUDIES OF IRRADIATION
EFFECTS ON THE PROPERTIES OF ADVANCED PRESSURE VESSEL
MATERIALS, AND FATIGUE AND HYDROGEN EMBRITTLEMENT
EFFECTS IN IRRADIATED HIGHER STRENGTH STEELS. HIGH
POINTS OF EXPERIMENTAL ACCOMPLISHMENT ARE OUTLINED IN
BRIEF. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-686 660 14/2 20/4
NAVAL RESEARCH LAB WASHINGTON D C

CONTROLLED DESTRUCTIVE TESTING OF PRESSURE
VESSELS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
APR 69 14P GENNARI, JERVIS J. ICZUL,
ERNEST C. I
REPT. NO. NRL-6855
PROJ: RF-101-03-46-5254, SF-199-03-01-1463

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, STRUCTURAL
SHELLS), (*STRUCTURAL SHELLS, HYDROSTATIC
TESTING), DEFORMATION, RUPTURE, FLUID FLOW,
BRITTLENESS, METALS, GLASS TEXTILES, COMPOSITE
MATERIALS, PHOTOMICROGRAPHY, TEST METHODS, TEST
FACILITIES

(U)

CONTROLLED DESTRUCTIVE TESTING OF SHELLS OR
PRESSURE VESSELS BY THE HYDROSTATIC METHOD DISCUSSED
IN THIS REPORT PROVIDES A GOOD MEANS OF ANALYZING THE
FAILURE MODES OF THESE STRUCTURES. THE TECHNIQUE
DESCRIBED ALLOWS A TEST TO BE HALTED AT ANY POINT -
EVEN BEFORE PERMANENT DEFORMATION HAS OCCURRED.
THIS TECHNIQUE ALSO HAS MERIT FOR TESTING PRESSURE
VESSELS MADE OF CERAMIC OR OTHER BRITTLE MATERIAL,
WHERE RUPTURE NORMALLY REDUCES THE VESSEL TO A POWDER
OR TO NUMEROUS SMALL FRAGMENTS. (AUTHOR)

(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-689 789 13/13 13/10
 NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

WINDOWS FOR EXTERNAL OR INTERNAL HYDROSTATIC
 PRESSURE VESSELS. PART III. CRITICAL PRESSURE OF
 ACRYLIC SPHERICAL SHELL WINDOWS UNDER SHORT-TERM
 PRESSURE APPLICATIONS. (U)

DESCRIPTIVE NOTE: FINAL REPT. JUL 66-AUG 68,
 JUN 69 166P STACHIW, J. D. BRIER, F.
 W. I
 REPT. NO. NCEL-TR-631
 PROJ: Y-F38-535-005-01-001

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO PART I, AD-646 882, AND
 PART 2, AD-652 343.

DESCRIPTORS: (*PRESSURE VESSELS, TRANSPARENT
 PANELS), (*TRANSPARENT PANELS, *ACRYLIC RESINS),
 UNDERWATER, STRUCTURAL PARTS,
 FAILURE(MECHANICS), LOADING(MECHANICS),
 HYDROSTATIC PRESSURE, MODELS(SIMULATIONS),
 DESIGN, STRESSES, UNDERWATER VEHICLES (U)
 IDENTIFIERS: *WINDOWS, UNDERWATER HABITATS (U)

MODEL AND FULL-SCALE ACRYLIC WINDOWS IN THE FORM OF
 SPHERICAL SHELL LENSES WITH PARALLEL CONVEX AND
 CONCAVE SURFACES HAVE BEEN IMPLoded BY LOADING THEIR
 CONVEX SURFACE HYDROSTATICALLY AT A 650-PSI/MIN RATE
 WHILE THEIR CONCAVE SURFACE WAS EXPOSED TO
 ATMOSPHERIC PRESSURE. THE THICKNESS OF THE MODEL
 WINDOWS VARIED FROM 0.250 TO 1.200 INCHES AND OF THE
 FULL-SCALE WINDOWS FROM 0.564 TO 4.000 INCHES, WHILE
 THE INCLUDED SPHERICAL SECTOR ANGLE OF THE LENS AND
 THE BEVEL ANGLE OF ITS EDGE VARIED FROM 30 TO 180
 DEGREES IN 30-DEGREE INCREMENTS. THE LOW-PRESSURE
 FACE DIAMETERS OF THE MODEL WINDOWS VARIED FROM 1.423
 TO 5.500 INCHES, WHILE THOSE OF THE FULL-SCALE
 WINDOWS VARIED FROM 6.200 TO 35.868 INCHES. IN
 ADDITION TO CRITICAL PRESSURES, DISPLACEMENTS OF THE
 LENS UNDER HYDROSTATIC PRESSURE WERE RECORDED AND
 PLOTTED AS FUNCTIONS OF PRESSURE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-690 183 13/4
WATERVLIET ARSENAL N Y BENET R AND E LABS

THE DESIGN OF PRESSURE VESSELS FOR VERY HIGH
PRESSURE OPERATION.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,

MAY 69 137P DAVIDSON, THOMAS E. ; KENDALL,

DAVID P. ;

PROJ: DA-1-T-061102-B-32-A

MONITOR: WVT 6917

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, STIFFENED
CYLINDERS), (*ELASTIC SHELLS, HYDROSTATIC
PRESSURE), STRUCTURAL PARTS, ELASTICITY,
STRUCTURAL PROPERTIES, DESIGN, SEALS,
MATHEMATICAL ANALYSIS, STRESSES,
STRAIN(MECHANICS), HARDENING, YIELD POINT,
FAILURE(MECHANICS)

(U)

IDENTIFIERS: AUTOFRETTAGE

(U)

THE REPORT IS A REVIEW OF THE THEORY AND PRACTICE
OF PRESSURE VESSEL DESIGN FOR VESSELS OPERATING IN
THE RANGE OF INTERNAL PRESSURES FROM 1 TO 55 KILOBARS
(APPROXIMATELY 15,000 TO 800,000 PSI) AND
UTILIZING FLUID PRESSURE MEDIA. THE FUNDAMENTALS
OF THICK WALLED CYLINDER THEORY ARE REVIEWED,
INCLUDING ELASTIC AND ELASTIC-PLASTIC THEORY, MULTI-
LAYER CYLINDERS AND AUTOFRETTAGE. THE VARIOUS
METHODS OF USING SEGMENTED CYLINDERS IN PRESSURE
VESSEL DESIGN ARE REVIEWED IN DETAIL. THE FACTORS
TO BE CONSIDERED IN THE SELECTION OF SUITABLE
MATERIALS FOR PRESSURE VESSEL FABRICATION ARE
DISCUSSED. THESE FACTORS INCLUDE STRENGTH,
TOUGHNESS AND ENVIRONMENTAL FACTORS. A BRIEF
REVIEW OF THE MATERIALS CURRENTLY AVAILABLE IS ALSO
INCLUDED. THE REPORT ALSO INCLUDES A DISCUSSION OF
PRESSURE SEALS AND CLOSURES SUITABLE FOR USE IN THIS
PRESSURE RANGE AND OF METHODS OF SUPPORTING THE END
CLOSURES OF THE VESSEL. (AUTHOR)

(U)

AD-697 272 13/13 13/10
 NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

WINDOWS FOR EXTERNAL OR INTERNAL HYDROSTATIC
 PRESSURE VESSELS. PART IV. CONICAL ACRYLIC
 WINDOWS UNDER LONG-TERM PRESSURE APPLICATION AT
 20,000 PSI. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT. 1 JUL 67-30 JUN 68,
 OCT 69 133P STACHIW, J. D. ;
 REPT. NO. NCEL-TR-645
 PROJ: Y-F38-535-005-01-005

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO PART 3, AD-689 789.

DESCRIPTORS: (*PRESSURE VESSELS, TRANSPARENT
 PANELS), (*TRANSPARENT PANELS, *ACRYLIC RESINS),
 UNDERWATER VEHICLES, HYDROSTATIC PRESSURE,
 TEMPERATURE, CONICAL BODIES,
 LOADING(MECHANICS), FAILURE(MECHANICS) (U)
 IDENTIFIERS: *WINDOWS (U)

CONICAL ACRYLIC WINDOWS OF 30-, 60-, 90-, 120-, AND
 150-DEGREE INCLUDED ANGLES HAVE BEEN SUBJECTED IN
 THEIR MOUNTING FLANGES TO 20,000 PSI OF HYDROSTATIC
 PRESSURE FOR UP TO 1,000 HOURS IN THE 32F-TO-75F
 TEMPERATURE RANGE. THE DISPLACEMENTS OF THE
 WINDOWS THROUGH THE FLANGE MOUNTING HAVE BEEN
 RECORDED AND ARE GRAPHICALLY PRESENTED AS A FUNCTION
 OF TIME, TEMPERATURE, CONICAL ANGLE, AND THICKNESS-
 TO-DIAMETER RATIO FOR THE READY REFERENCE OF THE
 DESIGNER. A DETAILED STUDY HAS ALSO BEEN MADE OF
 THE TYPES OF FAILURE AND OF THE DIMENSIONAL AND
 STRUCTURAL PARAMETERS THAT MUST BE CONSIDERED IN THE
 DESIGN OF SAFE, OPERATIONALLY ACCEPTABLE WINDOWS FOR
 LONG-TERM SERVICE UNDER HYDROSTATIC PRESSURE OF 20,
 000 PSI. THE TEST RESULTS INDICATE THAT A MINIMUM
 THICKNESS TO MINOR DIAMETER RATIO OF 2 AND AN
 INCLUDED CONICAL ANGLE OF 90 DEGREES OR LARGER IS
 REQUIRED TO PROVIDE SAFE AND OPTICALLY ACCEPTABLE
 WINDOWS FOR LONG-TERM SUSTAINED PRESSURE LOADINGS OF
 20,000 PSI. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-697 764 13/4 20/11
UTAH UNIV SALT LAKE CITY COLL OF ENGINEERING

A SURVEY ON FRACTURE OF PRESSURIZED VESSELS. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
AUG 69 82P FOLIAS, E. S. I
REPT. NO. UTEC-DO-69-063
CONTRACT: F04611-67-C-0043
MONITOR: AFRPL TR-69-223

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS,
FRACTURE(MECHANICS)), ELASTIC SHELLS,
HEMISPHERICAL SHELLS, STRESSES, CRACKS, CRACK
PROPAGATION, BENDING,
APPROXIMATION(MATHEMATICS), MATHEMATICAL
MODELS (U)

A SURVEY OF EXISTING SOLUTIONS DESCRIBING THE
STRESS DISTRIBUTION AROUND THE CRACK TIP OF AN
INITIALLY CURVED SHEET IS MADE AND A METHOD FOR
ESTIMATING APPROXIMATE STRESS INTENSITY FACTORS OF
OTHER MORE COMPLICATED SHELL GEOMETRIES IS DISCUSSED.
IN ADDITION, A FRACTURE CRITERION INCORPORATING A
GEOMETRY AND PLASTICITY CORRECTION IS DERIVED FOR THE
PREDICTION OF FAILURE IN FLAWED PRESSURIZED VESSELS
OF ARBITRARY SHAPE. A COMPARISON WITH SOME OF THE
EXISTING EXPERIMENTAL DATA IN THE LITERATURE
SUBSTANTIATES ITS POTENTIAL USE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-698 282 14/2 20/1
NAVAL RESEARCH LAB ORLANDO FLA UNDERWATER SOUND REFERENCE
DIV

ACOUSTIC CHARACTERISTICS OF A GLASS-FILAMENT-
WOUND PRESSURE VESSEL.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
NOV 69 19P YOUNG, A. MARK ; PRANDONI,
JOSEPH F. ;
REPT. NO. NRL-7013
PROJ: RF-05-111-401-4470, NRL-K03-30

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER SOUND EQUIPMENT,
ELECTROACOUSTIC TRANSDUCERS), (*ELECTROACOUSTIC
TRANSDUCERS, CALIBRATION), (*PRESSURE VESSELS,
ACOUSTIC PROPERTIES), ANECHOIC CHAMBERS,
FEASIBILITY STUDIES, FILAMENT WOUND CONSTRUCTION,
GLASS TEXTILES, HYDROSTATIC PRESSURE, ACOUSTIC
IMPEDANCE, MECHANICAL PROPERTIES, WALLS,
REINFORCED PLASTICS, DEFECTS(MATERIALS),
INTERFACES, PERFORMANCE(ENGINEERING)
IDENTIFIERS: INSERTION LOSS, LININGS,
EVALUATION

(U)

(U)

ACOUSTIC INSERTION LOSS OF A GLASS-FILAMENT-WOUND
PRESSURE VESSEL INTENDED FOR TRANSDUCER CALIBRATION
VARIES SIGNIFICANTLY AS A FUNCTION OF FREQUENCY,
POSITION, AND HYDROSTATIC PRESSURE. THE VARIATIONS
ARE BELIEVED TO BE DUE TO VOIDS IN THE GLASS-RESIN
AND IN THE GLASS-RESIN/RUBBER LINER INTERFACE, WHICH
GIVE RISE TO LARGE CHANGES IN THE CHARACTERISTIC
IMPEDANCE OF THE COMPOSITE WALLS AS A FUNCTION OF THE
SAME VARIABLES. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-699 330 18/9 18/10
ARMY ENGINEER REACTORS GROUP FORT BELVOIR VA ENGINEERING
DIV

SM-1A PRESSURE VESSEL LIFETIME AS RESULT OF IN-
PLACE ANNEALING.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
SEP 69 75P KNIGHTON, GEORGE W. ;
REPT. NO. ED-6922

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURIZED WATER REACTORS, *PRESSURE
VESSELS), (*REACTOR SYSTEM COMPONENTS, PRESSURE
VESSELS), LIFE EXPECTANCY, ANNEALING, STEEL,
RADIATION DAMAGE, ARMY EQUIPMENT
IDENTIFIERS: ARMY REACTORS(SM-1)

(U)

(U)

THE REPORT IS PRESENTED TO COVER THE 'RECOVERY OF
DUCTILITY' OF THE SM-1A REACTOR VESSEL STEEL AS A
RESULT OF THE 'IN-PLACE' ANNEALING. IT DISCUSSES
THE PRE-ANNEALING VESSEL LIFETIME, THE GENERAL
ANNEALING TECHNIQUES USED, THE SURVEILLANCE SPECIMEN
PROGRAM TO EVALUATE THE RECOVERY, THE RECOVERY
ACCOMPLISHED, AND THE ESTIMATED LIFETIME OF THE
ANNEALED REACTOR VESSEL. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM07

AD-700 233 11/4 18/8 18/10
NAVAL RESEARCH LAB WASHINGTON D C

TRENDS IN CHARPY-V SHELF ENERGY DEGRADATION AND
YIELD STRENGTH INCREASE OF NEUTRON-EMBRITTLED
PRESSURE VESSEL STEELS.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,
DEC 69 29P HAWTHORNE, J. RUSSELL ;
REPT. NO. NRL-7011
PROJ: NRL-M01-14, RR-007-11-46-5409

UNCLASSIFIED REPORT

DESCRIPTORS: (*NUCLEAR REACTORS, MATERIALS),
(*STEEL, *RADIATION DAMAGE), PRESSURE VESSELS,
EMBRITTLEMENT, IMPACT TESTS, NEUTRON REACTIONS,
TRANSITION TEMPERATURE, DUCTILITY, TOUGHNESS,
TENSILE PROPERTIES, WELDS

(U)

IDENTIFIERS: STEEL A-302-B, STEEL A-533,
STEEL A-543

(U)

THE EFFECTS OF NEUTRON IRRADIATION ON CHARPY-V
SHELF ENERGY AND YIELD STRENGTH WAS EXAMINED FOR
THREE PRESSURE VESSEL STEEL COMPOSITIONS: A302-B,
A533, AND A543. THE EFFECTS OF RADIATION
EXPOSURE AT LOW TEMPERATURE (<300F (149C))
AND AT ELEVATED TEMPERATURE (550F (288 C) TO
740F (393C)) ON THE OVERALL NOTCH DUCTILITY ARE
DOCUMENTED AND COMPARED. SUMMARY PLOTS SHOWING THE
SIMULTANEOUS DEGRADATION IN SHELF ENERGY AND THE
INCREASE OF YIELD STRENGTH LEVELS BROADLY ILLUSTRATE
THE PROGRESSIVE CHANGE FROM DUCTILE FRACTURE
PERFORMANCE TO RELATIVELY BRITTLE CHARACTERISTICS.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-702 600

13/4

DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA

PRESSURE VESSELS. VOLUME 1.

(U)

DESCRIPTIVE NOTE: REPORT BIBLIOGRAPHY JAN 63-JUN 69.

MAR 70 114P

REPT. NO. DDC-TAS-70-22-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO VOLUME 2, AD-866 750.

