WR:SJB

Let

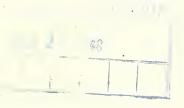
U. S. DEPARTMENT OF COMMERCE NATIONAL BUREAU OF STANDARDS WASHINGTON 25, D. C. Letter Circular LC910 (Superseding LC683)

July 27, 1948

ENGINEERING MECHANICS
Publications by Members of the Staff of the National Bureau of Standards

#### CONTENTS

Aircraft Structures
Engineering Structures
Machine Elements
Miscellaneous
Properties of Materials
Testing Methods



#### GENERAL INFORMATION

Some of these papers have appeared in the publications of the National Bureau of Standards, the National Advisory Committee for Aeronautics, and other scientific and technical journals. Unless specifically stated, these publications are not obtainable from the National Bureau of Standards.

Where the price is stated, the publication can be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. The price includes delivery in the United States, its territories and possessions, and in certain foreign countries which extend the franking privilege. For all other countries, one-third of the cost of the publication should be added to cover postage. Remittances should be made either by coupons (obtainable from the Superintendent of Documents in sets of 20 for \$1.00, good until used) or by check or money order payable to the "Superintendent of Documents, Government Printing Office."

Publications marked "OP" are out of print.

For papers in other scientific or technical journals, the name of the journal or of the organization publishing the article is given in abbreviated form, with the volume number (underscored), page and year of publication. The Bureau cannot supply copies of these journals, nor reprints from them. These publications as well as those marked "OP" usually can be consulted in technical and public libraries.

A duplicating service, through which copies of papers may be purchased, is maintained by the Engineering Societies' Library, 29 West 39th Street, New York 18, N. Y.

## ABBREVIATIONS National Bureau of Standards

- T = "Technologic Paper." T1 to T370. In 1928, these papers were superseded by the "Bureau of Standards Journal of Research."
- RP = "Research Paper." These are reprints of articles in the "Bureau of Standards Journal of Research" (BS J. Research) and the Journal of Research of the National Bureau of Standards (J. Research NBS), the latter being the title of the periodical since July 1934 (volume 13, number 1). When requesting a Journal at a library the volume number should be given as a reference.
  - C = "Circular."
  - M = "Miscellaneous Publication."
- LC = "Letter Circular." Free on request to the National Bureau of Standards

#### National Advisory Committee for Aeronautics

- TR = "Technical Report." Those reports which are out of print will be found in the Annual Reports. These Reports are in public libraries and in the Office of Aeronautical Intelligence, National Advisory Committee for Aeronautics, Washington, D. C.
- TN = "Technical Note." Free on request to the National Advisory Committee for Aeronautics.
  - W = "Wartime Report"

Circular C24 and Supplements (1901-1945) give a list of the publications of the National Bureau of Standards and is sold by the Superintendent of Documents for \$1.40. New publications are reviewed each month in the Technical News Bulletin, which is obtainable by subscription at \$1.00 a year in the United States, Canada, Cuba, Mexico, Newfoundland, and Republic of Panama, other countries at \$1.35.

### AIRCRAFT STRUCTURES

<u>Title</u>	Series	<u>Price</u>
Notes on aerodynamic forces on airship hulls. L.B.Tuckerman. NACA Tech. Note 129 (1923)	TN129	OP
An analysis of the deformation of the mooring spindle of the "Shenandoah". L.B.Tuckerman and C.S.Aitchison. BS Tech. Pap. <u>18</u> , 609 (1925)	<b>T27</b> 0	10¢
Inertia factors of ellipsoids for use in airship design. L.B.Tuckerman. NACA Tech. Report 210, 11th annual report (1925)	TR210	5¢
Technical aspects of the loss of the U.S.S. Shenandoah. J. of Am. Soc. Naval Engrs. (Washington 9, D.C.) 38, No. 3 (1926)		
Strength of tubing under combined axial and transverse loading. L.B.Tuckerman, S.N.Petrenko and C.D.Johnson. NACA Tech. Note 307 (1929)	TN307	
Strength of welded joints in tubular members for aircraft. H.L.Whittemore and W.C. Brueggeman. NACA Tech. Reports 16 (1930). J. Am. Welding Soc. (New York 18, N.Y.), 2, 107 (1930)	TR348	30¢
Strength of rectangular flat plates under edge compression. L.Schuman, and G.Back. NACA Tech. Reports <u>16</u> (1930)	TR356	15¢
Failures of aircraft engine parts and causes thereof. L.B.Tuckerman. Discussion.  Proc. Am. Soc. Testing Materials (Philadelphia 3, Pa) 30, part II, 195 (1930)		
Contribution to the design of compression members in aircraft. W.R.Osgood. J. Research NBS <u>13</u> , 157 (1934)	RP698	OP
A method for determining stresses in a non- rotating propeller blade vibrating with a natural frequency. W.Ramburg, P.S.Ballif and M.J.West. J. Research NBS 14, 189 (1935)	RP764	OP

Title	<u>Series</u>	Price
Aircraft: Materials and testing, Edgar Marburg Lecture. L.B.Tuckerman. Proc. Am. Soc. Testing Materials (Philadelphia 3, Pa.) 35, part II, 3 (1935)		
Mochanical properties of aluminum alloy rivets. W.C.Brueggeman. NACA Tech. Note 585 (1936)	TN585	
An interesting case of sub-multiple resonance. L.B.Tuckerman and W. Ramberg. The Physical Review (New York 22, N.Y.) 49, No. 11, 862, 2nd Series (1936)		
Strength of welded aircraft joints. W. C. Brueggeman. NACA Tech. Reports 23 (1937)	TR 584	15¢
Torsion tests of tubes. A.H.Stang, W. Ramberg and G.Back. NACA Tech. Reports 23 (1937)	TR601	10¢
Column strength of tubes elastically re- restrained against rotation at the ends. W.R.Osgood. NACA Tech. Reports <u>24</u> (1938)	TR615	15¢
Fatigue testing of wing beams by the resonance method. W.M.Bleakney. NACA Tech. Note 660 (1938)	TN660	
The crinkling strength and the bending strength of round aircraft tubing. W.R.Osgood. NACA Tech. Reports 24 (1938)	TR632	10¢
Experimental study of deformation and effective width in axially loaded sheet-stringer panels. W.Ramberg, A.E.McPherson and S.Levy. NACA Tech. Note 684 (1939)	TN684	
Calculation of stresses and natural frequencies for a totating propeller blade vibrating flexurally. W. Ramberg and S.Levy. J. Research NBS 21, 639 (1938)	RP1148	10¢