DESCRIPTORS: (*PRESSURE VESSELS, *BIBLIOGRAPHIES),
STRUCTURES, MATERIALS, MECHANICAL PROPERTIES,
FILAMENT WOUND CONSTRUCTION, TANKS (CONTAINERS),
RAMJET ENGINES, PLASMA JETS, REACTOR MATERIALS,
POWER REACTORS, SUBMARINE HULLS, MECHANICAL
WORKING, ROCKET CASES, METALLURGY

(U)

IDENTIFIERS: CONTAINMENT VESSELS, FRACTOGRAPHIC
DATA, ELECTRON FRACTOGRAPHY

(U)

THE ANNOTATED BIBLIOGRAPHY COMPRISES CITATIONS OF
UNCLASSIFIED REPORTS DEALING WITH TESTS AND
APPLICATIONS OF PRESSURE VESSELS USED FOR TANKS
(CONTAINERS), SUBMARINE HULLS, ROCKET CASES,
RAMJET ENGINES AND GUIDED MISSILES. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-702 731 14/2 13/12 13/10
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

IMPLOSIONS IN PRESSURE VESSELS, EXPERIMENTAL
RESULTS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. JUL 65-JUN 66,
FEB 70 88P KUSANO, HAROLD M. I
REPT. NO. NCEL-TN-1059
PROJ: YR009-03-01-004

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER VEHICLES, STRUCTURAL
PROPERTIES), (*TEST FACILITIES, PRESSURE
VESSELS), (*PRESSURE VESSELS, STRESSES),
SAFETY, SHOCK WAVES, PRESSURE, PREDICTIONS,
RESPONSE, O-RINGS, DAMAGE ASSESSMENT
IDENTIFIERS: *IMPLOSIONS

(U)

(U)

PRESSURE VESSELS WERE SUBJECTED TO IMPLOSION-
GENERATED HYDRODYNAMIC PRESSURES/IMPULSES. THE
EXPERIMENTAL RESULTS INDICATE THE HYDRODYNAMIC
PRESSURE AND THE DYNAMIC RESPONSE OF THE PRESSURE
VESSEL VARY, DEPENDING UPON (1) MODEL SIZE,
(2) IMPLOSION PRESSURE, AND/OR (3) DISTANCE
FROM IMPLOSION; GRAPHS SHOWING THESE RELATIONSHIPS
ARE PRESENTED. IMPLOSION PRESSURES UP TO 19,000-PSI
WERE OBTAINED. THE HIGHER IMPLOSION PRESSURES
OCCURRED IN THE 20,000 PSI PRESSURE VESSEL AND CAUSED
DAMAGE TO O-RINGS AND MOUNTING FACILITIES INSIDE
THE PRESSURE VESSEL, AND LOOSENED PIPE CONNECTIONS
FROM THE TOP COVER PLUG. HIGH-SPEED MOTION PICTURES
SHOWED THAT THE COLLAPSE OF AIR CAVITIES WAS
GENERALLY ASYMMETRIC AND INCONSISTENT. THE CRITICAL
MODEL SIZES FOR MAXIMUM PRESSURE DROP OR ENERGY
RELEASE IN PRESSURE VESSELS WERE DETERMINED. THE
EFFECTS OF IMPLOSION ON PRESSURE VESSELS CAN BE
REDUCED GREATLY BY FILLING THE TEST SPHERE WITH
WATER. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-703 834 13/4 20/11
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF LOCKHEED
RESEARCH LAB

FORMULAS AND METHODS USED IN THE ANALYSIS OF
PRESSURE VESSELS,

(U)

70 62P KURAL, MURAT I
REPT. NO. LMSC-4-11-66-5

UNCLASSIFIED REPORT

DESCRIPTORS: (•PROPELLANT TANKS, DESIGN),
(•PRESSURE VESSELS, STRESSES), STRUCTURAL
SHELLS, CONICAL BODIES, CYLINDRICAL BODIES, RINGS,
LOADING(MECHANICS), MATHEMATICAL ANALYSIS,
DEFORMATION, TABLES

(U)

THE PURPOSE OF THIS REPORT IS TO MAKE AVAILABLE A
COMPACT SUMMARY OF THE FORMULAS AND METHODS USED IN
THE STRESS ANALYSIS OF THIN PRESSURE VESSELS. THE
FIRST PART DEALS ONLY WITH MEMBRANE FORCES AND
DEFORMATIONS RESULTING FROM PRESSURE LOADING IN
SHELLS OF REVOLUTION. THE FORMULAS ASSOCIATED WITH
AXISYMMETRIC EDGE LOADINGS ARISING FROM
DISCONTINUITIES IN THE STRUCTURE HAVE BEEN TREATED IN
THE SECOND PART. THE LAST PART OF THE REPORT IS
CONCERNED WITH METHODS TO PREDICT UNKNOWN EDGE
(DISCONTINUITY) FORCES AND MOMENTS AT JUNCTURES
OF SHELLS. THE ENTIRE FORMULATION IS RESTRICTED TO
PRESSURE VESSELS WHERE SHELL COMPONENTS FALL INTO THE
CATEGORY OF 'THIN,' 'STEEP,' AND CONSTANT THICKNESS
SHELLS OF REVOLUTION. FURTHERMORE, NO COUPLING OF
EDGE EFFECTS IS ALLOWED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-703 963 18/10
NAVAL RESEARCH LAB WASHINGTON D C

STEELS FOR COMMERCIAL NUCLEAR POWER REACTOR PRESSURE
VESSELS. (U)

JUN 69 49P STEELE, L. E. ISTERNE, R.
H. , JR:

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN NUCLEAR ENGINEERING AND
DESIGN, VIO P259-307 1969.

DESCRIPTORS: (*POWER REACTORS, PRESSURE VESSELS);
(*PRESSURE VESSELS, *STEEL), SPECIFICATIONS,
MECHANICAL PROPERTIES, MICROSTRUCTURE,
MANUFACTURING METHODS (U)

THE PURPOSE OF THE REPORT IS TO DESCRIBE AND
CHARACTERIZE THE CARBON AND LOW-ALLOY STEELS WHICH
HAVE BEEN USED OR ARE ANTICIPATED FOR USE IN NUCLEAR
REACTOR PRESSURE VESSELS. THE SCOPE IS PURPOSELY
LIMITED TO MATERIALS AND ENVIRONMENTAL INFLUENCES
UPON THE PROPERTIES OF THESE MATERIALS. THROUGH
THE DATA ARE ORIENTED TOWARD THE REACTOR PRESSURE
VESSEL. MUCH OF THE INFORMATION IS APPLICABLE TO
AUXILIARY COMPONENTS SUCH AS STEAM GENERATORS AND
PRESSURIZERS. ENGINEERING CONSIDERATIONS ARE
REFERENCED ONLY IN THE INTEREST OF FURTHERING THE
BASIC AIM OF MATERIALS CHARACTERIZATION.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-704 787 13/4 20/11 9/2
NAVAL ORDNANCE LAB WHITE OAK MD

COMPUTER PROGRAM FOR A MONOBLOC, HOLLOW,
CLOSED-END CYLINDER SUBJECTED TO INTERNAL
PRESSURE.

(U)

FEB 70 43P DAWSON, VICTOR C. D. ;
REPT. NO. NOLTR-70-41

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, STRUCTURAL
PROPERTIES), (*STRESSES, MATHEMATICAL MODELS),
COMPUTER PROGRAMS, STRAIN(MECHANICS),

PLASTICITY, YIELD POINT, CYLINDRICAL BODIES

(U)

IDENTIFIERS: COMPUTER ANALYSIS, COMPUTERIZED
SIMULATION, AUTOFRETTAGE

(U)

THIS REPORT DESCRIBES A COMPUTER PROGRAM WRITTEN IN
BASIC LANGUAGE WHICH CALCULATES THE STRESSES AND
STRAINS IN A MONOBLOC, HOLLOW, CLOSED-END CYLINDER
SUBJECTED TO INTERNAL PRESSURE. EXAMPLES OF TYPICAL
CALCULATIONS ARE GIVEN, INCLUDING, AMONG OTHERS,
CONDITIONS THAT CAUSE AUTOFRETTAGE AND REVERSE
YIELDING. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-705 125 13/4 13/10
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

PRESSURE VESSEL CONCEPTS: EXPLORATORY EVALUATION
OF STACKED-RING AND SEGMENTED-WALL DESIGNS WITH
TIE-ROD END-CLOSURE RESTRAINTS. (U)

DESCRIPTIVE NOTE: FINAL REPT. OCT 64-OCT 65,
MAR 70 99P STACHIW, J. D. I
REPT. NO. NCEL-TR-666
PROJ: YR009-03-01-004

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER VEHICLES, PRESSURE
VESSELS), (*PRESSURE VESSELS, DESIGN),
HYDROSTATIC PRESSURE, CYLINDRICAL BODIES,
LAMINATED PLASTICS, BOLTED JOINTS, MANUFACTURING
METHODS, MARAGING STEELS, STRESSES,
PHOTOELASTICITY (U)

AN EXPLORATORY EXPERIMENTAL STUDY WAS CONDUCTED TO
EVALUATE THE STACKED-RING AND SEGMENTED-WALL PRESSURE
VESSEL CONCEPTS. THE EVALUATION CONSISTED OF
TESTING TO DESTRUCTION STACKED-RING AND SEGMENTED-
WALL PRESSURE VESSEL MODELS WITH TIE-ROD END-CLOSURE
RESTRAINTS AND EVALUATING A SERIES OF SEAL DESIGNS
UTILIZED IN THE SEALING OF THE JOINTS BETWEEN THE
PRESSURE VESSEL END CLOSURES AND THE CYLINDRICAL
PRESSURE VESSEL BODY. THE TEST RESULTS INDICATE
THAT THE STACKED-RING PRESSURE VESSEL DESIGN IS
APPROXIMATELY 50% HEAVIER THAN A MULTILAYERED
PRESSURE VESSEL OF SAME INTERNAL DIAMETER LENGTH,
MATERIAL, AND PRESSURE CAPABILITY. THE SEGMENTED-
WALL PRESSURE VESSEL DESIGN IS APPROXIMATELY 8 TO 9
TIMES HEAVIER THAN A MULTILAYERED PRESSURE VESSEL OF
SAME DIAMETER, LENGTH, MATERIAL, AND PRESSURE
CAPABILITY. THE FREE-FLOATING, SELF-ENERGIZING
RADIAL SEAL SYSTEM PROVIDED THE MOST RELIABLE AND
EXTRUSION-PROOF SEALING FOR VESSELS WITH CONSIDERABLE
RADIAL DILATION AND AXIAL END-CLOSURE MOVEMENT.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-706 713 13/4 20/13
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

HEAT TRANSFER CONSIDERATIONS IN A PRESSURE VESSEL
BEING CHARGED.

(U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
JUN 69 102P LYONS, JOHN THOMAS . IIII

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, PRESSURIZATION),
(*PRESSURIZATION, *HEAT TRANSFER), GAS
CYLINDERS, CONVECTION(HEAT TRANSFER), ADIABATIC
GAS FLOW, NUMERICAL ANALYSIS, SPECIFIC HEAT,
DIFFERENTIAL EQUATIONS, EXPERIMENTAL DATA,
THESES

(U)

EXPERIMENTAL DATA FOR THE CHARGING OF AN AIR
RECEIVER IS PRESENTED AND INTERPRETED IN DETAIL.
THE DATA INDICATES A SUBSTANTIAL DEPARTURE FROM THE
ADIABATIC BEHAVIOR. THE EXPERIMENTAL RESULTS ARE
USED TO EVALUATE EXISTING CLOSED FORM EXPRESSIONS FOR
THE THERMODYNAMIC STATE OF A GAS IN A RECEIVER. A
METHOD FOR EXPERIMENTALLY DETERMINING THE CONVECTIVE
HEAT TRANSFER COEFFICIENT IS DEVELOPED, EVALUATED AND
USED IN CONJUNCTION WITH THESE EXPRESSIONS.

(AUTHOR)

(U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-707 336 18/10 18/2 11/6
NAVAL RESEARCH LAB WASHINGTON D C

IRRADIATION EFFECTS ON REACTOR STRUCTURAL
MATERIALS.

(U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. 1 FEB-30
APR 70,

MAY 70 54P STEELE, L. E. ; SERPAN, C.
Z. ; JR. ; HAWTHORNE, J. R. ; KRAFFT, J. M. ;
GRAY, R. A. ; JR ;
REPT. NO. NRL-MR-2126
PROJ: NRL-M01-14; RRO07-11-41-5409
TASK: AT(49-5)-211U

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO QUARTERLY PROGRESS REPT.,
AD-703 617.

DESCRIPTORS: (*REACTOR MATERIALS, RADIATION
DAMAGE), (*STEEL, REACTOR MATERIALS),
EMBRITTLMENT, POWER REACTORS, PRESSURE VESSELS,
REACTOR FUEL CLADDING, FAST REACTORS,
FRACTURE(MECHANICS), NEUTRON REACTIONS,
VANADIUM

(U)

THE REPORT INCLUDES: (1) RESULTS OF A DAMAGE
FUNCTION APPROACH TO SPECTRUM ANALYSIS FOR ARMY
REACTOR SM-1, (2) ANALYSIS FOR FRACTURE
RESISTANCE IN HEAVY THICKNESS A533-B STEEL PLATE
AND WELD METAL, (3) THE ROLE OF IRON IN THE
FRACTURE OF AN IRRADIATED PRESSURE VESSEL STEEL,
(4) THE NATURE OF OBSERVED RADIATION DAMAGE IN
VANADIUM, AND (5) THE EFFECTS OF THE FAST REACTOR
ENVIRONMENT ON THE TENSILE PROPERTIES OF SELECTED
STRUCTURAL AND CLADDING ALLOYS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-707 363 13/10 11/9
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

DEVELOPMENT OF A SPHERICAL ACRYLIC PLASTIC PRESSURE
HULL FOR HYDROSPACE APPLICATION. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. OCT 64-OCT 69,
APR 70 222P STACHIW, J. D. I
REPT. NO. NCEL-TR-676
PROJ: YF38.535.005.006

UNCLASSIFIED REPORT

PORTIONS OF THIS DOCUMENT ARE NOT FULLY LEGIBLE.
SUPPLEMENTARY NOTE: LIMITED NUMBER OF COPIES CONTAINING
COLOR OTHER THAN BLACK AND WHITE ARE AVAILABLE UNTIL STOCK
IS EXHAUSTED. REPRODUCTIONS WILL BE MADE IN BLACK AND
WHITE ONLY.

DESCRIPTORS: (*UNDERWATER VEHICLES, PRESSURE
VESSELS), (*HULLS(MARINE), ACRYLIC RESINS),
PHYSICS LABORATORIES, DESIGN, CONTINENTAL SHELVES,
DEEP SUBMERGENCE, SPHERES, MANNED, OPERATION,
CONSTRUCTION MATERIALS, PROTECTION, SAFETY,
PERFORMANCE(ENGINEERING) (U)
IDENTIFIERS: *NEMO(NAVAL EXPERIMENTAL MANNED
OBSERVATORY), *NAVAL EXPERIMENTAL MANNED
OBSERVATORY (U)

A SPHERICAL, ACRYLIC PLASTIC CAPSULE HAS BEEN
DESIGNED FOR PROTECTION OF MAN AGAINST THE EXTERNAL
HYDROSTATIC PRESSURE PRESENT AT CONTINENTAL SHELF
DEPTHS. EXPERIMENTAL AND ANALYTICAL STUDIES HAVE
BEEN CONDUCTED TO EVALUATE THE PERFORMANCE OF BOTH
THE SPHERICAL CAPSULE DESIGN AND THE ACRYLIC PLASTIC
CONSTRUCTION MATERIAL AT CONTINENTAL SHELF DEPTHS.
RESULTS FROM TESTING TWENTY-TWO 15-INCH-OUTSIDE
DIAMETER MODELS AND A LARGE-SCALE PROTOTYPE UNDER
SHORT-TERM, CYCLIC, AND LONG-TERM HYDROSTATIC
PRESSURE INDICATE THAT THE DESIGN AND MATERIAL CHOSEN
MEET THE REQUIREMENTS FOR SAFE OPERATION AT
CONTINENTAL SHELF DEPTHS. A PROTOTYPE 64-INCH-OD
CAPSULE OF 2.5-INCH WALL THICKNESS, AND 4,000-POUND
POSITIVE BUOYANCY IN SEAWATER HAS BEEN SPECIFICALLY
DEVELOPED FOR THE NEMO (NAVAL EXPERIMENTAL
MANNED OBSERVATORY) SYSTEM. THE NEMO
PROTOTYPE CAPSULE SUCCESSFULLY WITHSTOOD 105
SIMULATED DIVES RANGING FROM 250 TO 2,400 FEET PRIOR
TO BEING TESTED TO IMPLOSION AT A SIMULATED DEPTH OF
4,150 FEET. UNTIL MORE EXPERIMENTAL DATA ARE
GENERATED ON THE FATIGUE LIFE OF THE FULL SCALE NEMO
CAPSULE UNDER DIFFERENT PRESSURE LOADINGS.

UNCLASSIFIED

ODC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-708 968 13/4 20/11
WATERVLIET ARSENAL N Y

A COMPLIANCE K CALIBRATION FOR A PRESSURIZED THICK-WALL CYLINDER WITH A RADIAL CRACK. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAY 70 34P UNDERWOOD, JOHN H. ; LASSELLE,
RALPH R. ; SCANLON, RAYMOND D. ; HUSSIAN, MOAYYED
A. ;
REPT. NO. WVT-7026
PROJ: DA-1-T-061102-B-32-A

UNCLASSIFIED REPORT

DESCRIPTORS: (•PRESSURE VESSELS, STRESSES),
CYLINDRICAL BODIES, CRACKS, PRESSURE, NUMERICAL
ANALYSIS, LOADING(MECHANICS), NOTCH TOUGHNESS,
TEST METHODS (U)
IDENTIFIERS: K CALIBRATIONS, STEEL 4340,
FRACTURE MECHANICS (U)

THE K CALIBRATION FOR AN INTERNALLY PRESSURIZED, THICK-WALL CYLINDER WITH A STRAIGHT, RADIAL NOTCH HAS BEEN DETERMINED FROM A COMPLIANCE TEST. THE METHOD SUGGESTED BY IRWIN IS USED WITH COMPLIANCE DEFINED AS THE CHANGE IN INTERNAL VOLUME OF A CYLINDER DIVIDED BY APPLIED HYDROSTATIC PRESSURE RATHER THAN THE USUAL LOAD-ELONGATION DEFINITION. THE DERIVATIVE OF INTERNAL VOLUME CHANGE WITH RESPECT TO NOTCH DEPTH, 'A', IS OBTAINED BY NUMERICAL ANALYSIS OF TANGENTIAL STRAIN MEASUREMENTS ON THE OD OF THE TEST CYLINDER. THIS DERIVATIVE LEADS DIRECTLY TO THE K CALIBRATION FOR THE CYLINDER. CUBIC SPLINE FUNCTIONS ARE USED TO APPROXIMATE BOTH THE STRAIN AS A FUNCTION OF POSITION ON THE CYLINDER AND THE RESULTING VOLUME CHANGE AS A FUNCTION OF 'A'. ALSO INCLUDED IN THE DETERMINATION OF K IS A PROOF, USING THE DIVERGENCE THEOREM IN THE THEORY OF ELASTICITY, THAT THE DERIVATIVES WITH RESPECT TO 'A' OF INTERNAL AND EXTERNAL VOLUME CHANGE ARE IDENTICAL. THIS ALLOWS THE USE OF EXTERNAL STRAIN MEASUREMENTS TO DETERMINE K BASED ON INTERNAL VOLUME CHANGE. (U)
(AUTHOR)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-709 446 13/4 13/13 20/11
NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER WASHINGTON D
C

STRESS ANALYSIS OF THIN ELASTOPLASTIC SHELLS. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
MAY 70 111P LOMACKY, OLES I
REPT. NO. NSRDC-3295
PROJ: SFD13-03-02
TASK: 1954

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, STRUCTURAL
SHELLS), (*STRUCTURAL SHELLS, STRESSES),
PLASTICITY, STRAIN(MECHANICS), SHEAR STRESSES,
DEFORMATION, DIFFERENTIAL EQUATIONS, NUMERICAL
ANALYSIS, SUBMARINE HULLS (U)
IDENTIFIERS: FINITE DIFFERENCE ANALYSIS (U)

A STRESS ANALYSIS IS PRESENTED OF THIN SHELLS,
HAVING LARGE DEFLECTIONS AND BEING LOADED INTO THE
STRAIN-HARDENING RANGE. PLASTIC STRAIN
INCOMPRESSIBILITY IS ASSUMED. THE TWO GOVERNING
DIFFERENTIAL EQUATIONS IN TERMS OF THE STRESS
FUNCTION AND THE NORMAL DISPLACEMENT ARE PRESENTED IN
TWO ALTERNATE FORMS. IN THE FIRST FORM
CORRESPONDING EQUATIONS OF THE ELASTIC PROBLEM ARE
MODIFIED ONLY BY ADDING THE INTEGRALS OF THE PLASTIC
STRAINS. THE ALTERNATE FORM REQUIRES THAT THE
COEFFICIENTS OF THE DIFFERENTIAL EQUATION OPERATORS
BECOME DEPENDENT ON THE LOAD, AND AN ITERATIVE
PROCESS IS PRESENTED BY WHICH THE SOLUTION CAN BE
OBTAINED, STARTING FROM THE KNOWN ELASTIC SOLUTION.
UTILIZING THE FIRST FORM, THE ANALYSIS IS APPLIED
TO THE PROBLEM OF STRESS CONCENTRATION AROUND A
CIRCULAR OPENING, WITH AND WITHOUT A REINFORCED RING
IN A PRESSURIZED SPHERICAL SHELL. NUMERICAL
SOLUTION IS OBTAINED BY AN ITERATIVE PROCEDURE, USING
THE FINITE DIFFERENCE TECHNIQUE FOR THE SPECIAL CASE
OF LINEARIZED DISPLACEMENTS AND DEFORMATION THEORY OF
PLASTICITY. THE SPEED OF CONVERGENCE DECREASES WITH
INCREASE IN PRESSURE AND DECREASE OF STRAIN-HARDENING
COEFFICIENT. THE PROCEDURE REQUIRED TO APPLY THE
INCREMENTAL THEORY AND TO INCLUDE FINITE
DISPLACEMENTS IS ALSO DISCUSSED IN DETAIL.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-709 554 18/10
NAVAL RESEARCH LAB WASHINGTON D C

THE INFLUENCE OF COMPOSITION ON THE FRACTURE
TOUGHNESS OF COMMERCIAL NUCLEAR VESSEL WELDS. (U)

DESCRIPTIVE NOTE: INTERIM REPT.,
JUN 70 22P STEELE,LENDELL E. ;
REPT. NO. NRL-7095
CONTRACT: AT(49-5)-2110
PROJ: RR007-11-41

UNCLASSIFIED REPORT

DESCRIPTORS: (•NUCLEAR POWER PLANTS, PRESSURE
VESSELS), (•PRESSURE VESSELS, EMBRITTLEMENT),
METAL JOINTS, WELDS, FRACTURE(MECHANICS),
TOUGHNESS, RADIATION DAMAGE, STATISTICAL DATA (U)
IDENTIFIERS: FRACTURE MECHANICS, RADIATION
EMBRITTLEMENT, STEEL A302-B, STEEL A533-B,
ELECTROSLAG WELDING (U)

IRRADIATION STUDIES OF WELDS OF THE ASTM TYPE
A302-B AND A533-B STEELS, MOST COMMONLY USED
FOR COMMERCIAL WATER REACTOR VESSELS, DEMONSTRATED
SEVERAL INSTANCES IN WHICH THE WELD METAL EXHIBITED
LOWER FRACTURE TOUGHNESS OR GREATER ELEVATION OF THE
BRITTLE-TO-DUCTILE TRANSITION TEMPERATURE THAN THAT
OBSERVED FOR THE COMPANION BASE-PLATE AND WELD HEAT-
AFFECTED-ZONE MATERIAL. EXAMINATION OF THE
STRUCTURE AND COMPOSITION LED TO THE CONCLUSION THAT
COMPOSITION IS CRITICAL TO THE LEVEL OF RADIATION-
INDUCED EMBRITTLEMENT. THE LEVEL OF COPPER AND
PHOSPHORUS CONTENTS HAS BEEN SHOWN TO BE ESPECIALLY
CRITICAL TO THE LEVEL OF EMBRITTLEMENT WITH WELDS
HAVING HIGH COPPER (>0.20%) AND PHOSPHORUS (>
0.015%) SHOWING GREATER EMBRITTLEMENT THAN THOSE
CONTAINING LESSER AMOUNTS. THESE EXPERIMENTAL
OBSERVATIONS WERE VERIFIED THROUGH LABORATORY TESTS
IN WHICH THESE CONSTITUENTS AND OTHER RESIDUAL
ELEMENTS WERE CONTROLLED IN WELDMENTS SIMULATING
THOSE FOR REACTOR SERVICE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-709 898 18/9 11/6
NAVAL RESEARCH LAB WASHINGTON D C

ANALYSIS OF NEUTRON-EMBRITTEMENT AND FLUX-
DENSITY CONSIDERATIONS OF THE ARMY SM-1 REACTOR
PRESSURE VESSEL, (U)

JUN 70 24P SERPAN, CHARLES Z., JR;
REPT. NO. NRL-7101
PROJ: NRL-M01-14, USA-ERG-11-69

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURIZED WATER REACTORS, PRESSURE
VESSELS), (*STEEL, EMBRITTEMENT), NEUTRON
FLUX, DOSIMETERS, NEUTRON SPECTRUM, TEMPERATURE,
POWER REACTORS, STATISTICAL ANALYSIS, TRANSITION
TEMPERATURE, REACTOR SYSTEM COMPONENTS (U)
IDENTIFIERS: FLUENCE, STEEL A-212, SM-1A (U)
REACTORS

THE ARMY SM-1 REACTOR HAS BEEN EVALUATED WITH
RESPECT TO THE INCREASE IN TRANSITION TEMPERATURE OF
THE A212-B STEEL PRESSURE VESSEL. ALTHOUGH
STEEL FROM THE HEAT FORMING THE VESSEL IS NOT
AVAILABLE FOR IRRADIATION-RESPONSE BEHAVIOR TESTING,
THE INITIAL TRANSITION TEMPERATURE OF 40 DEG F (4
DEG C) WAS DETERMINED FROM VESSEL STEEL. A
RELATIONSHIP BETWEEN INCREASING EMBRITTEMENT FOR A
4-IN.-THICK PLATE OF A212-B STEEL, REPRESENTING
THE ASTM REFERENCE HEAT FOR THIS COMPOSITION, AND
INCREASING NEUTRON FLUENCE WAS ESTABLISHED FOR THE
IRRADIATION TEMPERATURE CONDITIONS OF THE SM-1
REACTOR. COMBINING WITH THIS THE ARMY-IMPOSED
TRANSITION TEMPERATURE LIMIT FOR THE SM-1 REACTOR
VESSEL OF 295 DEG F (146 DEG C) RESULTS IN A
FLUENCE VALUE OF 2.65×10 TO THE 19TH POWER N/SQ.CM.
> 0.5 MEV FOR A LIFETIME VESSEL EXPOSURE. THE
NEUTRON FLUX LEVEL FOR THE VESSEL WAS ESTABLISHED BY
EXTRAPOLATING A CORE-REGION FLUX MEASUREMENT USING
THE RESULTS OF A CALCULATED NEUTRON SPECTRUM AT THE
REACTOR VESSEL. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-711 321 18/10 11/6
NAVAL RESEARCH LAB WASHINGTON D C

IRRADIATION EFFECTS ON REACTOR STRUCTURAL
MATERIALS.

(U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT, 1 MAY-31
JUL 70.

AUG 70 36P STEELE, L. W. ; HAWTHORNE, J.
R. ; SERPAN, C. Z. , JR. ; SMIDT, F. A. , JR. ;
REPT. NO. NRL-MR-2153
CONTRACT: AT(49-5)-2110
PROJ: RR007-11-41-5409, NRL-MO1-14

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-707 336.

DESCRIPTORS: (*REACTOR MATERIALS, RADIATION
DAMAGE), (*STEEL, RADIATION DAMAGE),
(*VANADIUM, RADIATION DAMAGE),
FRACTURE(MECHANICS), PRESSURE VESSELS, NEUTRON
REACTIONS, EMBRITTLEMENT
IDENTIFIERS: STEEL A-533B

(U)

(U)

THE REPORT INCLUDES: (1) ASSESSMENTS OF
RADIATION RESISTANT A533-B PLATE FROM A
CONTROLLED COMPOSITION 30-TON DEMONSTRATION MELT,
(2) A STUDY OF THROUGH-THICKNESS DUCTILITY IN AN
IRRADIATED REACTOR VESSEL WALL, (3) NEUTRON
EMBRITTLEMENT IN A SIMULATED REACTOR PRESSURE VESSEL
WALL, AND (4) FUNDAMENTAL EXPLORATION OF
RADIATION DAMAGE IN VANADIUM. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-711 845 11/6 18/10
NAVAL RESEARCH LAB WASHINGTON D C

A REASSESSMENT OF FRACTURE-SAFE OPERATING CRITERIA
FOR REACTOR VESSEL STEELS BASED ON CHARPY-V
PERFORMANCE. (U)

DESCRIPTIVE NOTE: SPECIAL INTERPRETATIVE REPT.,
SEP 70 29P LOSS, F. J. HAWTHORNE, J.
R. ISERPAN, C. Z. , JR;
REPT. NO. NRL-7152
CONTRACT: AT(49-5)-2110
PROJ: NRL-M01-14, RRU07-11-41-5409

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, FRACTURE(MECHANICS)),
(*PRESSURE VESSELS, NUCLEAR REACTORS), SAFETY,
TESTS, TRANSITION TEMPERATURE, DESIGN (U)
IDENTIFIERS: STEEL A-533B, TEAR TESTS (U)

FRACTURE-SAFE OPERATING CRITERIA FOR COMMERCIAL
NUCLEAR PRESSURE VESSELS BASED ON FRACTURE
ANALYSIS DIAGRAM PROCEDURES AND CHARPY-V
ENERGY TRENDS ARE REAPPRAISED WITH RESPECT TO THE
EFFECTS OF THICK-SECTION MECHANICAL CONSTRAINT AND
LOW CHARPY-V SHELF ENERGIES RESULTING FROM
NEUTRON IRRADIATION. COMPARISONS OF THE CHARPY-V
TEST WITH THE MORE DEFINITIVE DYNAMIC TEAR
TEST PROCEDURES INDICATE THE FORMER TO BE AN
ACCEPTABLE MEANS OF ASSESSING THE FRACTURE TOUGHNESS
OF A533-B STEEL. THE MECHANICAL CONSTRAINT
ASSOCIATED WITH 12-IN. THICKNESSES OF THIS STEEL
SUGGESTS THE ADDITION OF 70F (39C) TO THE
EXISTING CRITERION REQUIRING VESSEL OPERATION ABOVE
NDT + 60F (33C). RATIO ANALYSIS
DIAGRAM PROCEDURES ARE SHOWN TO BE USEFUL IN
INTERPRETING CHARPY-V SHELF LEVEL DATA OBTAINED
FROM VESSEL SURVEILLANCE PROGRAMS IN TERMS OF
CRITICAL TOUGHNESS LEVELS RELATING TO BRITTLE
FRACTURE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-713 258 20/11
CALIFORNIA UNIV BERKELEY

ELASTIC-PLASTIC ANALYSIS OF SOME PRESSURE VESSEL
HEADS.

(U)

JUL 69 IIP POPOV, E. P. IKHOJASTEH-
BAKHT, M. ISHARIFI, P. ;
CONTRACT: DAHCO4-69-C-0037
MONITOR: AROD 828411-A

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN JNL. OF ENGINEERING FOR
INDUSTRY, TRANSACTIONS OF THE ASME, P309-316 MAY
70.

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH
ILLINOIS UNIV., CHICAGO, DEPT. OF MATERIALS
ENGINEERING. PRESENTED AT THE WINTER ANNUAL MEETING
OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS,
LOS ANGELES, CALIF., 16-20 NOV 69. PAPER NO.
69-WA/PVP-7.

DESCRIPTORS: (*STRUCTURAL SHELLS, ELASTICITY),
(*PRESSURE VESSELS, ELASTICITY),
LOADING(MECHANICS), STRESSES,
BUCKLING(MECHANICS), MATHEMATICAL ANALYSIS
IDENTIFIERS: FINITE ELEMENT ANALYSIS,
ELASTOPLASTICITY

(U)

(U)

SIXTEEN ASME STANDARD TORISPHERICAL HEADS
ATTACHED TO CYLINDERS AND SUBJECTED TO INTERNAL
PRESSURE ARE ANALYZED AS ELASTIC AND/OR ELASTIC-
PLASTIC SHELLS USING A NEW FINITE ELEMENT. AS BASIC
ELEMENTS, THIN-WALLED FRUSTA WITH CURVED MERIDIANS
HAVING COMMON TANGENTS AND RADII AT THE NODAL CIRCLES
ARE EMPLOYED ASSURING GOOD ACCURACY OF THE RESULTS.
IN THE PLASTIC ANALYSIS EACH WALL-THICKNESS WAS
SUBDIVIDED INTO CONCENTRIC LAMINA IN ORDER TO MONITOR
THE BEHAVIOR OF THE MATERIAL. THE INCREMENTAL LAW
OF PLASTICITY IN CONJUNCTION WITH THE MISES YIELD
CONDITION AND THE ASSOCIATED FLOW RULE WERE USED IN
THE INELASTIC RANGE. THE RESULTS OF THE ANALYSIS
ARE PRESENTED IN DETAIL AND ARE COMPARED WITH THE
PROVISIONS OF THE ASME PRESSURE VESSEL CODE.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO: /ZOM07

AD-713 519 1976 20/11
WATERVLIET ARSENAL N Y

THE ROLE OF FRACTURE TOUGHNESS AND RESIDUAL STRESSES
IN THE FATIGUE AND FRACTURE BEHAVIOR OF LARGE
THICK-WALLED PRESSURE VESSELS. (U)

70 15P DAVIDSON, THOMAS E. ITHROOP,
JOSEPH F. REINER, ALBERT N. I

UNCLASSIFIED REPORT

DESCRIPTORS: (GUN BARRELS,
FRACTURE(MECHANICS)), PRESSURE VESSELS,
STRESSES, FATIGUE(MECHANICS), CRACKS, CRACK
PROPAGATION, PRESSURE, HYDRAULIC SYSTEMS, TEST
METHODS (U)
IDENTIFIERS: AUTOFRETTAGE (U)

SUMMARIZED ARE THE RESULTS OF AN INVESTIGATION INTO
THE FATIGUE AND FRACTURE BEHAVIOR OF LARGE THICK-
WALLED CYLINDERS IDENTICAL IN CONFIGURATION TO A
175MM CANNON TUBE. CRACK GROWTH RATES AND FATIGUE
LIFE DATA ARE PRESENTED FOR MATERIALS OF THREE
STRENGTH LEVELS AND DIFFERENT FRACTURE TOUGHNESS
LEVELS. THE EFFECTS OF AUTOFRETTAGE WERE EXAMINED
AND FOUND TO IMPROVE THE FATIGUE LIFE SIGNIFICANTLY.
THIS IMPROVEMENT IN LIFE IS SHOWN TO BE THE RESULT
OF RETARDATION OF THE FATIGUE CRACK GROWTH RATE AT
SMALL CRACK DEPTHS. THIS OBSERVATION, ALONG WITH
THE RELATIONSHIP BETWEEN FRACTURE TOUGHNESS, CRITICAL
CRACK DEPTH AND FRACTURE MODE, IS INTERPRETED IN
TERMS OF RECENT ADVANCEMENTS IN THE APPLICATION OF
FRACTURE MECHANICS TO THE CASE OF A CYLINDER UNDER
INTERNAL PRESSURE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-714 178 20/11 13/4
APPLIED TECHNOLOGY ASSOCIATES INC EMERSON N J

ANALYSIS OF A CIRCULAR CYLINDRICAL
PERFORATED SHELL.