<u>Title</u>	<u>Series</u>	Price
The column strength of two extruded alumi- num alloy H-sections. W. R. Osgood and Marshall Holt. NACA Tech. Reports 25, (1939)	TR656	10¢
Compressive test of a monocoque box. W. Ramberg, A.E.McPherson and S.Levy. NACA Tech. Note 721 (1939)	TN721	
Principles of moment distribution applied to stability of structural members. W.R.Osgood. Discussion. Proc. Fifth International Congress for Applied Mechanics (New York, N. Y.) 149 (1939)		
Dimensionless coefficients applied to the solution of column problems. W.R. Osgood. Discussion. J. Aerc. Sciences (New York 21, N. Y.) 8, No. 1, 23 (1940)		
Mechanical properties of flush-riveted joints. W.C.Brueggeman and F.C.Roop. NACA Tech. Report 701 (1940)	TR701	15¢
Mechanical properties of flush-riveted joints submitted by five airplane manufacturers. W.C.Brueggeman. NACA Wartime Report (1942)	W <b>-</b> 79	
Rectangular plate loaded along two adjacent edges by couples in its own plane. W.R.Osgood. J. Research NES 28, 159 (1942)	RP1450	5¢
Bending of rectangular plates with large deflections, S.Levy, NACA Tech. Report (1942)	TR737	20¢
Square plate with clamped edges under normal pressure producing large deflections. S.Levy. NACA Tech. Report (1942)	TR740	15¢
Normal-pressure tests of circular plates with clamped edges. A.E.McPherson, W.Ramberg, and S.Levy. NACA Tech. Report 744 (1942)	TR744	20¢

<u>Title</u>	Series	<u>Price</u>
Torsion test of a monocoque box. S.Levy, A.E.McPherson and W.Ramberg. NACA Tech. Note 782 (1942)	TN872	
Normal-pressure tests of rectangular plates. W.Ramberg, A.E.McPherson and S.Levy. NACA Tech. Report 748 (1942)	. TR748	20¢
Bending with large deflection of a clamped rectangular plate with length-width ratio of 1.5 under normal pressure. S.Levy and S.Greenman. NACA Tech. Note 853 (1942)	TN853	
Effect of rivet and spot-weld spacing on the strength of axially loaded sheet-stringer panels of 24S-T aluminum alloy. S.Levy, A.E.McPherson and W.Ramberg. NACA Tech. Note 856 (1942)	TN8 56	
Bending tests of a monocoque box. A.E.  McPherson, W.Ramberg and S.Levy. NACA Tech. Note 873 (1942)	TN873	
Buckling of rectangular plates with built- in edges. S.Levy. J. of Appl. Mech. (New York 18, N.Y.) 9, No. 4, A-171, (1942)		
Large-deflection theory for end compression of long rectangular plates rigidly clamped along two edges. S.Levy and P.Krupen. NACA Tech. Note 884 (1943)	TN884	
Large-deflection theory of curved sheet. S.Levy. NACA Tech. Note 895 (1943)	TN895	
The center of shear again. W.R.Osgood. J. of Applied Mechanics (New York 18, N.Y.) 10, No. 2, A-62, (1943).		
Round heat-treated chromium-molybdenum-steel tubing under combined loads. W.R.Osgood. NACA Tech. Note 896 (1943)	TN896	
Effect of curvature on strength of axially loaded sheet-stringer panels. W.Ramberg, S.Levy and K.L.Fienup. NACA Tech. Note 94 (1944)	4 TN944	
Torsion test to failure of a monocoque box. A.E.McPherson, D.Goldenberg and G. Zibritosky. NACA Tech. Note 953 (1944)	TN953	

<u>Title</u>	Series	Price
Effect of developed width on strength of axially loaded curved sheet stringer panels. A.F.McPherson, K.L.Fienup and G.Zibritosky. NACA Wartime Report W-51 (1944)	W <i>-5</i> 1	
Simply supported long rectangular plate under combined axial load and normal pressure. S.Levy, D.Goldenberg and G. Zibritosky. NACA Tech. Note 949 (1944)	TN949	
Axial fatigue test of 10 airplane wing- beam specimens by the resonance method. W.C.Brueggeman, P.Krupen and F.C.Roop. NACA Tech. Note 959 (1944)	TN959	
Notes on columns. W.R.Osgood. Discussion. J. of the Aero. Sciences (New York 21, N.Y.) <u>11</u> , No. 3, 196 (1944)		
Corrections for lengths of columns tested between knife edges. W.R.Osgood. J. of the Aero. Sciences. (New York 21, N. Y.) 11, No. 4, 378 (1944)		
Column formulas. W.R.Osgood. Proc. Am. Soc. Civil Engineers (New York 18, N.Y.) 70, No. 1 (1944)		
Axial fatigue tests at zero mean stress of 24S-T aluminum alloy sheet with and without a circular hole. W.C.Brueggeman, M.Mayer, Jr. and W.H.Smith. NACA Tech. Note 955 (1944)	TN955	
Analysis of square shear web above buckling load. S.Levy, K.L.Fienup and R.M. Woolley. NACA Tech. Note 962 (1945)	TN962	
Strength of wing beams under axial and transverse loads. W.Ramberg, A.E. McPherson and S.Levy. NACA Tech. Note 988 (1945)	ŢN988	
Instability of extrusions under compressive loads. W.Ramberg and S.Levy. J. of the Aero. Sciences (New York 21, N.Y.) 12, No. 4, 485 (1945)		

<u>Title</u>	<u>Series</u>	Price
Plastic bending - approximate solution. W.R.Osgood. J. of the Aero. Sciences (New York 21, N.Y.) 12, No. 4, 408 (1945)		
Analysis of deep rectangular shear web above buckling load. S.Levy, R.M. Woolley and J.N.Corrick. NACA Tech. Note 1009 (1946)	TN1009	
Clamped long rectangular plate under combined axial load and normal pressure. R.M.Woolley, J.N.Corrick and S.Levy. NACA Tech. Note 1047 (1946)	TN1047	
Effect of normal pressure on strength of axially loaded sheet-stringer panels. A.E.McPherson, S.Levy and G.Zibritosky. NACA Tech. Note 1041 (1946)	TN1041	
Instability of outstanding flanges simply supported at one edge and reinforced by bulbs at other edge. S. Goodman and E. Boyd. NACA Tech. Note 1433 (1947)	TN1433	
Instability of simply supported square plate with reinforced circular hole in edge compression. S.Levy, R.M. Woolley and W.D.Kroll. J. Research NBS, 39, No. 7, 571 (1947)	RP1849	10¢
Computation of influence coefficients for aircraft structures with discontinuities and sweep-back. S.Levy. J. Aero. Sciences (New York 21, N.Y.) 14, No. 10, 547, (1947)		
Reinforcement of a small circular hole in a plane sheet under tension. S.Levy, A.E.McPherson and F.C.Smith. J. of Applied Mechanics (New York 18, N.Y.) 15, No. 2, 160 (1948)		

#### ENGINEERING STRUCTURES

The reports on structural properties of house constructions, designated as Building Materials and Structures Reports (BMS), are listed in Letter Circular LC902. This letter circular can be obtained free on request to the National Bureau of Standards

<u>Title</u>	Series	Price
Tests of large bridge columns. J.H. Griffith and J.G.Bragg. (1918)	TlOl	OP
The compressive strength of large brick piers. J.G.Bragg (1918)	T111	OP
Load strain-gage tests of 150-ton float- ing crane for the Bureau of Yards and Docks, U.S. Navy Department, L.J. Larson and R.L.Templin. (1920)	T151	OP
Results of some compressive tests of structural steel angles. A.H.Stang and L.R.Strickenberg. Tech. Pap. BS 16, 651 (1922)	T218 <sub>.</sub>	OP
Welded pressure vessels. Bul. No. 5 Am. Bureau Welding (New York 18, N.Y.) J. Am. Welding Soc. (New York 18, N.Y.) 2, 11 (1923)		
Some compressive tests of hollow tile walls. H.L.Whittemore and B.D.Hath-cock. BS Tech. Pap. 17, 513 (1923)	T238	OP
Stresses in a few welded and riveted tanks tested under hydrostatic pressure. A.H. Stang and T.W.Greene. Toch. Pap. BS 17, 645 (1923)	T243	10¢
Strength of ideal walls. Brick and Clay Record (Chicago 3, Ill.) <u>62</u> , No. 4, 313 (1923)		
Spot-welded girders and columns tested for strength. L.B. Tuckerman. Eng. News-Record (New York 18, N.Y.) 92, 982 (1924)		
Strength of steel tubing under combined column and transverse loading including tests of columns and beams. T.W.Greene. Tech. Pap. BS 18, 243 (1924)	T258	OP

Title	Series	Price
Proper construction of welds for pressure vessels. H.L.Whittemore. Eng. News-Record (New York 18, N.Y.) 92, 462 (1924)		
Tests of some girder hooks. H.L.Whittemore and A.H.Stang. Tech. Pap. BS <u>18</u> , 305 (1924)	T260	10¢
Tangent modulus and the strength of steel columns in tests. O.H.Basquin. BS Tech. Pap. <u>18</u> , 381 (1924)	т263	OP
Tests of I-beams in torsion. L.B.Tuckerman. Discussion. Eng. News-Record (New York 18, N.Y.) 93, 882 (1924)		
Compressive strength of sand-lime brick walls. H.L.Whittemore and A.H.Stang. BS Tech. Pap. <u>19</u> , 57 (1925)	т276	OP
Tests of hollow tile and concrete slabs reinforced in one direction. D. E. Parsons and A.H.Stang. BS Tech. Pap. 19, 465 (1925)	T29ļ .	OP
Compressive and transverse strength of hollow-tile walls. A.H.Stang, D.E. Parsons and H.D.Foster. BS Tech. Pap. 20, 317 (1926)	T311 .	15¢
Strain lines, structural members. Delaware Bridge. Misc. Pub. BS M72 (1926)	М72 .	OP
Steel trusses carry 22 stories in Chicago Hotel. Eng. News-Record (New York 18, N.Y.) <u>96</u> , No. 16, 641 (1926)		·:
Investigation of the behavior and of the ultimate strength of riveted joints under load. E.L.Gayhart, Comdr., U.S.N. Trans. Soc. Naval Architects and Marine Engineers (New York, N.Y.) 34, 55 (1926)		

<u>Title</u>	<u>Series</u>	Price
Compressive strength of column web plates and wide web columns. R.S.Johnston. Tech. Pap. BS <u>20</u> , 733 (1926)	Т327	OP
Tests of large columns with H-shaped section. L.B.Tuckerman and A.H.Stang. Tech. Pap. BS <u>21</u> , 1 (1926)	T328	OP
Stresses in a rail due to a falling weight. A.H.Stang. J. Am. Weld. Soc. (New York 18, N.Y.) 6, No. 3, 64 (1927)		
The strength of solid and hollow walls of brick. A.H.Stang. The Ceramic Age (Newark, N.J.) 10, No. 6, 198 (1927), Architect, Builder & Industrial News, 4, No. 7, 141 (1928), Building Economy, 4, No. 1, 20 (1928)		
Strength of interlocking-rib tile walls. A.H.Stang, D.E.Parsons and A.B.Mc Daniel. BS Tech. Pap. 22, 389 (1928)	Т366	OP
Transverse tests of H-section column splices. J.H.Edwards, H.L.Whittemore and A.H. Stang. BS J. Research 4, 395 (1930) J. Am. Welding Soc. (New York 18, N.Y.) 2, 7 (1930)	RP157	
Test of composite beams and slabs of hollow tile and concrete. D.E.Parsons and A.H.Stang. BS J. Research 4, No. 6, 815, (1937)	RP181	15¢
Compressive tests of bases for subway columns. J.H.Edwards, H.L.Whittemore and A.H. Stang. BS J. Research 5, 619 (1930). J. Am Welding Soc. (New York 18, N.Y.) 10, 20 (1931)	R <sub>.</sub> P218	
Strength of welded shelf angle connections. J.H.Edwards, H.L.Whittemore and A.H. Stang. BS J. Research 5, 781 (1930). J. Am. Welding Soc. (New York 18, N.Y.) 10, 29 (1931)	RP230 -	10¢