(U)

NOV 69 88P MAHONEY, J. B. ; RUNG, R. I
REPT. NO. ATA-129-E-11-69
CONTRACT: N00024-68-C-5151

UNCLASSIFIED REPORT

DESCRIPTORS: (*STRUCTURAL SHELLS, ORIFICES),
(*ORIFICES, STRESSES), (*PRESSURE VESSELS,
DESIGN), CYLINDRICAL BODIES, STIFFENED
CYLINDERS, BENDING, ELASTICITY, COMPUTER PROGRAMS
IDENTIFIERS: FORTRAN

(U)

(U)

THE REPORT CONTAINS A SUMMARY OF THE WORK DONE
UNDER A CONTINUING RESEARCH CONTRACT GIVEN TO
APPLIED TECHNOLOGY ASSOCIATES IN THE FIELD OF
PRESSURE VESSEL DESIGN. IN PARTICULAR IS DEVELOPED
THE THEORETICAL SOLUTION FOR THE DISTRIBUTION OF
STRESSES IN A PERFORATED CYLINDRICAL SHELL. THESE
CALCULATIONS HAVE BEEN REDUCED TO COMPUTER CODES AND
ARE GIVEN IN THE APPENDIX OF THE REPORT. IN
ADDITION TO THE COMPUTER CODES DEVELOPED FOR THE
EFFECTIVE ELASTIC CONSTANTS, THE REPORT CONTAINS A
CODE FOR THE ANALYSIS OF A CIRCULAR CYLINDRICAL SHELL
WHOSE SURFACE IS PENETRATED ONLY OVER A PORTION.
THUS THE 'EQUIVALENT' ELASTIC CONSTANTS OBTAINED
CAN BE USED WITHIN THE SHELL THEORY DEVELOPED IN THE
REPORT TO DESCRIBE THE DEFLECTIONS AND STRESSES IN A
PARTIALLY PERFORATED SHELL. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-714 562 \ 11/6 20/12 13/4
AEROSPACE CORP EL SEGUNDO CALIF LAB OPERATIONS

THE EFFECT OF PROCESSING ON PLASTIC STRAIN
ANISOTROPY OF TI-6AL-4V,

(U)

SEP 70 25P AMATEAU, MAURICE F. ; DULL,
DENNIS L. ; RAYMOND, LOUIS ;
REPT. NO. TR-0059(6250-10)-5
CONTRACT: F04701-70-C-0059
MONITOR: SAMSC TR-70-380

UNCLASSIFIED REPORT

DESCRIPTORS: (*TITANIUM ALLOYS, PLASTICITY),
(*PRESSURE VESSELS, MANUFACTURING METHODS),
ELASTICITY, ANISOTROPY, STRAIN HARDENING,
LOADING(MECHANICS)
IDENTIFIERS: TITANIUM ALLOY 6AL 4V

(U)

(U)

THE PLASTIC STRAIN ANISOTROPY OF TI-6AL-4V
WAS EXAMINED AFTER VARIOUS THERMO-MECHANICAL
TREATMENTS, INCLUDING HEAT TREATING, ROLLING, AND
FORGING. THE PROCESSING TEMPERATURES WERE VARIED
FROM ROOM TEMPERATURE TO 1950F. THE ANISOTROPY,
IN TERMS OF THE STRAIN RATIO R, WAS MEASURED BY
POST-YIELD STRAIN GAGES IN THE THREE PRINCIPAL
DIRECTIONS. THE RESULTS WERE CORRELATED WITH THE
(0002) POLE FIGURES FOR EACH THERMOMECHANICAL
TREATMENT. THE PLASTIC STRAIN ANISOTROPY, WHICH WAS
CONSISTENT WITH THE BASAL POLE TEXTURE, WAS FOUND TO
DEPEND UPON BOTH THE METHOD AND THE TEMPERATURE OF
MECHANICAL WORKING. THE GREATEST R VALUES
OCCURRED FOR THE COLD-ROLLED MATERIAL WHERE THE SHEET
NORMAL ROTATES TO WITHIN 15 DEG FROM THE BASAL POLE.
IN ADDITION, R IS NOT CONSTANT UNDER UNIAXIAL
TENSION BUT GENERALLY INCREASES WITH THE AMOUNT OF
PLASTIC STRAIN. THE VARIATION OF R WITH UNIAXIAL
STRAIN DEPENDS UPON THE FORMING TEMPERATURE, WITH THE
LARGEST CHANGES OCCURRING IN SAMPLES THAT WERE ROLLED
AT ROOM TEMPERATURE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-716 032 20/12
NAVAL ORDNANCE LAB WHITE OAK MD

FATIGUE OF THICK-WALLED, HIGH-PRESSURE
CYLINDERS.

(U)

JUN 70 24P DAWSON, V. C. D. ; GOELLER,
J. E. ;
REPT. NO. NOLTR-70-135

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS,
FATIGUE(MECHANICS)), CYLINDRICAL BODIES,
STRESSES, TENSILE PROPERTIES, CREEP
IDENTIFIERS: AUTOFRETTAGE

(U)

(U)

THE REPORT CONTAINS THE RESULTS OF A STUDY TO
DEVELOP A THEORETICAL APPROACH WHEREBY UNIAXIAL
FATIGUE DATA CAN BE USED TO PREDICT THE PERMISSIBLE
NUMBER OF CYCLES OF A THICK-WALLED CYLINDER.
EXPERIMENTAL DATA FROM THE LITERATURE WERE EXAMINED
ON OPEN END AND CLOSED END CYLINDERS IN AN
AUTOFRETTAGED AND NON-AUTOFRETTAGED CONDITION WITH
WALL RATIOS FROM 1.2 TO 2.0. DISTORTION ENERGY WAS
USED TO REDUCE THE TRIAXIAL STRESS STATE TO AN
EQUIVALENT UNIAXIAL STRESS. A NEW METHOD WAS THEN
DEVELOPED WHEREBY THE NUMBER OF CYCLES COULD BE
PREDICTED AS A FUNCTION OF THE MEAN AND ALTERNATING
PRESSURE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-716 527 20/11 13/13
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

APPLIED METHODS OF CALCULATION OF SHELLS AND
THIN-WALLED CONSTRUCTIONS,

(U)

NOV 70 510P AVDONIN, A. S. ;
REPT. NO. FTD-6040101
TASK: DIA-T65-04-18A/19A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF MONO.
PRIKLADNYE METODY RASCHETA OBOLOCHEK I
TONKOSTENNYKH KONSTRUKTSII, MOSCOW, 1969 P1-402, BY
ROBERT ALLEN POTTS, AND RAY E. ZARZA.

DESCRIPTORS: (*STRUCTURAL SHELLS,
LOADING(MECHANICS)), STABILITY, BENDING,
STRESSES, HYDROSTATIC PRESSURE, PRESSURE VESSELS,
RODS, PARTIAL DIFFERENTIAL EQUATIONS, STIFFENED
CYLINDERS, NUMERICAL ANALYSIS, USSR

(U)

IDENTIFIERS: TRANSLATIONS, PLATES(STRUCTURAL
MEMBERS)

(U)

THE BOOK DISCUSSES CALCULATION CONCERNING SHELLS OF
REVOLUTION AND ELEMENTS OF THIN-WALLED CONSTRUCTIONS
FOR STRENGTH, RIGIDITY AND STABILITY UNDER VARIOUS
FORMS OF FORCE ACTION. SUCH PROBLEMS INCLUDE, FOR
EXAMPLE, CALCULATIONS OF DOUGHNUT-SHAPED SHELLS,
LOADED BY INTERNAL PRESSURE, SPHERICAL SHELLS, LOADED
BY LOCAL LOADS, ETC. PROBLEMS OF STABILITY OF
SHELLS ARE GIVEN IN THE BOOK IN A NEW FORMULATION.
THE CONDITIONS ON THE CONTOUR OF HALF-WAVES ARE
DETERMINED BY LOADING CONDITIONS AND THE PROPOSED
FORM OF LOSS OF STABILITY. THE NEW APPROACH TO
THESE PROBLEMS REFINES AND EXPANDS THE CONCEPT OF
STABILITY OF SHELLS AND GIVES THE POSSIBILITY OF
SOLVING PRACTICALLY IMPORTANT PROBLEMS.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-716 862 20/11 13/4
NEW YORK UNIV BRONX DEPT OF AERONAUTICS AND
ASTRONAUTICS

BUCKLING OF A CIRCULAR ELASTIC RING
CONFINED TO A UNIFORMLY CONTRACTING CIRCULAR
BOUNDARY, (U)

SEP 70 49P EL-BAYOUMY, LOTFI ;
REPT. NO. NYU-AA-70-18
CONTRACT: AF-AFOSR-813-67
PROJ: AF-9768, AF-9782
TASK: 976802, 978201
MONITOR: AFOSR 70-2337TR

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELASTIC SHELLS,
BUCKLING(MECHANICS)), (*PRESSURE VESSELS,
REINFORCING MATERIALS), RINGS, REINFORCED
CONCRETE, LOADING(MECHANICS), THERMAL STABILITY,
HYDROSTATIC PRESSURE, STRAIN(MECHANICS),
BOUNDARY VALUE PROBLEMS, STRESSES, CALCULUS OF
VARIATIONS, THESES (U)

THE PRESENT PAPER CONTAINS A DETAILED ANALYSIS OF
THE TITLE PROBLEM. ALSO INCLUDED IS A REVIEW OF
RELATED BUCKLING PROBLEMS AVAILABLE IN THE
LITERATURE. THE BUCKLED CONFIGURATION IS ASSUMED TO
CONSIST OF TWO REGIONS, VIZ., THE DETACHED REGION,
WHERE SHALLOW ARCH APPROXIMATIONS ARE ADOPTED, AND AN
ATTACHED REGION, WHERE THE RING ASSUMES A CONSTANT
CURVATURE. THE PROBLEM IS TREATED AS A VARIATIONAL
PROBLEM WITH VARIABLE END POINTS FOR WHICH THE
VARIATIONAL FORMULATION YIELDS, IN ADDITION TO THE
DIFFERENTIAL EQUATIONS AND BOUNDARY CONDITIONS, A
TRANSVERSALITY CONDITION, DETERMINING THE EXTEND OF
THE DETACHED REGION. THE RESULTS INDICATE THAT THE
RING WILL NOT BUCKLE UNLESS EXTERNAL DISTURBANCES ARE
PRESENT. A DISCUSSION OF ENERGY BARRIERS SHOWS THAT
THE RING'S ABILITY TO SUSTAIN EXTERNAL DISTURBANCES
DIMINISHES AS THE CONTRACTION INCREASES.

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-717 301 20/11
WATERVLiet ARSENAL N Y

FATIGUE CRACK TOLERANCE IN THICK WALLED
CYLINDERS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
NOV 70 49P THROUP, JOSEPH F. ;
R&PT. NO. WVT-7035
PROJ: DA-1-T-062105-A-328

UNCLASSIFIED REPORT

DESCRIPTORS: (*CYLINDRICAL BODIES,
FATIGUE(MECHANICS)), (*PRESSURE VESSELS,
FATIGUE(MECHANICS)), (*CRACKS,
TOLERANCES(MECHANICS)), STRESSES, BENDING,
FRACTOGRAPHY, CALIBRATION, TOUGHNESS,
PRESSURIZATION, LOADING(MECHANICS),
MATHEMATICAL MODELS
IDENTIFIERS: CRACK SHAPES

(U)

(U)

A K-CALIBRATION FOR PART-THROUGH WALL CRACKS OF
SEMI-ELLIPTICAL SHAPE IN A PRESSURIZED THICK WALLED
CYLINDER IS OBTAINED IN TWO PARTS WHICH INCLUDE THE
STRESS GRADIENT IN THE TUBE WALL AND THE EFFECT OF
THE PRESSURE ACTING WITHIN THE CRACK CAVITY. USING
K IN A LIMITING CONDITION, THE CALIBRATION PROVIDES
A FAILURE CRITERION FOR ESTIMATION OF CRITICAL CRACK
DEPTHS FOR BRITTLE FRACTURE. THE DISPERSION IN
CRACK TOLERANCE MAY BE ESTIMATED FROM THE
DISTRIBUTION IN TEMPERING TEMPERATURES AMONG THE
FORGINGS. THIS EMPLOYS THE RELATIONSHIPS OF THE
MECHANICAL PROPERTIES TO TEMPERING TEMPERATURE.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-717 618 18/9
NAVAL RESEARCH LAB WASHINGTON D C

SM-1A REACTOR PRESSURE VESSEL
SURVEILLANCE: IRRADIATION OF FOLLOW-ON
CAPSULES IN THE SM-1 REACTOR,

(U)

DEC 70 15P SERPAN, CHARLES Z. , JR;
REPT. NO. NRL-7211
CONTRACT: AT(49-5)-2110
PROJ: NRL-M01-14, RR007-11-41-5409

UNCLASSIFIED REPORT

DESCRIPTORS: (*POWER REACTORS, PRESSURE VESSELS),
(*NEUTRON FLUX, MEASUREMENT), REACTOR CONTROL,
NEUTRON TRANSPORT THEORY, REACTOR CORES, REACTOR
FUEL ELEMENTS, ANNEALING, NEUTRON DETECTORS,
RADIATION DAMAGE
IDENTIFIERS: SM-1A REACTORS

(U)

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THREE CAPSULES CONTAINING CHARPY V-NOTCH SPECIMENS OF A DUPLICATE RING-FORGING OF SM-1A REACTOR PRESSURE-VESSEL STEEL WERE PREPARED FOR PLACEMENT INTO THE SM-1A REACTOR AS PART OF THE CONTINUING VESSEL SURVEILLANCE PROGRAM OF THAT REACTOR. THESE CAPSULES PLUS TWO MORE CONTROL CAPSULES WERE IRRADIATED IN THE SM-1 REACTOR AT 440 DEGREES F (227 DEGREES C) TO MATCH THE SM-1A REACTOR PRESSURE-VESSEL TRANSITION TEMPERATURE AND FLUENCE CONDITIONS PRIOR TO THE SM-1A ANNEALING. THE CAPSULES WERE THEN FURNACE ANNEALED UNDER THE SM-1A REACTOR ANNEALING CONDITIONS AND WERE REIRRADIATED IN THE SM-1 TO THE FLUENCE AND TRANSITION-TEMPERATURE CONDITIONS OF THE SM-1A AT THE END OF CORE 3. CONTROL POINTS WERE ESTABLISHED AFTER EACH STEP. SIGNIFICANT DIFFERENCES IN FLUX LEVELS AT A POINT IN THE SM-1 REACTOR WERE NOTED BETWEEN AN EARLIER FLUX-MONITOR IRRADIATION AND THE SUBSEQUENT SURVEILLANCE-CAPSULE IRRADIATIONS. THESE DIFFERENCES WERE FOUND TO BE DIRECTLY RELATED TO THE TWO DIFFERENT FUEL CORES IN PLACE AT THOSE TIMES. HIGHER FLUXES WERE GENERATED AT THE CORE EDGE DURING THE FLUX MONITOR IRRADIATION SINCE THE CORE WAS OLD AND THE CENTER WAS CONSIDERABLY BURNED OUT. LOWER FLUXES WERE MEASURED AT THE SAME CORE-EDGE LOCATION DURING THE SURVEILLANCE-CAPSULE IRRADIATIONS SINCE A NEW, SMALLER DIAMETER CORE PEAKED IN FLUX TOWARD THE CENTER.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-718 25 18/9
ARMY ENGINEER REACTORS GROUP FORT BELVOIR VA ENGINEERING
DIV

SM-1A VAPOR CONTAINER LEAK TEST: 3-5
AUGUST 1970.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
FEB 71 28P JOHNSON, GEORGE I
REPT. NO. ED-7101

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURIZED WATER REACTORS, PRESSURE
VESSELS), (*PRESSURE VESSELS, LEAKAGE (FLUID)),
POWER REACTORS, VAPOR PRESSURE, LEAK DETECTORS,
TESTS, DATA PROCESSING SYSTEMS
IDENTIFIERS: SM-1A REACTOR

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THE REPORT PRESENTS THE RESULTS OBTAINED DURING THE
LEAK RATE TESTS ON THE SM-1A VAPOR CONTAINER.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-718 812 13/13 13/10
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

WINDOWS FOR EXTERNAL OR INTERNAL HYDROSTATIC
PRESSURE VESSELS. PART V. CONICAL
ACRYLIC WINDOWS UNDER LONG-TERM PRESSURE
APPLICATION OF 10,000 PSI. (U)

DESCRIPTIVE NOTE: FINAL REPT. JUL 69-JUN 70,
JAN 71 79P STACHIW, J. D. ; MOODY, W.

A. ;
REPT. NO. NCEL-TR-708
PROJ: YF38-535-005-01-005

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO PART 4, AD-497 272.

DESCRIPTORS: (*PRESSURE VESSELS, TRANSPARENT
PANELS), (*TRANSPARENT PANELS, *ACRYLIC RESINS),
UNDERWATER VEHICLES, CONICAL BODIES, HYDROSTATIC
PRESSURE, FAILURE(MECHANICS) (U)
IDENTIFIERS: *WINDOWS (U)

CONICAL ACRYLIC WINDOWS OF 30-, 60-, 90-, 120- AND
150-DEGREE INCLUDED ANGLE AND 0.500 TO 1.250 T/D
(THICKNESS TO MINOR DIAMETER RATIO) HAVE BEEN
SUBJECTED IN THEIR MOUNTING FLANGES TO 10,000 PSI OF
HYDROSTATIC PRESSURE FOR 500 AND 1,000 HOURS AT
AMBIENT ROOM TEMPERATURE. THE DISPLACEMENT OF THE
WINDOWS THROUGH THE FLANGE MOUNTING HAS BEEN RECORDED
AS A FUNCTION OF TIME AND PLOTTED FOR THE READY
REFERENCE OF THE DESIGNER. THE MAGNITUDE OF THE
WINDOW DISPLACEMENT HAS BEEN FOUND TO BE A FUNCTION
OF TIME, ANGLE, TEMPERATURE, T/D RATIO AND
PRESSURE. IT IS RECOMMENDED THAT FOR SAFE SINGLE
SUSTAINED OPERATION OF 1,000 HOUR DURATION AT 10,000
PSI HYDROSTATIC LOADING AT AMBIENT TEMPERATURE THE
WINDOWS SHOULD HAVE AN INCLUDED CONICAL ANGLE $\geq$ OR
 $\approx$ 90 DEGREES AND A MINIMUM T/D RATIO OF 0.750.
FOR SUSTAINED LOADINGS IN EXCESS OF 1,000 HOURS THE
MINIMUM T/D RATIO OF 1.000. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-718 970 13/4 13/13
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

DESIGN OF MULTI-REGION PRESSURE VESSELS
USING MAXIMUM SHEAR THEORY.

(U)

DESCRIPTIVE NOTE: TECHNICAL NOTE.

JAN 71 47P LEYENAR, ANTONIO R. ISTACK,
THOMAS E. I
REPT. NO. TN-1971-5
CONTRACT: F19628-70-C-0230
PROJ: AF-649L
MONITOR: ESD TR-71-9

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, DESIGN), SHEAR
STRESSES, DEFORMATION, DUCTILITY, BRITTLENESS,
MATHEMATICAL MODELS, COMPUTER PROGRAMS
IDENTIFIERS: SHEAR THEORY, AUTOFRETTAGE,
FORTRAN, COMPUTER AIDED DESIGN

(U)

(U)

A METHOD IS OUTLINED FOR MULTI-REGION PRESSURE
VESSELS DESIGN CALCULATIONS USING THE MAXIMUM SHEAR
THEORY. THIS TREATMENT IS EMPLOYED DUE TO THE
SIMPLICITY OF THE METHOD AND BECAUSE THE RESULTS ARE
QUITE CONSERVATIVE FOR BOTH DUCTILE AND BRITTLE
MATERIALS. A PROCEDURE FOR OBTAINING AN OPTIMUM
DESIGN IS GIVEN FOR A DESIRED PERCENTAGE OF AUTO-
FRETTAGE ON THE INNER WALL OF THE PRESSURE VESSEL.
A COMPUTER PROGRAM WAS WRITTEN IN FORTRAN II
LANGUAGE AND THE VARIOUS DESIGN POSSIBILITIES WERE
EXECUTED BY IBM-1620 COMPUTER. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-720 576 14/4 13/4
ARMY MISSILE COMMAND REDSTONE ARSENAL ALA ARMY
PROPULSION LAB AND CENTER

DETERMINATION OF PROOF TEST LEVEL FOR TEST-
DEGRADABLE COMPONENTS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
NOV 70 29P MAYKUT, A. R. I
REPT. NO. RK-TR-70-19
PROJ: DA-1-M-262303-A-214

UNCLASSIFIED REPORT

DESCRIPTORS: (*RELIABILITY, TEST METHODS),
(*PRESSURE VESSELS, RELIABILITY), STRESSES,
OPTIMIZATION, FILAMENT WOUND CONSTRUCTION
IDENTIFIERS: PROOF TESTS

(U)

(U)

WHEN VIEWED FROM THE STANDPOINT OF STRESS/STRENGTH
INTERFERENCE THEORY, CONVENTIONAL PROOF TESTING
PRACTICE YIELDS A COMPONENT POPULATION WITH AN
INITIAL RELIABILITY OF 1.0. SUCH MAY NOT BE THE
CASE, HOWEVER, IF THE COMPONENTS ARE DEGRADED BY THE
PROOF TEST. THE PROOF TEST IS THUS REVIEWED FOR
THE CASE OF TEST-DEGRADABLE COMPONENTS.
METHODOLOGY IS DEVELOPED WHICH ALLOWS THE
DETERMINATION OF AN OPTIMUM TEST LEVEL. FINALLY,
THIS THEORY IS APPLIED TO FILAMENT-WOUND PRESSURE
VESSELS, AND IT IS FOUND THAT TEST-DEGRADABLE
COMPONENTS REQUIRE A PROOF TEST USAGE ENTIRELY
DIFFERENT FROM THAT FOLLOWED WITH COMPONENTS NOT
SUBJECT TO THIS DEGRADATION. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-720 676 18/10 11/6
NAVAL RESEARCH LAB WASHINGTON D C

ANALYSIS OF RADIATION-INDUCED EMBRITTLEMENT
GRADIENTS ON FRACTURE CHARACTERISTICS OF
THICK-WALLED PRESSURE VESSEL STEELS.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,

MAR 71 23P LOSS, F. J. HAWTHORNE, J.
R. SERPAN, C. Z. , JR. PUZAK, P. P. ;
REPT. NO. NRL-7209
CONTRACT: AT(49-5)-2110
PROJ: RR007-11-41-5409, NRL-M01-14

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, RADIATION DAMAGE),
(*REACTOR MATERIALS, EMBRITTLEMENT),
FRACTURE(MECHANICS), PRESSURE VESSELS
IDENTIFIERS: STEEL A-533B

(U)

(U)

THE FRACTURE BEHAVIOR OF THICK-WALLED NUCLEAR
VESSELS IS CONSIDERED FOR THE CASE OF A RADIATION-
INDUCED TOUGHNESS GRADIENT THROUGH THE WALL WHICH
CHARACTERISTICALLY RESULTS FROM NEUTRON ATTENUATION
BY THE WALL MATERIAL ITSELF. FRACTURE-SAFE DESIGN
ANALYSES BASED ON LINEAR ELASTIC FORMULATIONS OR
EXTRAPOLATIONS OF THESE FORMULATIONS TO THE ELASTIC-
PLASTIC REGIME ARE NOT SUFFICIENTLY DEVELOPED TO
CHARACTERIZE THE INTEGRATED BEHAVIOR OF A WALL WHOSE
TOUGHNESS CAN RANGE FROM BRITTLE AT THE INNER SURFACE
TO HIGHLY DUCTILE AT THE OUTER SURFACE. SOLUTIONS
TO THE PROBLEM IN THE FORESEEABLE FUTURE WILL BE
OBTAINED ONLY BY EXPERIMENTAL MEANS. THE PRESENT
APPROACH USES THE FRACTURE ANALYSIS DIAGRAM
(FAD) TOGETHER WITH A NEW INTERPRETATIVE METHOD FOR
FRACTURE EXTENSION RESISTANCE BASED ON MODIFIED
DYNAMIC TEAR SPECIMENS AS THE TOOLS FOR GRADIENT
ASSESSMENTS. WITH THESE TECHNIQUES THE SIGNIFICANCE
OF THE TOUGHNESS GRADIENT THROUGH THE WALL IS
ASSESSED IN TERMS OF THICK SECTION MECHANICAL
CONSTRAINT, AND FRACTURE CHARACTERISTIC OF THE
COMPLETE WALL ARE PREDICTED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-720 678 18/10 11/6 13/8
NAVAL RESEARCH LAB WASHINGTON D C

MAJOR FACTORS AFFECTING NEUTRON IRRADIATION
EMBRITTLEMENT OF PRESSURE-VESEL STEELS AND
WELDMENTS.

(U)

DESCRIPTIVE NOTE: SUMMARY REPT.,
OCT 70 22P STEELE,LENDELL E. ;
REPT. NO. NRL-7176
CONTRACT: AT(49-5)-2110
PROJ: RRO07-41-11-5409, NRL-M01-14

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, RADIATION DAMAGE),
(*WELDS, RADIATION DAMAGE), REACTOR MATERIALS,
EMBRITTLEMENT, PRESSURE VESSELS
IDENTIFIERS: *NEUTRON IRRADIATION EMBRITTLEMENT

(U)

(U)

THE MAJOR ASPECTS OF NEUTRON IRRADIATION
EMBRITTLEMENT IN STEEL PRESSURE VESSELS OF LARGE
COMMERCIAL NUCLEAR-POWER REACTORS ARE REVIEWED,
DRAWING ON THE RESULTS OF AEC-SPONSORED PROGRAMS
WHICH HAVE EMPHASIZED RESEARCH RELATED TO REACTOR
VESSEL RELIABILITY. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-721 292 11/6 13/4 20/12
MARTIN MARIETTA CORP DENVER COLO DENVER DIV

THE EFFECTS OF THE SURFACE LAYER ON PLASTIC
DEFORMATION AND CRACK PROPAGATION. (U)

DESCRIPTIVE NOTE: SEMI-ANNUAL REPT.,
MAR 71 15P KRAMER, IRVIN R. ;
REPT. NO. CR-71-2
CONTRACT: DAAG46-70-C-0102, ARPA ORDER-180
MONITOR: AMMRC CR-71-2/1

UNCLASSIFIED REPORT

DESCRIPTORS: (*ALUMINUM ALLOYS, CRACK
PROPAGATION), (*TITANIUM ALLOYS, CRACK
PROPAGATION), (*PRESSURE VESSELS,
FRACTURE(MECHANICS)), STRESSES,
LOADING(MECHANICS), FATIGUE(MECHANICS) (U)
IDENTIFIERS: ALUMINUM ALLOY 2014, TITANIUM ALLOY
6AL 4V, PLASTIC DEFORMATION (U)

THE REPORT DESCRIBES THE EFFECT OF A SURFACE LAYER
ON THE RATE OF CRACK PROPAGATION AND, BASED ON THIS
KNOWLEDGE, THE AUTHOR PROPOSES TO IMPROVE THE CRACK
PROPAGATION RESISTANCE OF METALS USED IN PRESSURE
VESSELS. THE QUALIFICATION OF PRESSURE VESSEL
HARDWARE IS USUALLY ACHIEVED BY THE PROOF TEST
METHOD. THE MAXIMUM SIZE OF THE FLAW THAT IS
PRESENT CAN BE PREDICTED FROM FRACTURE MECHANICS.
HOWEVER, CRACKS CAN GROW BELOW THE CRITICAL STRESS
INTENSITY K_{IC} AND CAN CAUSE LEAK FAILURE.
THEREFORE, THE SUBCRITICAL CRACK GROWTH
CHARACTERISTICS OF METALS ARE IMPORTANT IN PRESSURE
VESSEL MATERIAL SELECTION. AN EVALUATION OF THE
CRACK GROWTH RATE UNDER SUSTAINED OR CYCLIC LOADING
UNDER THE SERVICE STRESS GIVES A MEASURE OF
RELIABILITY OF THE HARDWARE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-724 641 13/4 20/11
WATERVLIET ARSENAL N Y

STRESS INTENSITY FACTORS FOR INTERNALLY
PRESSURIZED THICK-WALL CYLINDERS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAY 71 26P UNDERWOOD, JOHN H. ;
REPT. NO. WVT-7124
PROJ: DA-1-T-061102-B-32-A

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, STRESSES),
PRESSURIZATION, LOADING(MECHANICS), CRACKS,
FATIGUE(MECHANICS), NUMERICAL ANALYSIS
IDENTIFIERS: FRACTURE MECHANICS

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(U)

SELECTED STRESS INTENSITY FACTOR SOLUTIONS FROM THE LITERATURE ARE RELATED TO THE PROBLEM OF INTERNALLY PRESSURIZED THICK-WALL CYLINDERS WITH STRAIGHT-FRONT AND CURVED-FRONT CRACKS. THE RECENT K SOLUTIONS OF BOWIE + FREESE AND RICE + LEVY ARE COMBINED IN AN ESTIMATE OF THE K SOLUTION FOR A PRESSURIZED CYLINDER WITH A SEMIELLIPTICAL CRACK ORIGINATING ALONG THE INNER WALL. THE ESTIMATE OF K IS COMPARED WITH THE AVAILABLE EXPERIMENTAL AND ANALYTICAL K DATA FOR SHALLOW CRACKS. THE ESTIMATED K SOLUTION IS MODIFIED TO ACCOUNT FOR VARIOUS COMPLEX LOADINGS IN PRESSURIZED CYLINDERS. INCLUDED ARE MODIFICATIONS TO DESCRIBE LACK OF PRESSURE ON THE CRACK SURFACES IN PRESSURIZED CYLINDERS, RESIDUAL STRESS IN THE WALL OF PRESSURIZED CYLINDERS, A COMBINATION OF AN UNPRESSURIZED CRACK AND RESIDUAL STRESS IN THE WALL. THE EFFECT OF CYLIC PRESSURE LOADING ON K IS ALSO DISCUSSED IN RELATION TO THROOP'S WORK ON FATIGUE OF PRESSURIZED CYLINDERS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-725 463 18/8 11/6 20/12
NAVAL RESEARCH LAB WASHINGTON D C

STRUCTURE AND COMPOSITION EFFECTS ON
IRRADIATION SENSITIVITY OF PRESSURE VESSEL
STEELS,

(U)

71 12P STEELE, L. E. I

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN AMERICAN SOCIETY FOR
TESTING AND MATERIALS, SPEC. TECH. PUB. N484,
P164-175 1970.

DESCRIPTORS: (*STEEL, RADIATION DAMAGE),
(*REACTOR SYSTEM COMPONENTS, PRESSURE VESSELS),
MICROSTRUCTURE, METALLOGRAPHY, GRAIN
STRUCTURES(METALLURGY), GRAIN SIZE, IMPURITIES,
MECHANICAL PROPERTIES

(U)

THE PAPER EMPHASIZES ENGINEERING IMPLICATIONS OF
THE EFFECTS OF STRUCTURE AND COMPOSITION ON THE
IRRADIATION SENSITIVITY OF STEELS. THEORETICAL
CONSIDERATIONS ARE DISCUSSED AND REVIEWED AS THEY
RELATE TO POSSIBLE EXPLANATIONS FOR OBSERVATIONS ON
THE SUBJECT. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-725 796 13/4 21/4
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND
RAUMFAHRT E V BRUNSWICK (WEST GERMANY)

BERECHNUNG OBERIRDISCHER
FLUESSIGKEITSLAGERTANKS (CALCULATION REGARDING
ABOVE GROUND LIQUID STORAGE TANKS), (U)

70 42 NIEDERSTADT, G. ;
REPT. NO. DFVLR-SONDERDRUCK-93

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN ZEITSCHRIFT KUNSTSTOFFE,
V6D N12 P1071-1073 1970. NO COPIES FURNISHED BY DDC OR
NTIS.
SUPPLEMENTARY NOTE: TEXT IN GERMAN.

DESCRIPTORS: (*PRESSURE VESSELS, STRESSES),
(*FUELS, STORAGE TANKS), FLEXURAL STRENGTH,
CORROSION, SAFETY, MATERIALS, MATHEMATICAL
ANALYSIS, WEST GERMANY (U)

AUSGEHEND VON DEN „RICHTLINIEN FUR ORTSFESTE
OBERIRDISCHE TANKS AUS GFK ZUR LAGERUNG VON
HEIZOL UND DIESELKRAFTSTOFFEN, „ WURDE UNTERSUCHT,
OB ES ZULASSIG IST, LAGERBEHALTER IN ANLEHNUNG AN
DIE VORSCHRIFTEN FUR DRUCKBEHALTER (VORIAUFIGES
AD-MERKBLATT N 1) ZU BERECHNEN.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-725 847 13/4 20/11
ILLINOIS INST OF TECH CHICAGO DEPT OF MECHANICS

PLASTIC ANALYSIS AND PRESSURE--VESSEL
SAFETY,

(U)

JUN 71 32P HODGE, PHILIP G. , JR
REPT. NO. DOMIIT-1-45
CONTRACT: N00014-67-A-0210-0002
PROJ: NP-064-429

UNCLASSIFIED REPORT

DESCRIPTORS: (*STRUCTURAL PROPERTIES,
*PLASTICITY), (*PRESSURE VESSELS, STANDARDS),
DESIGN, FATIGUE(MECHANICS), DEFORMATION,
PRESSURIZATION, FAILURE(MECHANICS), STRUCTURAL
SHELLS, LOADING(MECHANICS), SAFETY
IDENTIFIERS: PRESSURE VESSEL CODES

(U)

(U)

THE ROLE OF PLASTICITY THEORY IN THE DESIGN OR
ANALYSIS OF PRESSURE VESSELS IS CONSIDERED. IT IS
SHOWN THAT THE THEORY IS HELPFUL IN PREDICTING SOME
BUT NOT ALL OF THE POSSIBLE CAUSES OF PRESSURE-VESSEL
FAILURE. VARIOUS MODELS FOR PLASTICITY THEORY ARE
DISCUSSED. THE CURRENT STATE OF TECHNOLOGY IN THIS
FIELD IS SURVEYED AND SOME INDICATIONS ARE GIVEN FOR
FUTURE LINES OF RESEARCH. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-734 926 13/4 11/6
AUBURN UNIV ALA ENGINEERING EXPERIMENT STATION

CRACK TOLERATING ABILITY OF A HIGH-STRENGTH
BIAXIALLY STRESSED CYLINDRICAL PRESSURE
VESSEL CONTAINING A SURFACE CRACK. (U)

DESCRIPTIVE NOTE: REPT. NO. 9 (FINAL) 29 JUN 70-31
DEC 71,
DEC 71 30P MAYNOR, HAL W. ; WALDROP,
RICHARD S. ;
CONTRACT: DAAH01-70-C-1424

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS,
FRACTURE(MECHANICS)), STEEL, CRACKS,
CYLINDRICAL BODIES, STRESSES, CRACK
PROPAGATION (U)
IDENTIFIERS: STEEL 4130 (U)

TEST SPECIMENS IN THE FORM OF CYLINDRICAL PRESSURE
VESSELS WERE DEEP DRAWN FROM AISI 4130 STEEL AND
HEAT TREATED TO AN AVERAGE UNIAXIAL YIELD STRENGTH
(0.2 PER CENT OFFSET) OF 207 KSI. EACH VESSEL
WAS PROVIDED WITH AN INITIAL SURFACE CRACK CONSISTING
OF A MECHANICALLY-PRODUCED SLOT, TERMINATING AT EACH
END IN A FATIGUE-INDUCED, HAIRLINE-TYPE CRACK.
STRAIN GAGES MOUNTED AT BOTH ENDS OF THE CRACK
PROVIDED A MEASURE OF THE DISPLACEMENT AT THESE
LOCATIONS DURING THE DEVELOPMENT OF INTERNAL
PRESSURES CULMINATING IN BURSTING. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-735 874 20/11 13/10.1
NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER BETHESDA
MD

AN EVALUATION OF FINITE ELEMENT METHODS FOR
THE COMPUTATION OF ELASTIC STRESS INTENSITY
FACTORS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
DEC 71 80P OGLESBY, JOHN J. ; LOMACKY,
OLES I
REPT. NO. NSRDC-3751
PROJ: SF35-422-210
TASK: 15055

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, STRESSES),
(*SUBMARINE HULLS, FRACTURE(MECHANICS)), CRACK
PROPAGATION, LOADING(MECHANICS),
FATIGUE(MECHANICS), ELASTICITY,
STRAIN(MECHANICS), PROGRAMMING(COMPUTERS),
IDENTIFIERS: FINITE ELEMENT ANALYSIS

(U)

(U)

THE REPORT SUMMARIZES THE FIRST PHASE OF THE
DEVELOPMENT OF COMPUTER PROGRAMS FOR CALCULATING
ELASTIC STRESS INTENSITY FACTORS AT THE CRITICAL
(FATIGUE-PRONE) DETAILS OF PRESSURE HULLS. THE
WORK IS PART OF A BROADER STUDY AIMED AT THE
DEVELOPMENT OF ANALYTICAL METHODS FOR FATIGUE AND
FRACTURE ANALYSIS OF SUBMARINE HULLS. TWO NEW
TECHNIQUES ARE INTRODUCED. ONE IS BASED ON DIRECT
APPLICATION OF THE LINEAR ELASTIC FRACTURE MECHANICS
RELATIONS BETWEEN THE STRESS INTENSITY FACTORS AND
THE NEAR CRACK TIP DISPLACEMENT FIELDS UTILIZING TWO-
TERM SERIES EXPANSION. THE STRESS INTENSITY FACTORS
ARE COMPUTED DIRECTLY FROM THE NODAL DISPLACEMENTS
OBTAINED PREVIOUSLY FROM THE FINITE ELEMENT PROGRAM.
THE SECOND TECHNIQUE IS BASED ON DIRECT
INCORPORATION INTO THE FINITE ELEMENT COMPUTER
PROGRAM OF THE STRAIN ENERGY OF THE SINGULAR ELEMENT
ENCLOSING THE CRACK TIP. EXAMPLES OF THE
APPLICATION OF SUCH METHODS TO SEVERAL SIMPLY
AXISYMMETRIC AND TWO-DIMENSIONAL PLANE STRAIN
PROBLEMS ARE PRESENTED ALONG WITH RECOMMENDATIONS FOR
FUTURE STUDIES AND APPLICATIONS. (AUTHOR)

(U)

UNCLASSIFIED

UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-736 594 11/9 13/10
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

WINDOWS FOR EXTERNAL OR INTERNAL HYDROSTATIC
PRESSURE VESSELS. PART VI. CONICAL
ACRYLIC WINDOWS UNDER LONG-TERM PRESSURE
APPLICATION AT 5,000 PSE. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT. MAR 69-OCT 70,
NOV 71 66P STACHIW, J. D. ; GRAY, K.
O. ;
REPT. NO. NCEL-TR-747
PROJ: YF51-543-008-01-001

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO PART 5, AD-718 812.