<u>Title</u>	Series	Price
Stress distribution welded steel pedestals. J.H.Edwards, H.L.Whittemore and A.H. Stang. BS J. Research 5, 803 (1930). J. Am. Welding Soc. (New York 18, N. Y.) 10, 46 (1931)	RP232	OP
Strain measurement in the reinforcement for the dome of the Natural History Building. W.C.Lyons, H.L.Whittemore, A.H.Stang and L.R.Sweetman. BS J. Research 6, 183 (1931)	RP268	15¢
Compressive tests of jointed H-section steel columns. J.H.Edwards, H.L.Whittemore and A.H.Stang. BS J. Research 6, 305 (1931)	RP277	15¢
Tests of cellular sheet-steel flooring. H.L.Whittemore and J.M.Frankland. BS J. Research 9, 131 (1932) J. Am. Welding Soc. 12, 4 (1933)	RP463	10¢
Final report committee on welded rail joints. Bureau Welding (New York 18, N.Y.) (1932		
The areas and tensile properties of deformed concrete reinforcement bars. A.H.Stang, L.R.Sweetman and C.Gough. BS J. Research 2, 509 (1932)	RP486	OP
Column curves and stress-strain diagrams. W.R.Osgood. BS J. Research <u>9</u> , 571 (1932)	RP492	OP
Shear tests of reinforced brick masonry beams. D.E.Parson, A.H.Stang and J.W.McBurney. BS J. Research 2, No. 6, 749 (1932)	RP504	OP
Wind bracing connection efficiency. W.R. Osgood. Discussion. Proc. Am. Soc. Civil Engineers (New York 18, N.Y.) 58, 675 (1932)	· ·	
Compressive strength of steel columns in- cased in brick walls. A.L.Harris, A.H.Stang and J.W.McBurney. BS J. Research 10, No. 1, 123 (1933)	RP520	5Æ

<u>Title</u>	Series	Price
Test of a flat steel plate floor under load. L.B.Tuckerman, A.H.Stang and W.R. Osgood. BS J. Research 12, 362 (1934)	RP662	OP
Neutral axis in a reinforced concrete member subjected to combined stress. W.R.Osgood. Civil Eng. (New York 18, N.Y.) 4, No. 10, 546 (1934)		
Stresses in space structures. W.R.Osgood. Discussion. Proc. Am. Soc. Civil Engineers (New York 18, N.Y.) 60, 1085 (1934)		
Tests of Mesnager hinges. D.E.Parsons and A.H.Stang. J.Am. Concrete Inst. (Detroit, Mich.) 6, 304 (1935).		
The double-modulus theory of column action. W.R.Osgood. Civ. Eng. (New York 18, N.Y.) 5, No. 3, 173 (1935)		
Rational design of steel columns. W.R.Osgood. Discussion. Proc. Am. Soc. Civil Engineers (New York 18, N.Y.) 61, No. 3, 391 (1935)		
Test of steel tower columns for the George Washington Bridge. A.H.Stang and H.L. Whittemore. J. Research NBS <u>15</u> , 317 (1935)	RP831	10¢
Accelerated service test of pintle bearings. A.H.Stang and L.R.Sweetman. J. Research NBS <u>15</u> , 591 (1935)	RP854	5¢
Some tests of steel columns incased in concrete. A.H.Stang, H.L.Whittemore and D.E.Parsons. J.Research NBS 16, 265 (1936)	RP873	10¢
Tests of eight large H-shaped columns fabricated from carbon manganese steel: A.H.Stang, H.L.Whittemore and L.R. Sweetmen. J. Research NBS 16, 595 (1936)	RP896	5¢
Tests of steel chord members for the Bayonne Bridge. A.H.Stang, H.L.Whittemore and L.R.Sweetman. J. Research NBS <u>16</u> , 627 (1936)	RP897	5¢

<u>Title</u>	Series	Price
Strength of a riveted steel rigid frame having straight flanges. A.H.Stang, M.Greenspan and W.R.Osgood. J. Research NBS 21, 269 (1938)	RP1130	: 15¢,
Strength of a riveted steel rigid frame having a curved inner flange. A.H. Stang, M. Greenspan and W.R.Osgood. J. Research NBS 21, 853 (1938)	RP1161	10¢
Heterostatic loading and critical astatic loads. L.B.Tuckerman. J. Research NBS 22, 1 (1939)	RP1163	10¢
A theory of flexure for beams with non- parallel extreme fibers. W.R.Osgood. Trans. Am. Soc. Mechanical Engineers (New York 18, N.Y.) 61, A-122 (1939)		
Strength of a welded steel rigid frame. A.H. Stang and M.Greenspan. J. Research NBS 23, 145 (1939)	RP1224	5¢
Steel rigid frames. W.R.Osgood. Discussion. Proc. Am. Soc. Civil Engineers (New York 18, N.Y.) 67, 472 (1941)		
Stresses in a rectangular knee of a rigid frame. W.R.Osgood. J. Research NBS 27, 443 (1941)	RP1431	5¢
Refinement in design to conserve materials. W.R.Osgood. Eng. News Record (New York 18, N.Y.) 128, No. 17, 58 (1942)	•	
Perforated cover plates for steel columns:  program and test methods. A.H.Stang and M.Greenspan. J. Research NBS 28, No. 6, 669 (1942)	RP1473	10¢
Perforated cover plates for steel columns: compressive properties of plates having ovaloid perforations and a width-to- thickness ratio of 40. A.H.Stang and M.Greenspan. J. Research NBS 28, No. 6, 687 (1942)	RP1474	10¢

Title	Series	Price
Perforated cover plates for steel columns: compressive properties of plates having ovaloid perforations and a widthto thickness ratio of 68. A.H.Stang and M.Greenspan. J. Research NBS 29, No. 4, 279 (1942)	RP1501	10¢
Perforated cover plates for steel columns:     compressive properties of plates having     ovaloid perforations and a width-to     thickness ratio of 53. A.H.Stang and     M.Greenspan. J. Research NBS 30, No. 1,     15 (1943)	RP1514	10¢
Perforated cover plates for steel columns: compressive properties of plates having circular perforations and a width-to thickness ratio of 53. A.H. Stang and M.Greenspan. J. Research NBS 30, No. 3, 177 (1943)	RP1527	10¢
Perforated cover plates for steel columns:     compressive properties of plates having     a net-to-gross cross-sectional-area     ratio of 0.33. A.H.Stang and M.Greenspan     J. Research NBS 30, No. 5, 411 (1943)	. RP1540	10¢
Axial rigidity of perforated structural members. M.Greenspan. J. Research NBS 31, 305 (1943)	RP1568	10¢
Device for measuring principal curvatures and principal strains on a nearly plane surface. A.E.McPherson. NACA Tech. Note 1137 (1947)	TN1137	
Performance test of wire strain gages V - Error in indicated bending strains in thin sheet metal due to thickness and rigidity of gage. W.R.Campbell and A.F.Medbery. NACA.Tech. Note 1318 (1947)	TN1318	
A vacuum tube for acceleration measurement. W.Ramberg. Electrical Engineering (New York 18, N.Y.) 66, No. 6, 555 (1947)		