DESCRIPTORS: (*ACRYLIC RESINS, HYDROSTATIC
PRESSURE), (*UNDERWATER VEHICLES, *TRANSPARENT
PANELS), PRESSURE VESSELS, CONICAL BODIES,
PRESSURIZATION, DEFORMATION,
TOLERANCES(MECHANICS), LOADING(MECHANICS),
TEST METHODS (U)
IDENTIFIERS: *UNDERWATER HABITATS, *WINDOWS (U)

CONICAL ACRYLIC WINDOWS WITH FIVE INCLUDED ANGLES
(ALPHA) FROM 30 TO 180 DEGREES AND THICKNESS-TO-
MINOR-DIAMETER (T/D) RATIOS FROM 0.375 TO 1.00
HAVE BEEN SUBJECTED TO 5,000 PSI OF SUSTAINED
HYDROSTATIC LOADING FOR UP TO 1,000 HOURS IN THE
TEMPERATURE RANGE FROM 65F TO 75F WHILE THE AXIAL
DISPLACEMENT OF THE WINDOWS THROUGH THE FLANGE HAS
BEEN MONITORED. THE MAGNITUDE OF AXIAL
DISPLACEMENT WAS FOUND TO BE A FUNCTION OF ALPHA, T/
D RATIO, TEMPERATURE, AND DURATION OF LOADING.
ONLY WINDOWS WITH T/D RATIOS GREATER THAN OR
EQUAL TO 1.000, 0.625, 0.500, 0.500, AND 0.500 FOR
30-, 60-, 90-, 120-, AND 150-DEGREE CONICAL ANGLES,
RESPECTIVELY, WERE FOUND TO BE FREE OF CRACKS.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZQM07

AD-737 190 18/9 18/8
NAVAL RESEARCH LAB WASHINGTON D C

PROCEDURES FOR INTERPRETING THE STRUCTURAL
IMPLICATIONS OF RADIATION-DAMAGE SURVEILLANCE
RESULTS ON NUCLEAR PRESSURE VESSELS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
DEC 71 21P STEELE, L. E. ISEPAN, C.
Z. , JR;
REPT. NO. NRL-7358
CONTRACT: AT(49-5)-5409
PROJ: NRL-M01-14, RR022-11-41-5409

UNCLASSIFIED REPORT

DESCRIPTORS: (*REACTOR SYSTEM COMPONENTS, PRESSURE
VESSELS), (*PRESSURE VESSELS, RADIATION DAMAGE),
(*STEEL, FRACTURE(MECHANICS)), NEUTRON
REACTIONS, EMBRITTLEMENT, THERMAL STRESSES,
TRANSITION TEMPERATURE, NON-DESTRUCTIVE TESTING

(U)

THE STRUCTURAL IMPLICATIONS OF RADIATION EFFECTS TO
NUCLEAR REACTOR PRESSURE VESSELS ARE ASSESSED
PRIMARILY THROUGH SURVEILLANCE PROGRAMS IN WHICH THE
PROPERTIES OF THE VESSEL ARE PROJECTED FROM AN
EVALUATION OF SMALL SPECIMENS OF THE VESSEL STEEL.
IN THE USA, THE CURRENT FRACTURE-SAFE CRITERION
REQUIRES THAT THE VESSEL OPERATING TEMPERATURE, AT
CERTAIN STRESS LEVELS, BE AT THE FTE (FRACTURE
TRANSITION ELASTIC) TEMPERATURE, DEFINED AS
NDT+60F(33C), DERIVED FROM SURVEILLANCE
MEASUREMENTS. REVIEW OF AVAILABLE DATA FROM FIVE
REACTOR SURVEILLANCE PROGRAMS INDICATES THAT THIS
CRITERION IS ADEQUATE FOR THE VESSELS CONCERNED.
COMPLETE ASSURANCE OF FRACTURE-SAFE OPERATING
CONDITIONS CAN BE ATTAINED THROUGH A LIMIT-ANALYSIS
PROCEDURE THAT CONSIDERS AND INTEGRATES THE EFFECTS
OF FIVE FACTORS: (A) THE RADIATION-INDUCED
SHIFT IN TRANSITION TEMPERATURE, (B) THE INITIAL
SHELF ENERGY, (C) THE RADIATION-REDUCED DUCTILE
SHELF ENERGY, (D) THE EFFECTS OF THE FLUENCE
(AND TOUGHNESS) GRADIENT THROUGH A THICK VESSEL
WALL, AND (3) THE EFFECTS OF THICKNESS-INDUCED
MECHANICAL CONSTRAINT. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-743 630 13/13 20/11
CALIFORNIA UNIV BERKELEY

ELASTIC-PLASTIC ANALYSIS OF THICK-WALLED
PRESSURE VESSELS WITH SHARP DISCONTINUITIES,

(U)

FEB 71 6P LARSEN, K. ; POPOV, P. I
CONTRACT: DAHCO4-69-C-0037
MONITOR: AROD 828414-A

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN THE JNL. OF ENGINEERING
FOR INDUSTRY, P1016--1020 NOV 71.

SUPPLEMENTARY NOTE: PRESENTED AT THE NATIONAL CONGRESS
ON PRESSURE VESSELS AND PIPING (1ST), HELD IN
SAN FRANCISCO, CALIF. MAY 10-12, 1971. AMERICAN
SOCIETY OF MECHANICAL ENGINEERS, PAPER NO. ASME-
71-PVP-23.

DESCRIPTORS: (*PRESSURE VESSELS, STRUCTURAL
PROPERTIES), STRUCTURAL SHELLS, BODIES OF
REVOLUTION, PLASTICITY, ELASTICITY, NUMERICAL
METHODS AND PROCEDURES

(U)

IDENTIFIERS: *ELASTIC-PLASTIC ANALYSIS, FINITE
ELEMENT ANALYSIS

(U)

APPLICATION OF SPECIAL ISOPARAMETRIC FINITE
ELEMENTS IS PRESENTED FOR THE ELASTIC-PLASTIC
ANALYSIS OF SHELLS OF REVOLUTION. GENERAL
ISOPARAMETRIC ELEMENTS ARE SELECTED WHICH, IN THE
FORM OF A LAYERED SYSTEM, ARE CAPABLE OF REPRESENTING
A SOLID OF REVOLUTION. THE CUSTOMARY KIRCHHOFF-
LOVE HYPOTHESIS IS NOT INVOKED AND SOLUTIONS
THEREFORE APPLY BOTH TO THIN AND THICK SHELLS OF
REVOLUTION. SHARP DISCONTINUITIES IN GEOMETRY,
CIRCUMFERENTIAL RIBS AND/OR GROOVES, AS WELL AS
CELLULAR WALLS MAY BE STUDIED. A SPECIAL FEATURE
IS THE DEVELOPMENT OF AN ELEMENT PERMITTING SLIDING
AT THE ELEMENT INTERFACES WITH OR WITHOUT FRICTION.
THE ILLUSTRATIVE EXAMPLES INCLUDE A PRESSURE VESSEL
WITH A CIRCUMFERENTIAL CRACK IN THE WALL THICKNESS,
AND A CIRCULAR PLATE CONSISTING OF TWO DISKS WHICH
CAN SLIDE ALONG THEIR INTERFACE. THE SOLUTIONS ARE
LIMITED TO AXIALLY SYMMETRIC PROBLEMS. FLOW THEORY
OF PLASTICITY IS USED IN THE INELASTIC REGIONS.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-744 941 18/10 11/6 18/8
NAVAL RESEARCH LAB WASHINGTON D C

IRRADIATION EFFECTS ON REACTOR STRUCTURAL
MATERIALS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. 1 FEB-30
APR 72,

MAY 72 46P STEEL, L. E. ISMIDT, F. A.
, JR. SPRAGUE, J. A. ISHAHINIAN, P. WATSON,
H. E. ;

REPT. NO. NRL-MR-2441

PROJ: RRO22-11-41-5409, RRO22-11-41-5425

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-739 312.

DESCRIPTORS: (*REACTOR MATERIALS, *RADIATION
DAMAGE), (*STEEL, RADIATION DAMAGE), PRESSURE
VESSELS, WELDS, FATIGUE (MECHANICS),
FRACTURE (MECHANICS), CRACK PROPAGATION,
ELECTRON MICROSCOPY, NEUTRON BEAMS, IRON ALLOYS,
NOTCH TOUGHNESS, LIQUID METAL COOLED REACTORS, ION
BOMBARDMENT, STAINLESS STEEL (U)

IDENTIFIERS: STEEL 316, NEUTRON IRRADIATION, ION
IMPLANTATION (U)

THE RESEARCH PROGRAM INVOLVES A BROAD STUDY OF THE
EFFECTS OF NUCLEAR RADIATION UPON MATERIALS. THE
REPORT, COVERING RESEARCH FOR THE PERIOD 1 FEBRUARY
- 30 APRIL 1972, INCLUDES: (1) ELECTRON
MICROSCOPY OBSERVATIONS OF RADIATION DAMAGE IN
PRESSURE VESSEL STEELS AND IRON ALLOYS, (2) THE
EFFECT OF NEUTRON IRRADIATION ON FATIGUE CRACK
PROPAGATION IN AUSTENITIC STAINLESS STEEL AT HIGH
TEMPERATURE, (3) A STUDY OF RADIATION REDUCTION
IN NOTCH TOUGHNESS OF STAINLESS STEEL SUBMERGED ARC
WELDS, (4) THE EFFECT OF CYCLOTRON-INJECTED
HELIUM ON THE FATIGUE PROPERTIES OF 316 STAINLESS
STEEL, AND (5) PRELIMINARY RESULTS FROM AN
ENVIRONMENTAL EXPOSURE OF CANDIDATE CTR FIRST-WALL
STRUCTURAL ALLOYS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-745 299 11/6 18/10 18/8
NAVAL RESEARCH LAB WASHINGTON D C

DAMAGE-FUNCTION ANALYSIS OF NEUTRON
EMBRITTLEMENT IN STEEL AT REACTOR SERVICE
TEMPERATURES.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
JUN 72 18P SERPAN, CHARLES Z. ; JR;
REPT. NO. NRL-7405
PROJ: NRL-M01-14, RRO22-11-41
TASK: 6409

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, *RADIATION DAMAGE),
(*REACTOR MATERIALS, STEEL), (*PRESSURE VESSELS,
REACTOR MATERIALS), NEUTRON REACTIONS, FAST
NEUTRONS, THERMAL NEUTRONS, TRANSITION TEMPERATURE,
LIFE EXPECTANCY

(U)

IDENTIFIERS: NEUTRON EMBRITTLEMENT, STEEL A-
302B

(U)

NEUTRON-INDUCED INCREASES IN THE BRITTLE-DUCTILE
TRANSITION TEMPERATURE (DELTA TT) OF A302-B
PRESSURE VESSEL STEEL HAVE BEEN MEASURED FROM
IRRADIATIONS IN A NUMBER OF REACTOR ENVIRONMENTS FOR
NEUTRON FLUENCES REPRESENTATIVE OF PRESSURE VESSEL
DESIGN LIFETIMES. WHILE THESE MEASUREMENTS HAVE
PERMITTED FORMULATION OF THE TRENDS NECESSARY FOR
DELTA TT PROJECTIONS IN OPERATING REACTORS, CERTAIN
ANOMALOUS RESULTS HAVE BEEN OBSERVED WHEREIN
MEASUREMENTS FELL OUTSIDE THE NOMINAL LIMITS OF THE
TRENDS. AS A SUMMATION OF RESEARCH ON THIS STEEL
AND TO RESOLVE THE ANOMALOUS RESULTS, A DAMAGE
FUNCTION WAS DERIVED FOR THE NEUTRON-INDUCED DELTA
TT RESPONSE OF A302-B STEEL AT REACTOR
OPERATING TEMPERATURES. THE DAMAGE FUNCTION IS A
SERIES OF WEIGHTING FACTORS FOR THE DAMAGING CAPACITY
OF NEUTRONS OF ALL ENERGY GROUPS IN A REACTOR
SPECTRUM; THESE FACTORS THUS INDICATE THE RELATIVE
IMPORTANCE OF SPECIFIC ENERGY-GROUP NEUTRONS TO THE
DAMAGING PROCESS. TECHNIQUES FOR DERIVATION OF THE
DAMAGE FUNCTION AND THE COMPLEMENTING CORRELATION-
EVALUATION METHOD ARE DIRECTLY APPLICABLE TO MORE
ADVANCED REACTOR SYSTEMS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM07

AD-746 111 11/6 13/8
NAVAL RESEARCH LAB WASHINGTON D C

CHARACTERIZATION OF GTA WELDMENTS IN IONI-
BCO-2CR-1MO STEEL,

(U)

JUN 72 36P STONESIFER, FRED R. SMITH,
HERSCHEL L. I
REPT. NO. NRL-MR-2466
PROJ: NRL-84F01-15

UNCLASSIFIED REPORT

DESCRIPTORS: (*NICKEL ALLOYS, *WELDING),
(*PRESSURE VESSELS, CORROSION-RESISTANT ALLOYS),
AUSTENITE, INERT GAS WELDING, TENSILE PROPERTIES,
IMPACT TESTS, NOTCH TOUGHNESS, MICROSTRUCTURE
IDENTIFIERS: STEEL IONI BCO 2CR 1MO, STEEL
HY-180, STEEL HY-210, *HIGH STRENGTH STEELS,
GAS TUNGSTEN ARC WELDING

(U)

(U)

THE STUDY OF IONI-BCO-2CR-1MO STEEL
INCLUDES EVALUATIONS OF TENSILE, IMPACT, HARDNESS,
FRACTURE TOUGHNESS PROPERTIES, AND METALLOGRAPHIC
FEATURES. BASE PLATE AND THREE WELDMENTS IN ONE-
INCH THICKNESSES ARE EXAMINED TO COMPARE AS-WELDED
PROPERTIES WITH THOSE OBTAINED AFTER REAGING, AND
RESULTS OF WELDING THE IONI ALLOY WITH 9-4-20 WIRE
AS OPPOSED TO A MATCHING WELD WIRE COMPOSITION.
CRITICAL CRACK SIZES ARE CALCULATED FOR THE
MATERIAL. THE MOST DESIRABLE WELD PROPERTIES ARE
OBTAINED USING THE MATCHING WELD WIRE AND A REAGING
CYCLE. HOWEVER, THE IMPROVEMENT GAINED THROUGH
REAGING IS PROBABLY NOT SUFFICIENT TO JUSTIFY THE
ADDITIONAL COST FOR MOST PRACTICAL APPLICATIONS.
(AUTHOR)

(U)

UNCLASSIFIED

/ZDM07

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-746 878 11/2 13/10
NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER BETHESDA
MD

THE STRUCTURAL BEHAVIOR OF GLASS PRESSURE
HULLS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
JUN 72 111P NISHIDA, KANEHIRO ;
REPT. NO. NSRDC-3863
PROJ: S4636
TASK: 12326

UNCLASSIFIED REPORT

DESCRIPTORS: (*SUBMARINE HULLS, *GLASS),
STRUCTURAL PROPERTIES, PRESSURE VESSELS, DEEP
SUBMERGENCE, HEMISPHERICAL SHELLS, JOINTS,
FRACTURE(MECHANICS), HYDROSTATIC PRESSURE,
FATIGUE(MECHANICS)
IDENTIFIERS: GLASS JOINTS

(U)

(U)

A REPORT ON GLASS PRESSURE VESSELS FOR DEEP
SUBMERGENCE IS PRESENTED. EMPHASIS IS ON THE
STRUCTURAL RESPONSE OF SPHERICAL AND HEMISPHERICAL
GLASS SHELLS UNDER EXTERNAL HYDROSTATIC AND CYCLIC
PRESSURE. RESULTS OF EARLIER PROGRAMS ARE REVIEWED.
A COMPUTERIZED ANALYSIS TRADING OFF THE VARIABLES
IN THE JOINT PROBLEM IS PRESENTED. FINAL JOINT
GEOMETRIES ARE DISCUSSED AND DATA ON CHEMICALLY
STRENGTHENED GLASS HEMISPHERICAL SHELLS WITH
EQUATORIAL JOINT RINGS UNDER FATIGUE CONDITIONS ARE
PRESENTED. THE RESULTS INDICATE RELATIVELY
EFFICIENT (W/D = 0.5). SMALL PRESSURE VESSELS
OF CHEMICALLY STRENGTHENED GLASS ARE PRACTICAL FOR
UNMANNED NONCRITICAL APPLICATIONS TO 20,000 FT.
NINE 10-INCH DIAMETER CHEMICALLY STRENGTHENED GLASS
HEMISPHERICAL SHELLS OF PPG 1080 GLASS WITH OVERALL
WEIGHT TO DISPLACEMENT RATIOS OF 0.5 SURVIVED AT
LEAST 3000 CYCLES TO 20,000 FT. EACH HEMISPHERE
WAS THEN SUBJECTED TO A PROOF TEST TO 30,000 FT.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-746 885 11/4 13/4
NAVAL ORDNANCE LAB WHITE OAK MD

PROPERTIES OF GRAPHITE FIBER COMPOSITES AT
CRYOGENIC TEMPERATURES.

(U)

DESCRIPTIVE NOTE: REPORT FOR JUN 67-AUG 69 ON TASKS
1 AND 2.

MAY 70 101P SIMON, ROBERT A. ALFRING;
RICHARD;
REPT. NO. NOLTR-69-183
MONITOR: NASA CR-72652

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREVIOUSLY ANNOUNCED AS N70-
31828.

DESCRIPTORS: (*COMPOSITE MATERIALS, FILAMENT WOUND
CONSTRUCTION), (*FILAMENT WOUND CONSTRUCTION,
*CRYOGENICS), (*CARBON FIBERS, FILAMENT WOUND
CONSTRUCTION), MECHANICAL PROPERTIES, PRODUCTION,
STRAIN(MECHANICS), GRAPHITE, EPOXY PLASTICS,
BINDERS, TANKS(CONTAINERS), TENSILE
PROPERTIES, PRESSURE VESSELS, SPACECRAFT
COMPONENTS

(U)

IDENTIFIERS: *FIBER COMPOSITES

(U)

NEED FOR LOW-WEIGHT, CRYOGENIC PRESSURE VESSELS FOR
SPACECRAFT RESULTED IN AN INVESTIGATION TO MEASURE
GRAPHITE FIBER COMPOSITE PROPERTIES AT CRYOGENIC
TEMPERATURES. UNDERTAKEN WAS AN INVESTIGATION OF
MECHANICAL PROPERTIES OF SEVERAL FIBERS AND RESINS AS
COMPOSITE STRANDS, BARS, AND ROL RINGS. IT SHOWED
THAT COMPOSITE MODULI INCREASED BY 0 TO 20% AT -
195C, AND COMPOSITE TENSILE STRENGTHS DECREASED BY
0 TO 30%. ALSO STUDIED WAS THE DESIGN,
FABRICATION, AND TESTING OF GRAPHITE FILAMENT WOUND
PRESSURE VESSELS. THE PRESSURE VESSEL PERFORMANCE
FACTOR OF PV/W SHOWED THE GRAPHITE VESSELS TO BE
COMPETITIVE WITH BORON AND TWO-THIRDS AS HIGH AS
FIBERGLASS.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-747 217 13/10 13/3
BECHTEL CORP SAN FRANCISCO CALIF

DEVELOPMENT OF END-CLOSURE SYSTEMS FOR
UNDERSEA CONCRETE PRESSURE RESISTANT
CYLINDRICAL HULLS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 3 JUN 71-24 MAY 72,
MAY 72 119P LEONARD, ROBERT G. ;MORKEN,
PAUL G. I

CONTRACT: N62399-71-C-0017
MONITOR: NCEL CR-72.017

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SPONSORED BY NAVAL FACILITIES
ENGINEERING COMMAND, WASHINGTON, D. C.

DESCRIPTORS: (*PRESSURE VESSELS, BULKHEADS),
(*STRUCTURAL SHELLS, UNDERWATER), CONSTRUCTION
MATERIALS, CONFIGURATION, CONCRETE, POSITIONING
DEVICES(MACHINERY), HANDLING, SEALS,
FEASIBILITY STUDIES

(U)

IDENTIFIERS: UNDERWATER STRUCTURES, CLOSURES

(U)

THE PURPOSE OF THIS STUDY WAS TO DEVELOP END-
CLOSURE SYSTEMS FOR UNDERSEA CONCRETE
PRESSURE RESISTANT HULLS. THESE END-
CLOSURES MUST SEAL AND LOCK CONCRETE CYLINDERS
RANGING FROM 20 TO 60 FT. IN DIAMETER. THEY MUST
BE REMOVABLE PERMITTING FULL ACCESS WHEN THE
CYLINDERS ARE LOCATED ON THE OCEAN FLOOR IN 1000. FT.
OF WATER AND WHEN THE CYLINDERS ARE LOCATED ON LAND.
THE STUDY CONSIDERS END-CLOSURE CONFIGURATION
INCLUDING GEOMETRY AND MATERIAL, ACTUATION OR
HANDLING METHODS AND SEALING AND LOCKING ALTERNATES.
AREAS REQUIRING ADDITIONAL RESEARCH AND DEVELOPMENT
ARE IDENTIFIED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-748 147 18/10 11/6
NAVAL RESEARCH LAB WASHINGTON D C

INTERPRETING THE STRUCTURAL SIGNIFICANCE OF
TIME DEPENDENT EMBRITTLEMENT PHENOMENA TO
NUCLEAR REACTOR PRESSURE VESSEL INTEGRITY.

(U)

72 10P STEEL, L. E. ; WATSON, H.
E. ;
CONTRACT: AT(49-5)-2110

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN THE JNL. OF MATERIALS, V7
N2 P178-187 JUN 72.

DESCRIPTORS: (*NUCLEAR REACTORS, PRESSURE
VESSELS), (*PRESSURE VESSELS, EMBRITTLEMENT),
HYDROGEN EMBRITTLEMENT, DISPERSION HARDENING,
FATIGUE(MECHANICS), AGING(MATERIALS),
NEUTRON REACTIONS, STEEL

(U)

DURING FABRICATION AND IN SUBSEQUENT SERVICE, A
NUCLEAR REACTOR PRESSURE VESSEL IS SUBJECTED TO
FACTORS, SUCH AS THERMAL AGING, STRAIN AGING, NEUTRON
RADIATION, WHICH MAY CAUSE EMBRITTLEMENT. LIMITED
AVAILABLE DATA SUGGEST THAT COMBINED EFFECTS OF THESE
FACTORS ARE USUALLY NO MORE SEVERE THAN RADIATION
EMBRITTLEMENT ALONE FOR THE STEELS OF CURRENT VESSEL
CONSTRUCTION. HOWEVER, LOW CYCLE FATIGUE MAY
COMPLICATE THE IRRADIATED CONDITION BY EXTENDING
FLAWS. THE CURRENT STATE OF KNOWLEDGE OF SUCH
COMBINED ENVIRONMENTAL EFFECTS AND OF TECHNIQUES FOR
FAILURE PREVENTION REQUIRES A LIMIT APPROACH WHICH
WILL ASSURE A DUCTILE CONDITION AT ALL TIMES WHILE
THE VESSEL IS IN SERVICE. THE ANALYSIS MUST
INTEGRATE IRRADIATED TRANSITION TEMPERATURE, FRACTURE
ENERGY LEVEL, RADIATION INDUCED GRADIENT, AND
THICKNESS CONSTRAINT EFFECTS. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-748 583 11/9 13/10
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

WINDOWS FOR EXTERNAL OR INTERNAL HYDROSTATIC
PRESSURE VESSELS. PART VII. EFFECT OF
TEMPERATURE AND FLANGE CONFIGURATIONS ON
CRITICAL PRESSURE OF 90-DEGREE CONICAL
ACRYLIC WINDOWS UNDER SHORT-TERM
LOADING.

(U)

DESCRIPTIVE NOTE: FINAL REPT. JUN 69-JUN 70,
AUG 72 55P STACHIW, J. D. MCKAY, J.

R. I

REPT. NO. NCEL-TR-773
PROJ: YF51.543-008-01-001

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO REPORT DATED NOV 71, AD-
736 594.

DESCRIPTORS: (*ACRYLIC RESINS, HYDROSTATIC
PRESSURE), (*UNDERWATER VEHICLES, TRANSPARENT
PANELS), PRESSURE VESSELS, CONICAL BODIES,
PRESSURIZATION, DEFORMATION,
LOADING(MECHANICS), FRACTURE(MECHANICS),
TOLERANCES(MECHANICS)

(U)

IDENTIFIERS: *UNDERWATER HABITATS, *WINDOWS

(U)

CONICAL ACRYLIC WINDOWS OF 90-DEGREE INCLUDED ANGLE
AND 0.083 TO 0.775 THICKNESS-TO-MINOR-DIAMETER (T/
D) RATIOS HAVE BEEN TESTED TO ULTIMATE FAILURE
UNDER SHORT-TERM HYDROSTATIC LOADING. THE AMBIENT
TEMPERATURE WAS VARIED FROM 32F TO 90F AND THE
RELATIONSHIP BETWEEN MINOR WINDOW DIAMETER (D) AND
MINOR WINDOW CAVITY DIAMETER IN THE FLANGE (DF)
VARIED FROM 0.970 TO 1.500. THE TEST RESULTS SHOW
THAT THE CRITICAL PRESSURE OF IDENTICAL WINDOWS AT
90F IS APPROXIMATELY 10% TO 20% LESS THAN AT
70F, AND AT 32F IT IS APPROXIMATELY 15% TO
25% MORE THAN AT 70F. TO IMPROVE THE CRITICAL
PRESSURE OF 90-DEGREE CONICAL ACRYLIC WINDOWS, IT IS
RECOMMENDED THAT SUCH WINDOWS BE DESIGNED WITH A
WINDOW/FLANGE MISMATCH RATIO OF D/DF GREATER THAN
1.00, THE EXACT MAGNITUDE DEPENDING ON THE WINDOW'S
T/D RATIO, SERVICE, AND DESIGN CONSIDERATIONS.
(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-749 029 13/10 11/9
NAVAL UNDERSEA CENTER SAN DIEGO CALIF

ACRYLIC PLASTIC HEMISPHERICAL SHELLS FOR NUC
UNDERSEA ELEVATOR.

(U)

DESCRIPTIVE NOTE: RESEARCH REPT. 1971-72.
SEP 72 35P STACHIW, J. D. ;
REPT. NO. NUC-TP-315
PROJ: ZFXX-412-001

UNCLASSIFIED REPORT

DESCRIPTORS: (*HEMISPHERICAL SHELLS, DESIGN),
(*PRESSURE VESSELS, UNDERWATER), ELEVATORS,
ACRYLIC RESINS, MATERIAL FORMING, MANUFACTURING
METHODS, LOADING(MECHANICS), HYDROSTATIC
TESTS

(U)

IDENTIFIERS: UNDERWATER ELEVATORS, FREE FORMING
FABRICATION, EVALUATION

(U)

FREE-FORMED, FLANGED, ACRYLIC HEMISPHERICAL SHELLS
WITH A NOMINAL 27-IN. MEDIAN RADIUS HAVE BEEN
EXPERIMENTALLY EVALUATED FOR SERVICE AS EXTERNAL
PRESSURE HULLS WITH A NOMINAL 56-FT DEPTH. BECAUSE
THE FREE-FORMING FABRICATION TECHNIQUE PRODUCES
HEMISPHERES WITH SIGNIFICANT VARIATION IN THICKNESS
AND SPHERICITY, UNEVEN STRESS DISTRIBUTION RESULTS
DURING EXTERNAL HYDROSTATIC LOADING. AS A RESULT,
EXTREME CARE MUST BE EXERCISED WHEN UTILIZING FREE-
FORMED ACRYLIC HEMISPHERES BECAUSE THEIR ELASTIC
INSTABILITY PRESSURE AND MAGNITUDE OF STRESSES CANNOT
BE PREDICTED ON THE BASIS OF EQUATIONS FOR IDEAL
ACRYLIC SPHERES. USING AN EXPERIMENTAL APPROACH TO
THE EVALUATION OF 54-IN.-MEDIAN-DIAMETER HEMISPHERES,
IT WAS FOUND THAT NOMINALLY 1-IN.-THICK ACRYLIC PLATE
STOCK IS ADEQUATELY THICK FOR FREE-FORMING OF SHELLS
THAT WILL BE UTILIZED AS PRESSURE HULLS FOR AN
OPERATIONAL DEPTH OF 56 FT. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-749 653 7/4 14/2 20/13
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

APPARATUS USED FOR THE EXPERIMENTAL STUDY OF
THE THERMODYNAMIC PROPERTIES OF GASES AT
PRESSURES OF UP TO 10-12 KILOBARS AND AT
TEMPERATURES UP TO 3000K, (U)

AUG 72 IIP ANTANOVICH, A. A. ; PLOTNIKOV,
M. A. ;
REPT. NO. FTD-HT-23-1266-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF MONO.
TEPLOFIZICHESKIE SVOISTVA GAZOV (THERMOPHYSICAL
PROPERTIES OF GASES) MOSCOW, 1970 P156-159, BY
PAUL J. REIFF, JR.

DESCRIPTORS: (*LABORATORY EQUIPMENT, *PRESSURE
VESSELS), (*GASES, *THERMODYNAMICS), DESIGN,
HIGH-PRESSURE RESEARCH, HIGH-TEMPERATURE RESEARCH,
COMPRESSIVE PROPERTIES, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

SPECIAL APPARATUS HAS BEEN DEVELOPED FOR THE STUDY
OF THE THERMODYNAMIC PROPERTIES OF GASES AT HIGH
TEMPERATURES. THE APPARATUS CONSISTS OF A THICK
WALLED POWER CYLINDER WITH INTERNAL PRESSURE
AMOUNTING TO 10-12 KILOBARS. CHANNELS OF A WATER
COOLING SYSTEM ARE LOCATED IN THE POWER CYLINDER
WALL. THE INTERNAL SPACE OF THE THERMAL CHAMBER IS
HEATED BY AN ELECTRIC COIL ON WHICH SHORT CERAMIC
TUBES HAVE BEEN PLACED. A PYROLITIC GRAPHITE
BUSHING IS USED. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-849 039 19/1 20/11
PICATINNY ARSENAL DOVER N J AMMUNITION ENGINEERING
LAB

SIMPLIFIED SHELL ANALYSIS (EDGE AND
INTERIOR INFLUENCE COEFFICIENTS FOR PRESSURE
VESSELS WITH SPHERICAL CAP).

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
FEB 69 72P GRIFFEL, WILLIAM ;
MONITOR: PA TR-3868

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROJECTILES, STRESSES),
DEFORMATION, INTERFACES, CYLINDRICAL BODIES,
LOADING(MECHANICS), EQUATIONS,
PROGRAMMING(COMPUTERS), PRESSURE VESSELS
IDENTIFIERS: REINFORCING RINGS

(U)

(U)

A RAPID AND ACCURATE FORMULATION OF THE
COMPATIBILITY EQUATIONS AT THE JUNCTION OF THE
CYLINDER AND SPHERICAL CAP IS MORE CONVENIENT WHEN
USING DIMENSIONLESS COEFFICIENTS. IT IS THE OBJECT
OF THIS STUDY TO RELIEVE SOME OF THE TEDIOUS AND
TIME-CONSUMING CALCULATIONS INVOLVED IN COMPUTING THE
DISCONTINUITY STRESSES AT THE JUNCTION. THE
COEFFICIENTS AS TABULATED WERE PROGRAMMED ON A
COMPUTER. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-851 958 11/6 19/7 20/11
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF LOCKHEED
RESEARCH LAB

DEVELOPMENT OF IMPROVED BIAxIAL STRENGTH IN
TITANIUM ALLOY ROCKET MOTOR CASES THROUGH
TEXTURE HARDENING.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 1 MAR 67-15 FEB 69,
FEB 69 94P FITZPATRICK, J. M. ; CROSSLEY,
F. A. ; HOFFMAN, O. ; TSUI, E. Y. W. ; LEWIS,
R. E. ;

CONTRACT: FD4611-67-C-0074

MONITOR: AFRPL TR-69-59

UNCLASSIFIED REPORT

DESCRIPTORS: (*ROCKET CASES, STRUCTURAL
PROPERTIES), (*TITANIUM ALLOYS, HARDENING),
DRAWING(MACHINE PROCESSING), PRESSURE VESSELS,
HYDROSTATIC TESTS, RUPTURE,
LOADING(MECHANICS), ANISOTROPY, STRESSES,
ROLLING(METALLURGY), ELECTRON BEAM WELDING,
INERT GAS WELDING, METALLOGRAPHY, MEMBRANES,
TENSILE PROPERTIES, FRACTURE(MECHANICS)

(U)

IDENTIFIERS: TITANIUM ALLOY 6AL 4V, TITANIUM
ALLOY 7AL 2.5MO, *TEXTURE HARDENING

(U)

THE REPORT SUMMARIZES THE RESULTS OF A FOUR-PHASE
PROGRAM, THE OBJECTIVE OF WHICH WAS TO DEMONSTRATE
THE MERIT OF A HEAT-TREATABLE, TEXTURE-HARDENED,
TITANIUM ALLOY FOR USE IN ROCKET MOTOR CASES. THE
DETAILS OF HYDROBURST TESTING OF A 17 IN. -DIAMETER
SPHERICAL PRESSURE VESSEL ARE INCLUDED. SHEET
ROLLING AND HEAT-TREATING PROCEDURES WERE
INVESTIGATED TO DETERMINE SUITABLE PROCESSES BY WHICH
TEXTURE-HARDENED SHEET COULD BE PRODUCED. AN
INVESTIGATION OF THE SHEAR-FORMING PROCESS FOR
PRODUCING SUITABLY TEXTURED Ti-6AL-4V CYLINDERS
OF 18-IN. DIAMETER WAS MADE. A WELDING STUDY TO
DETERMINE THE EFFECTS OF DIFFERENT WELDING PROCEDURES
ON THE TEXTURE TUNGSTEN-INERT-GAS AND ELECTRON-BEAM
TECHNIQUES WERE EMPLOYED. A DEMONSTRATION OF A
SPHERICAL TANK FABRICATION AND HYDROBURST TEST WAS
MADE USING TEXTURE-HARDENED Ti-6AL-4V ALLOY.
(AUTHOR)

(U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-855 520 19/7 11/6 13/8
AEROJET-GENERAL CORP FULLERTON CALIF ORDNANCE DIV

PLASMA ARC WELDING PROCESS DEVELOPMENT
PROGRAM. VOLUME I.