Title	<u>Series</u>	<u>Price</u>
The measurement of acceleration with a vacuum tube. W.Ramberg. Proc. Am. Inst. Elec. Eng. (New York 18,' N.Y.), Paper 47-108 T Section, 66, (1947)		
Performance tests of wire strain gages VI - Effect of temperature on cal- ibration factor and gage resistance. W.R.Campbell. NACA Tech. Note 1456 (1948)	TN1456	
Perforated cover plates for steel col- umns: compressive properties of plates having ovaloid, elliptical, and "square" perforations. A.H. Stang and B.S.Jaffe. J. Research NBS 40, No. 2, 121 (1948)	RP1861	10¢
Perforated cover plates for steel columns: Summary of compressive properties. A.H.Stang and M.Greenspan. J. Research NBS 40, No. 5, 347 (1948)	RP1880	10¢

#### MACHINE ELEMENTS

	Title	Series	Price
The 1	friction and carrying capacity of ball and roller bearings. H.L.Whittemore and S.N.Petrenko. (1921)	T201	OP
Expe	rimental use of liquid air and explosives for tightening body-bound bolts. H.L. Whittemore. Am. Machinist (New York 18, N.Y.) 56, 524 (1922)		
The :	strength of bolt threads as affected by inaccurate machining. G.M.Deming. Mech. Engineering (New York 18, N.Y.) 45, 583 (1923)		
Bibl:	iography on riveted joints. Am. Soc. Mech. Engineers (New York 18, N.Y. (1924)		
Labo	ratory strength tests of motor truck wheels. T.W.Greene. J. Soc. Automotive Engineers (New York 18, N.Y.) XV, 150 (1924)	٠	
Test	s of ball bearings for rotating beam fatigue machines. L.B.Tuckerman and C.S.Aitchison. Am. Machinist (New York 18, N.Y.) <u>61</u> , 369 (1924)		
Phys	ical properties of electrically welded steel tubing. H.L.Whittemore, J.S. Adelson and E.O.Seaquist. BS J. Research 4, 475 (1930). J. Am. Welding Soc. (New York 18, N.Y.), 9, 17 (1930)	RP161	OP
Note	on the electrical resistance of contacts between nuts and bolts. F.Wenner, G.W. Nusbaum and B.C.Cruickshanks. BS J. Research 5, 757 (1930)	RP22 <b>7</b>	OP
The r	relation of torque to tension for thread- locking devices. H.L.Whittemore, G.W. Nusbaum and E.O.Seaquist. BS J. Research Z, 945 (1931)	RP386	OP
Impa	ct and static tensile properties of bolts. H.L.Whittemore, E.O.Seaquist and G.W. Nusbaum. J. Research NBS <u>14</u> , 139 (1935)	RP763	OP

LC910 Machine Elements

	<u>Title</u>	Series	Price
Load	distribution and strength of excable equalizers. A.H.Stang and Sweetman. J. Research NBS <u>17</u> , (1936)	d L.R. PPOTO	5¢
The	sliding of metals. W.R.Osgood. Engineer (London, England) <u>168</u> (1939)	The , 426	•

# MISCELLANE OUS .

<u>Title</u>	Series	Price
Tests of hollow building tiles. Bernard D. Hathcock and E. Skillman. (1919)	TP120	OP
Strength and other properties of wire rope. J.H.Griffith and J.G.Bragg. (1919)	T121	OP
Physical tests of motor truck wheels. C.P. Hoffman. (1920)	T150	OP
Results of some tests of manila rope. A.H. Stang and L.R.Strickenberg. (1921)	· T198	OP
Tests of rotary drill pipes. A.H.Stang. Iron Age (New York 17, N.Y.) <u>108</u> , 804 (1921) and <u>109</u> , 359 (1922)		
Size standardization by preferred numbers. L.B.Tuckerman. Am. Soc. Mech. Eng. (New York 18, N.Y.) (1922)	•	
Investigation of oxyacetylene welding and cutting blowpines, with special reference to their design, safety and economy in operation. R.S. Johnston. (1922)	T200	· OP
Some tests of steel wire rone on sheaves. E. Skillman. Tech. Pap. BS 17, 227 (1923)	T229	OP
Loading tests of a hollow tile and reinforced concrete floor of Arlington Building, Washington, D.C. L.J.Larson and S.N. Petrenko. Tech. Pap. BS 17, 405 (1923)	T236	OP
Testing gas welds. H.L.Whittemore. Welding Engineer (Chicago 11, II1.) 12, 38 (1927 Am. Machinist (New York 18, N.Y.) 66, 40 (1927). Power (New York 18, N.Y.) 65, 21 (1927). Acetylene J. (Chicago, III.), 28 330 (1927). Welding J. (London, England) XXIV, 46 and 156 (1927).	9	
Comparative tests of six-inch cast iron pipe of American and French Manufacture. S.N.Petrenko. Tech. Pap.BS 21, 231 (1927)	· T336	OP