(U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. JUL 66-NOV 68,
APR 69 246P GAW, W. D. ; STARR, G. L. ;
REPT. NO. AGC-1070-01(01)FP-VOL-1
CONTRACT: AF 33(615)-5353
PROJ: AF-9-800
MONITOR: AFML TR-68-379-VOL-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO VOLUME 2, AD-855 521.

DESCRIPTORS: (*ROCKET CASES, *ARC WELDING),
PRESSURE VESSELS, NICKEL ALLOYS, TITANIUM ALLOYS,
METAL PLATES, IMPACT TESTS, TENSILE PROPERTIES,
YIELD POINT, ELONGATION, STRESSES,
FAILURE(MECHANICS), ELECTRODES, SPHERES,
PLASMA JETS, TUNGSTEN, CONFIGURATION

(U)

IDENTIFIERS: TITANIUM ALLOY 6AL 4V, NICKEL
ALLOY INCONEL 718, NICKEL ALLOY RENE 41,
*PLASMA ARC WELDING, WEIGHT SAVING, EVALUATION

(U)

THE OBJECTIVE OF WORK REPORTED IN THIS VOLUME WAS
TO EVALUATE PLASMA ARC WELDING TORCHES FOR
FABRICATING ROCKET MOTOR CASES AND WEIGHT-CRITICAL
UNFIRED PRESSURE VESSELS. WELDING STUDIES WERE
ACCOMPLISHED UTILIZING 6AL-4V TITANIUM, INCONEL
718, AND RENE 41. (AUTHOR)

(U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

1889 498 14/2 13/10
NAVAL SHIP RESEARCH AND DEVELOPMENT LAB ANNAPOLIS MD

NONDESTRUCTIVE TESTING FOR PRESSURE
VESSELS.

(U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1,

MAR 70 93P PETRISKO, EDWIN M. ;

REPT. NO. NSRDL/A-1-18

PROD: NAVFAC-PO-D-0006, YF38-534.010.02.002

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER VEHICLES, PRESSURE
VESSELS), (*PRESSURE VESSELS, NON-DESTRUCTIVE
TESTING), ULTRASONIC RADIATION, MAGNETIC FIELDS,
TEST METHODS, TEST EQUIPMENT, CRACKS, STRESSES,
DETECTION, WELDS, RADIOGRAPHY

(U)

IDENTIFIERS: *MAGNETIC PARTICLE TESTS, *ULTRASONIC
TESTS, *LIQUID PENETRANT TESTS

(U)

A STATE-OF-TECHNOLOGY SURVEY WAS CONDUCTED ON
NONDESTRUCTIVE TESTING TECHNIQUES FOR PRESSURE
VESSELS. THE PURPOSE OF THE INVESTIGATION WAS TO
PROVIDE INFORMATION FOR THE DESIGN, CONSTRUCTION, AND
CERTIFICATION OF HIGH-PRESSURE TANKS. THE SURVEY
SHOWED THAT CONSIDERABLE RESEARCH IS ATTEMPTING TO
EXTEND THE USEFULNESS OF NONDESTRUCTIVE TESTING TO
MEET MORE DEMANDING CRITERIA OF CERTIFICATION AND TO
EXPAND THE CAPABILITY TO NEARLY ALL ASPECTS OF
ASSURING MATERIAL ADEQUACY. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-869 053 11/6 13/8
RATTLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS
INFORMATION CENTER

REVIEW OF RECENT DEVELOPMENTS. ALUMINUM AND
MAGNESIUM.

(U)

MAY 70 SP HALLOWELL, J. B. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO REPORT DATED 17 OCT 69,
AD-860 405.

DESCRIPTORS: (*ALUMINUM ALLOYS, REVIEWS).
(*MAGNESIUM ALLOYS, REVIEWS), EXTRUSION,
CYLINDRICAL BODIES, LANDING GEAR, PRESSURE
VESSELS, ELECTRON BEAM WELDING, HEAT TREATMENT,
CORROSION RESISTANCE, LITHIUM ALLOYS, HONEYCOMB
CORES, AGING(MATERIALS)

(U)

IDENTIFIERS: ANNOUNCEMENT BULLETINS

(U)

CONTENTS: LANDING-GEAR CYLINDER BACK EXTRUDED;
PRESSURE VESSELS FABRICATED BY EB WELDING OF 2219
ALLOY; EFFECTS OF COMPOSITION AND HEAT TREATMENT ON
STRENGTH AND CORROSION RESISTANCE; CHARACTERISTICS
OF X7080, 7178 AND 7075 ALLOYS; EVALUATION OF
7049-T73 ALUMINUM; AGING OF MAGNESIUM-LITHIUM-
ALUMINUM ALLOYS; AND MG-LI ALLOY HONEYCOMB
CORES.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-869 476 13/4 14/2 22/4
MARTIN MARIETTA CORP DENVER COLO DENVER DIV

VERIFICATION TESTING OF CONJUGATE
STRUCTURE.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
APR 70 246P THOMPSON, E. DALE ;
REPT. NO. MCR-70-62
CONTRACT: F04611-68-C-0055
MONITOR: AFRPL TR-70-47

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE VESSELS, NON-DESTRUCTIVE
TESTING), ALTITUDE CHAMBERS, COMPRESSIVE
PROPERTIES, LOADING(MECHANICS), STRESSES,
HYDROSTATIC TESTS, STRAIN(MECHANICS), CRACKS,
METAL JOINTS, WELDS, PHOTOMICROGRAPHY,
DEFLECTION, FAILURE(MECHANICS)

(U)

IDENTIFIERS: CONJUGATE STRUCTURES, FAILURE
ANALYSIS

(U)

THE CONJUGATE STRUCTURE CONSISTED OF A FORWARD
SKIRT, FORWARD DOME, FORWARD BARREL, COMMON DOME, AFT
BARREL, AFT CONE AND AFT SKIRT. THE FORWARD AND
AFT BARREL SECTIONS WERE MADE OF TITANIUM ROLL
DIFFUSION BONDED TRUSS CORE PANELS. THE CONJUGATE
STRUCTURE WAS DELIVERED TO THE MARTIN MARIETTA
CORPORATION, DENVER DIVISION FOR STRUCTURAL
TESTING TO DEMONSTRATE ITS ABILITY TO WITHSTAND
DESIGN CONDITIONS BY A SUBJECTION TO LIMIT LOADS AND
LIMIT INTERNAL TANK PRESSURES. MARTIN MARIETTA
CORPORATION RECEIVING INSPECTION IDENTIFIED
STRUCTURAL DISCREPANCIES WHICH BROUGHT ABOUT A CHANGE
IN THE TEST CONTRACT. INSTEAD OF THE ORIGINALLY
PLANNED THREE TEST CONDITIONS, THE CONJUGATE
STRUCTURE WAS SUBJECTED TO A DETAILED INSPECTION AND
A STRUCTURAL REPAIR OPERATION, AND THE TEST PORTION
WAS MODIFIED TO INCLUDE FIVE TEST CONDITIONS. THE
FIRST TWO OF THESE TEST CONDITIONS WERE COMPLETED.
A VISUAL AND RADIOGRAPHIC INSPECTION, MADE AFTER
THE COMPLETION OF THE SECOND TEST, IDENTIFIED SEVEN
AREAS OF STRUCTURAL FAILURES. ONE FAILURE, A 42.5
IN. LONG CRACK IN THE INNER WELD OF THE AFT TANK
BARREL TO THE LOWER Y-RING CIRCUMFERENTIAL WELD
JOINT, WAS SEVERE ENOUGH TO PROHIBIT CONTINUED
TESTING. THE TANK BARREL SECTIONS, MADE UP OF
ROLL-DIFFUSION-BONDED-TRUSS-CORE, SUCCESSFULLY
CARRIED THE DESIGN LIMIT LOADS AND INTERNAL TANK
PRESSURES ASSOCIATED WITH THE TWO TEST CONDITIONS. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-870 390 11/6 20/12
BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS
INFORMATION CENTER

REVIEW OF RECENT DEVELOPMENTS. LOW-
TEMPERATURE PROPERTIES OF METALS,

(U)

JUN 70 6P CAMPBELL, J. E. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO REPORT DATED 27 FEB 70,
AD-866 215.

DESCRIPTORS: (*METALS; LOW-TEMPERATURE RESEARCH),
(*CRYOGENICS, METALS), STAINLESS STEEL,
DUCTILITY, TOUGHNESS, TITANIUM, TITANIUM ALLOYS,
ALUMINUM ALLOYS, PRESSURE VESSELS, THERMAL
CONDUCTIVITY, RESISTANCE(ELECTRICAL), NICKEL
ALLOYS

(U)

IDENTIFIERS: ANNOUNCEMENT BULLETINS

(U)

CONTENTS: DUCTILITY OF AUSTENITIC STAINLESS
STEEL AT -320F; TOUGHNESS OF PRECRACKED TITANIUM
SHEET AT -423F; CRYOGENIC PROPERTIES OF TITANIUM
ALLOYS IN THE RUSSIAN LITERATURE; PROPERTIES OF
ALUMINUM ALLOYS TO -423F; PRESSURE VESSEL TESTS
AT CRYOGENIC TEMPERATURES; AND THERMAL CONDUCTIVITY
AND ELECTRICAL RESISTIVITY OF FOUR ALLOYS AT
CRYOGENIC TEMPERATURES.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM07

AD-873 130 13/4 20/11
NAVAL SHIP RESEARCH AND DEVELOPMENT LAB ANNAPOLIS MD

STRESS ANALYSIS/MEASUREMENT TECHNIQUES FOR
PRESSURE VESSELS.

(U)

DESCRIPTIVE NOTE: PROGRESS REPT. OCT 69-JAN 70,
JUL 70 66P PETRISKO, EDWIN M. ;
REPT. NO. NSRDL/A-1-21
PROJ: NAFVAC-PO-D-0006, YF38-534-D10

UNCLASSIFIED REPORT

DESCRIPTORS: (•PRESSURE VESSELS, STRESSES),
STRAIN(MECHANICS), TEST METHODS,
PHOTOELASTICITY, STRAIN GAGES, PIEZOELECTRIC
GAGES, COATINGS, BRITTLENESS, BONDING, STATE-OF-
THE-ART REVIEWS

(U)

IDENTIFIERS: BRITTLE COATINGS

(U)

A STATE-OF-TECHNOLOGY SURVEY WAS CONDUCTED ON
STRESS ANALYSIS AND MEASUREMENT TECHNIQUES FOR
PRESSURE VESSELS. THE PURPOSE OF THE INVESTIGATION
WAS TO PROVIDE CURRENT INFORMATION FOR THE DESIGN,
CONSTRUCTION AND CERTIFICATION OF HIGH PRESSURE
CHAMBERS. THE SURVEY SHOWED CURRENT LIMITATIONS OF
THESE TECHNIQUES, AND ONGOING RESEARCH ATTEMPTING TO
ADVANCE THE STRESS ANALYSIS/MEASUREMENT TECHNIQUES.
(AUTHOR)

(U)

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CORPORATE AUTHOR - MONITORING AGENCY

•ADVANCED RESEARCH PROJECTS AGENCY
ARLINGTON VA

• • •
ARPA-E62
ELASTIC-PLASTIC ANALYSIS OF
PRESSURE VESSEL COMPONENTS,
AD-682 482

•AEROJET-GENERAL CORP AZUSA CALIF

• • •
0623 01 3
STUDY OF THE EFFECTS OF
THICKNESS ON THE PROPERTIES OF
LAMINATED FOR UNDERWATER PRESSURE
VESSELS.
AD-296 424

•AEROJET-GENERAL CORP FULLERTON CALIF
ORDNANCE DIV

• • •
AGC-1070-01(01)FP-VOL-1
PLASMA ARC WELDING PROCESS
DEVELOPMENT PROGRAM, VOLUME 1.
(AFML-TR-68-379-VOL-1)
AD-855 520

•AEROJET-GENERAL CORP SACRAMENTO
CALIF

• • •
AGC-062713
RESEARCH AND DEVELOPMENT IN
SUPPORT OF THE POLARIS PROGRAM,
TASK 1. INVESTIGATION OF FILAMENT
WINDING PATTERNS.
AD-425 196

•AEROSPACE CORP EL SEGUNDO CALIF

• • •
TOR269 4304 5
STRESSES IN THIN VESSELS UNDER
INTERNAL PRESSURE,
(SSD-TOR63 367)
AD-431 706

•AEROSPACE CORP EL SEGUNDO CALIF LAB
OPERATIONS

• • •
TR-0059(6250-10)-5
THE EFFECT OF PROCESSING ON
PLASTIC STRAIN ANISOTROPY OF Ti-6AL-
4V.

(SAMSO-TR-70-380)
AD-714 562

•AIR FORCE MATERIALS LAB WRIGHT-
PATTERSON AFB OHIO

• • •
AFML-TR-68-379-VOL-1
PLASMA ARC WELDING PROCESS
DEVELOPMENT PROGRAM, VOLUME 1.
AD-855 520

•AIR FORCE OFFICE OF SCIENTIFIC
RESEARCH ARLINGTON VA

• • •
AFOSR-65-0315
CASCADE ARRANGEMENT IN
SPHERICAL PRESSURE VESSEL DESIGN
FOR NUCLEAR POWER REACTORS,
AD-614 591

• • •
AFOSR-65-1294
PRESSURE CHAMBER FOR
MICROELECTROPHYSIOLOGICAL
TECHNIQUES (CAISSON DE COMPRESSION
POUR TECHNIQUES
MICROELECTROPHYSIOLOGIQUES),
AD-621 281

• • •
AFOSR-70-2337R
BUCKLING OF A CIRCULAR ELASTIC
RING CONFINED TO A UNIFORMLY
CONTRACTING CIRCULAR BOUNDARY,
AD-716 862

•AIR FORCE ROCKET PROPULSION LAB
EDWARDS AFB CALIF

• • •
AFRPL-TR-69-59
DEVELOPMENT OF IMPROVED BIAXIAL
STRENGTH IN TITANIUM ALLOY ROCKET
MOTOR CASES THROUGH TEXTURE
HARDENING.
AD-851 958

• • •
AFRPL-TR-69-223
A SURVEY ON FRACTURE OF
PRESSURIZED VESSELS.
AD-697 764

• • •
AFRPL-TR-70-47
VERIFICATION TESTING OF

0-1
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CONJUGATE STRUCTURE,
AU-869 476

•ALLIED RESEARCH ASSOCIATES INC
CONCORD MASS

• • •
ARA-F-271-5
PHOTOELASTIC INVESTIGATION OF
STRESSES IN A PENETRATED
HEMISPHERE.
AD-615 415

• • •
ARA-F-9250-3
PHOTOELASTIC INVESTIGATION OF
STRESSES AT WINDOWS AND HATCHES IN
SPHERICAL PRESSURE VESSELS,
AD-653 749

•APPLIED TECHNOLOGY ASSOCIATES INC
EMERSON N J

• • •
ATA-129-E-11-69
ANALYSIS OF A CIRCULAR
CYLINDRICAL PERFORATED SHELL,
AD-714 178

•ARDE-PORTLAND INC PARAMUS N J
• • •
CRYOGENIC STRETCH-FORMING OF
SOLID-PROPELLANT ROCKET CASES.
AD-403 459

•ARIZONA UNIV TUCSON

• • •
THE DESIGN OF RESEARCH
APPARATUS FOR CONSTANT-VOLUME
COMBUSTION PROCESSES.
AU-611 782

•ARMY ENGINEER REACTORS GROUP FORT
BELVOIR VA ENGINEERING DIV

• • •
EO-6922
SM-1A PRESSURE VESSEL LIFETIME
AS RESULT OF IN-PLACE ANNEALING.
AD-699 330

• • •
EO-7101
SM-1A VAPOR CONTAINER LEAK
TEST: 3-5 AUGUST 1970.
AD-718 026

•ARMY MATERIALS AND MECHANICS RESEARCH
CENTER WATERTOWN MASS

• • •
AMMRC-CR-71-2/1
THE EFFECTS OF THE SURFACE
LAYER ON PLASTIC DEFORMATION AND
CRACK PROPAGATION.
AD-721 292

•ARMY MATERIALS RESEARCH AGENCY
WATERTOWN MASS

• • •
AMRA-TR63 12
ANALYTICAL STUDY FOR A
HYDRODYNAMIC TEST SYSTEM,
AD-419 356

•ARMY MISSILE COMMAND REDSTONE
ARSENAL ALA ARMY PROPULSION LAB
AND CENTER

• • •
RK-TR-70-19
DETERMINATION OF PROOF TEST
LEVEL FOR TEST-DEGRADABLE
COMPONENTS.
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CASCADE ARRANGEMENT IN
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CASCADE ARRANGEMENT IN
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• • •

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•STERNE, R. H., JR.
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•TAYLOR, C. E.
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•TOTTEN, J. K.
 . . .
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 SECTION XV. HIGH PRESSURE AIR
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•TSUI, E. Y.
 . . .
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•TSUI, E. Y. W.
 . . .
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 . . .
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•WALDROP, RICHARD S.
 . . .
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•WALDROP, RICHARD S.
 . . .
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UNCLASSIFIED

WAT-ZIC

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