	111000110110	
<u>Title</u>	<u>Series</u>	Price
Control for welding. H.L.Whittemore. J. Am. Welding Soc. (New York 18, N.Y. 7, 52 (1928)	)	
Efficiency of machinists vises. H.L. Whittemore and L.R.Sweetman. BS J. Research 3, 191 (1929)	RP91	ОР
Corrosion of open valley flashings. K.H. Beij. BS J. Research 3, No. 6, 987 (1929)	RP123	OP
Procedure control for aircraft welding. H.L.Whittemore, J.J.Crowe and H.H. Moss. Proc. Am. Soc. Testing Materials (Philadelphia 3, Pa.) 30, part II, 140 (1930). Welding (Pittsburgh, Pa.), 1, 589 (1930)		
Seams for copper roofing. K.H.Beij. BS J. Research <u>5</u> , 585 (1930)	RP216	15¢
Report of structural steel welding committee Am. Bureau Welding (New York 18, N.Y.) (1931).		
A welded dredge pipe. H.L.Whittemore. Industry and Welding (Cleveland 13, Ohio) 2, 12 (1931).		
Welding research. H.L.Whittemore. Industry and Welding (Cleveland 13, Ohio) 2, 7 (1931).	,	
A welded steam pipe. H.L.Whittemore. Industand Welding (Cleveland 13, Ohio) 2, 2 (1931).	try	
These consulting engineers. H.L.Whittemore. Industry and Welding (Cleveland 13, Ohio) 4, 17 (1932)		
Safe welding practice. H.L.Whittemore. Eng. News-Record (New York 18, N.Y.) 112, 237 (1934).		
Flow in roof gutters. K.Hilding Beij. BS J. Research <u>12</u> , No. 2, 193 (1934).	RP644	5¢

<u>Title</u>	<u> Şeries</u>	Price
Report of the joint board of review appointed to investigate the causes of the accident to the balloon "Explorer". L.B.Tuckerman. Member of the Board. National Geographic Society contributed technical papers stratosphere series, No. 1, 71 (1935)		
Ballast requirements and performance of the stratosphere balloon "Explorer II". L.B.Tuckerman, W.Ramberg and F.D.Swan. National Geographic Society contributed technical papers stratosphere series, No. 2, 250 (1936)		
Inspection and tensile tests of some worn wire ropes. W.H.Fulweiler, A.H.Stang and L.R.Sweetman, J.Research NBS <u>17</u> , 401 (1936)	RP920	OP
Approximation to a function of one variable from a set of its mean values. M. Greenspan. J. Research NBS 23, 309 (1939)	RP1235	OP
Effect of a small hole on the stresses in a uniformly loaded plate. M.Greenspan. Quarterly of Applied Mathematics (Providence, R.I.) II, No. 1, 60 (1944)		
The Hankinson Formula. W.R.Osgood. Comment and discussion. Eng. News Record (New York 18, N.Y.) <u>135</u> , 646 (1945)		
Impact strength of nylon and of sisal ropes. S.B. Newman and H.G. Wheeler. J. Research NBS 35, 417 (1945)		10¢
Dynamic tensile tests of parachute webbing. A.H.Stang, M.Greenspan and S.B.Newman. J. Research NBS 36, No. 10, 411 (1946)	RP1710	5¢
Theory for axial rigidity of structural members having ovaloid or square perfor ations. M. Greenspan. J. Research NBS 37, No. 3, 157 (1946)	- RP1737	10¢

LC910 Miscellaneous

<u>Title</u>	Series	Price
A statistical analysis of some mechanical properties of manila rope. S.B.Newman and J.H.Curtiss. J.Research NBS 39, No. 7, 551 (1947)	RP1847	10¢
On the intensity of light reflected from or transmitted through a pile of plates. L.B. Tuckerman. J. Opt. Soc. of Am. (New York 22, N.Y.) 37, No. 10, 818 (1947)		

#### PROPERTIES OF MATERIALS

CALLATAN TO CALLATON		
<u>Title</u>	Series	Price
Impact tests for woods. NACA Tech. Note 78, (1922)	<b>T</b> N78	OP
Fatigue or progressive failure of metals under repeated stress. L.B. Tuckerman. Discussion. Proc. Am. Soc. Testing Materials (Philadelphia 3, Pa.) 22, part II, 266 (1922)		
Mechanical meaning of hardness numbers. S.N. Petrenko. Mech. Engineering (New York 18 N.Y.) 46, 926 (1924)	Ð	
Hardness and hardness testing. L.B. Tuckerman. Mech. Engineering (New York 18, N.Y.) 47, 53 (1925)		
Report of conference on fatigue phenomena of metals. H.L.Whittemore. Nat. Res. Council Div. of Eng. and Ind. Research, 21 (1927)		
The strength of brick in tension. J.W.Mc- Burney. J. Am. Ceramic Soc., (Columbus 2 Ohio) 2, No. 2, 114 (1928)	<b>;</b> .	
The effect of strength of brick on compressive strength of brick masonry. J.W. McBurney. Proc. Am. Soc. Testing Material (Philadelphia 3, Pa.) 28, part II, 605 (1928)	ls	
Compressive strength of clay brick walls. A.H.Stang, D.E.Parsons and J.W.Mc- Burney. BS J. Research 3, No. 4, 507 (1929)	RP108	OP
Fatigue resistance of some aluminum alloys L.B.Tuckerman. Discussion. Proc. Am. Soc. Testing Materials (Philadelphia 3, Pa.) 29, part II, 344 (1929)		
Fatigue studies of non-ferrous sheet metals. L.B.Tuckerman. Discussion. Proc. Am. Soc. Testing Materials (Philadelphia 3, Pa.) 29, part II, 365 (1929)		

Aircraft materials. L.B. Tuckerman. Discussion. Proc. Am. Soc. Testing Materials. (Philadelphia 3, Pa.) 30, part II, 175 (1930)

Title Series A rational definition of yield strength. W.R. Osgood. J. of Applied Mechanics, (New York 18, N.Y.) 7, No. 2, A-61 (1940)Material shortages a redesign and substitution. H.L. Whittemore. Eng. News-Record (New York 18, N.Y.) 128, 114 (1942)Tensile and pack compressive tests of some sheets of aluminum alloy. 1025 carbon steel, and chromium-nickel TN840 steel. C.S. Aitchison and J.A. Miller. NACA Tech Note 840 (1942) Tensile and compressive properties of some stainless steel sheets. C.S.Aitchison. W.Ramberg, L.B.Tuckerman and H.L. RP1467 15¢ Whittemore. J. Research MBS 28, 499 (1942)Description of stress-strain curves by three parameters. W. Ramberg and W.R. Osgood. TN902 · NACA Tech. Note 902 (1943) Tensile and compressive tests of magnesium alloy J-1 sheet. C.S.Aitchison and J.A.Miller. NACA Tech. Note 913 (1943) TN913 Mechanical properties of metals and alloys. John L. Everhart, W. Earl Lindlief, J. C447 \$2.25 Kanegis, P.G.Weissler and Frieda Siegel. Circular 447 (1943) Symposium on the significance of the hardness test of metals in relation to design. L.B. Tuckerman. Discussion. Proc. Am. Soc. Testing Materials (Philadelphia 3, Pa.) 43, 847 (1943) Significance of the secent and tangent . moduli of elasticity in structural design. W.R.Osgood. Discussion. J. of the Aeronautical Sciences (New York 21, N.Y.) 11, No. 1, 91 (1944)

RP1742

10¢

Title Series Price Plastic bending. W.R.Osgood. J. of the Aeronautical Sciences (New York 21, N.Y.) 11, No. 3, 213 (1944) Micro-deformation under tension and compression loads of thin aluminum alloy sheets for aircraft construction. J.A.Miller. Discussion. Proc. Am. Soc. Testing Materials (Philadelphia 3, Pa.) <u>44</u>, 683 (1944) Axial fatigue tests at two stress amplitudes of 0.032-inch 24S-T sheet specimens with a circular hole. W.C.Brueggeman. TN983 M.Mayer, Jr. and W.H.Smith. NACA Tech. Note 983 (1945) Plastic bending - further considerations. W.R. Osgood. J. of the Aeronautical Sciences (New York 21, N.Y.) 12, No. 3, 253 (1945) Stress-strain formulas. W.R.Osgood, J. of the Aeronautical Sciences (New York 21, N.Y.) <u>13</u>, No. 1, 45 (1946) Stress-strain and elongation graphs for aluminum alloy R301 sheet. J.A.Miller. TN1010 NACA Tech. Note 1010 (1946) Determination and presentation of compressive stress strain data for thin sheet metal. W.Ramberg and J.A.Miller. J. Aero. Sciences (New York 21, N.Y.) 13, No. 11, 569 (1946)

Stress-strain and elongation graphs for alclad aluminum-alloy 75S-T sheet. J.A. TN1385 Miller. NACA Tech. Note 1385 (1947)

Poisson's ratio of some structural alloys

NBS 37, 211 (1946)

for large strains. A.H.Stang, M. Greenspan and S.B.Newman. J. Research

<u>Tîtle</u>	Series	Price
Stress-strain and elongation graphs for the alclad aluminum-alloy 24S-T sheet.  James A. Miller. NACA Tech. Note 1512 (1948)	· TN1512	
Stress-strain and elongation graphs for alclad aluminum-alloy 245-T81 sheet. NACA Tech. Note 1513 (1948)	TN1513	

## TESTING METHODS

<u>Title</u>	<u>Series</u>	Price
Comparison of five methods used to measure hardness. R.P.Devries. (1912)	Tll	OP
Airplane tensiometer. L.J.Larson. NACA Report 32 4th Annual Report (1918)	TR32	5¢
The hardness testing of metals. Report of Committee of Eng. Div. of Nat. Research Council. Mech. Engineering (New York 18, N.Y.) 43, 445 (1921)	. 1	o .⁵
Optical strain gages and extensometers. L.B. Tuckerman. Proc. Am. Soc. Testing Materials (Philadelphia 3, Pa.) 23, part II, 602 (1923).		
New developments in electrical telemeters.  O.S.Peters and R.S.Johnston. Proc. Am. Soc. Testing Materials (Philadelphia 3, Pa.), 23, part II, 592 (1923)	, • · · · · · · · · · · · · · · · · · ·	7. g
Equalizer apparatus for transverse tests of brick. H.L.Whittemore. B\$ Tech. Papers. 18, 107 (1924)	T251	OP
A simple fixture for testing belting. Am. Machinist (New York 18, N.Y.) 60, 722 (1924)		
Cable reel of simple design. H.L.Whittemore.  Machinery (New York 18, N.Y.) 30, 925 (1924)		
Design of specimens for short-time fatigue tests. L.B. Tuckerman and C.S. Aitchison. Tech. Pap. BS 19, 47 (1924)	T275	OP
Table of Brinell hardness numbers. Misc. Pub. BS, M62 (1924)	M62	OP
Tests of thin gage metals. H.L.Whittemore. Discussion. Proc. Am. Soc. Testing Materials (Philadelphia 3, Pa.) 24, part II, 1006-1011 (1924)		

Title	Series	Price
Comparative slow bend and impact notched bar tests of some metals. S.N.Petrenko. Tech. Pap. BS 19, 315 (1925)	T289	OP
Strain detection in mild steel by wash coating. R.S.Johnston, British Iron and Steel Inst. (London, England) <u>CXII</u> , 342 (1925)		
Elastic ring for verification of Brinell hardness testing machines. S.N.Petrenko. Trans. Am. Soc. Steel Treating (Cleveland, Ohio) IX, 420 (1926)		
A fabric tension meter for use on aircraft. L.B.Tuckerman, G.H.Keulegan and H. N. Eaton. BS Tech. Pap. <u>20</u> , 581 (1926)	т320	10¢
Methods of socketing fiber rope and tensile strength tests. H.L.Whittemore and C.T. Ervin. The Cord Age, (New York 16, N.Y.) 2, No. 6, 12, 46, (1926)		
Impact testing of insulating material. H.L.Whittemore. Discussion. Proc. Am. Soc. Testing Materials (Phila. 3, Pa.) <u>26</u> , part II, 653 (1926)		
Standardizing the Brinell test. H.L. Whittemore, L.B. Tuckerman and S.N. Petrenko. Discussion. Am. Soc. Steel Treating (Cleveland, Ohio), XI, 67 (1927)		
A portable apparatus for transverse tests of brick. A.H.Stang. BS Tech. Papers, 21, 347 (1927)	T341	OP
The Whittemore strain gage. H.L.Whittemore. Instruments (Pittsburgh 12, Pa.) I, 299 (1928)		
Rings for checking accuracy of testing machines. W.S.Morehouse. Iron Age (New York 17, N.Y.) 123, 945 (1929)		

	<u>Title</u>		Series	Price
The (	determination and significance proportional limit in testing L.B.Tuckerman. Discussion. Prosoc. Testing Materials (Philad Pa.) 29, part II, 538 (1929)	metals. oc. Am.		
Repo	rt of committee E-1 on methods testing. L.B.Tuckerman. Discu Proc. Am. Soc. Testing Materia (Philadelphia 3, Pa.) 29, par (1929)	ssion. als.		
A net	w dead weight testing machine by capacity. L.B.Tuckerman, Heand S.N.Petrenko. BS J. Reseate (1930). Metals and Alloys (New 1, 661 (1930)	.L.Whittemon	RP147	OP
Rela <sup>-</sup>	tionships between Rockwell and numbers. S.N.Petrenko. BS J. 15, 19 (1930)		RP185	OP
Spec:	imens for torsion tests of met. Tuckerman. DiscussionProc Testing Material (Philadelphi. 30, part II, 545 (1930)	Am. Šoc.		
Inspe	ection service for welded structured as need. H.L.Whittemore: Steel land 13, Ohio), <u>88</u> (1931). We Engineer (Chicago, Ill.), <u>16</u> ,	l (Cleve÷ lding		
Ther	mal effects in elastic and pla deformation. L.B.Tuckerman. D Proc. Am. Soc. Testing Materi delphia 3, Pa.) <u>32</u> , part II,	iscussion. als. (Phila	-	
A me	thod of exciting resonant vibramechanical systems. L.B.Tucket Dryden and H.B.Brooks. BS J. 1	rman, H.L.	RP556	OP
Dete	rmination of stresses from str three intersecting gage lines application to actual tests. Osgood and R.G.Sturm. BS J. R 10, 685 (1933)	and its W.R.	RP559	OP

Title	Series	Price
A propeller-vibration indicator. H.L. Dryden and L.B.Tuckerman. BS J. Research 12, No. 5, 537 (1934)	RP678	OP
An extensometer comparator. A.H.Stang and L.R.Sweetman. J.Research NBS <u>15</u> , 199 (1935). Mechanical World and Engineer-ing Record (Manchester, England) <u>XCVIII</u> , 473 (1935)	·RP822	OP
Determination of principal stresses from strains on four intersecting gage lines 45° apart. W.R.Osgood. J. Research NBS 15, 579 (1935)	RP851	OP
Determination of the Brinell number of metals S.N.Petrenko, W.Ramberg and B.L.Wilson. J. Research NBS 17, 59 (1936)		5¢
Speed control for screw-power testing machine driven by direct-current motors. A.H. Stang and L.R.Sweetman. Am. Soc. Testing Materials. (Philadelphia 3, Pa.) Bul. No. 87, August 1937		
Compensation of strain gages for vibration an impact. W.Bleakney. J. Research NBS 18, 723 (1937)	d RP1005	5¢
Calibration of testing machines under dynamic loading. B.L.Wilson and C.Johnson. J. Research NBS 19, 41 (1937)	RP1009	OP
Graphical computations of stresses from strain data. A.H.Stang and M.Green-span. J. Research NBS <u>19</u> , 437 (1937)	RP1034	10¢
The "pack" method for compressive tests of thin specimens of materials used in thin wall structures. C.S.Aitchison and L.B. Tuckerman. NACA Tech. Reports 25 (1939)	- TR649	10¢
The significance of tests. W.E.Emley and L.B. Tuckerman. Am. Soc. Testing Materials (Philadelphia 3, Pa.) Bul. No. 99 (1939)		
Extension of pack method for compressive tests. C.S.Aitchison. NACA Tech. Note 789 (1940)	TN789	

<u>Title</u>	Series	<u>Price</u>
Symposium on the significance of the tension test. W.R.Osgood. Discussion. Proc. Am. Soc. Testing Materials (Philadelphia 3, F40, 583, (1940)	Pa.)	
Effect of aging on mechanical properties of aluminum-alloy rivets. F.C.Roop. NACA Tech. Report 724 (1941)	TR724	15¢
Note on plane strain. W.R.Osgood. J. Applied Mechanics (New York 18, N.Y.) 9, A-26 (1942)		
Proposed method of verification and classification of strainometers. B.L.Wilson. Am. Soc. Testing Materials. (Philadelphia 3, Pa.) Bul. No. 117, 83 (1942)		
A portable calibrator for dynamic strain gages. A. E.McPherson. NACA Tech. Note 887 (1943)	TN887	
Adaptor for measuring principal strains with Tuckerman Strain Gage. A.E. McPherson. NACA Tech. Note 898 (1943)	TN898	
Dead-weight machines of 111,000-and 10,100- pound capacities. B.L.Wilson, D.R. Tate and G.Borkowski. Circular 446, June (1943)	C446	5¢
A subpress for compressive tests. C.S. Aitchison and J.A.Miller. NACA Tech. Note 912 (1943)	TN912	
Guides for preventing buckling in axial fatigue tests of thin sheet-metal specimens. W.C.Brueggeman, and M. Mayer, Jr. WACA Tech. Note 931 (1944)	TN931	
Characteristics of the Tuckerman strain gage. B.L.Wilson. Proc. Am. Soc. Testing Materials (Philadelphia 3, Pa.) 44, 1017 (1944)		

Title	Series	Price
Performance tests of wire strain gages I - calibration factors in tension. W. R. Campbell. NACA Tech. Note 954 (1944)	_ TN954	
A comparison of microhardness indentation tests. D.R.Tate. Trans. Am. Soc. for Metals (Cleveland 3, Ohio) 35, 374 (1945)		
A transfer strain gage for large strains. M.Greenspan and L.R.Sweetman. J. Res. NBS 34, No. 6, 595 (1945)	RP1658	5¢
Performance tests of wire strain gages II - calibration factors in compression. W.R.Campbell. NACA Tech. Note 978 (1945)	TN978	
Performance tests of wire strain gages III - calibrations at high tensile strains. W.R.Campbell. NACA.Toch. Note 997 (1945)	TN997	
Errors in indicated strain for a typical wire strain gage caused by prestraining, temperature changes, and weathering. W.R.Campbell. WACA Tech. Note 1011 (1946)	TN1011	
A fixture for compressive tests of thin sheet metal between lubricated steel guides. J.A.Miller, MACA Tech. Note 1022 (1946)	TN1022	
Specification for Knoon Indenters. Letter Circular LC819, (1946)	LC819	
Performance tests of wire strain gages IV - axial and transverse sensitivities. W.R.Campbell. HACA Tech. Note 1042 (1946)	TN1042	
Proving rings for calibrating testing machines. B.L.Wilson, D.R.Tate and G.Borkowski. Circular 454, (1946)	C454	10¢
Temperature coefficients for proving rings. B.L.Wilson, D.R.Tate and G.Borkowski. J. Research NBS 37, No. 1, 1 (1946)	RP1726	10¢
Vacuum-tube acceleration pickum. W.Ramberg. J. Research NBS 37, No. 6, 391 (1946)	RP1754	15¢