A guide to the Howard W. Emmons Papers

Worcester Polytechnic Institute

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ABSTRACT

Howard Emmons, a professor of Mechanical Engineering at Harvard University for forty years, was a leader in fire research and fire safety science in the second half of the 20th Century. This collection includes his papers and reports, including reports of the Home Fire Project, and papers and reports by others in the fire safety science field.

BIOGRAPHICAL SKETCH

Howard W. Emmons was born in Morristown, N.J. Aug. 30, 1912. He received Master of Engineering and Master of Science Degrees from Stevens Institute of Technology, in 1933 and 1935 respectively. He received his Doctor of Science degree from Harvard University in 1938. After two years at Westinghouse Electric and one at the University of Pennsylvania as Associate Professor, Emmons came to Harvard University in 1940. He became Gordon McKay Professor of Mechanical Engineering there in 1949, and in 1966 became Abbott and James Lawrence Professor of Engineering. He retired from Harvard in 1983.

Professor Emmons was married and had three children. He lived in Sudbury, MA for many years, and was chairman of the Lincoln-Sudbury School Committee (1954-1968) and a town selectman (1969-1972).

Emmons' focus throughout his career was on fire safety science, and he was on the leading edge in this field. He re-created furnished rooms in his laboratory and observed them burning. He developed mathematical models for predicting fire spread, and later the Harvard Computer Fire Code.

He chaired the National Academy of Science's Committee on Fire Research, and helped bring about the passage of the National Fire Research and Safety Act of 1968. He chaired and participated in many other boards and committees related to fire safety.

With grants from the National Science Foundation, and working with Factory Mutual Research and Engineering Corp., Emmons directed Harvard's Home Fire Project.

After Howard Emmons' retirement from Harvard, he continued to work in the Fire Safety Science field, serving on committees and as a consultant, and continuing his work on the Home Fire Project.

Howard Emmons received many awards and honors, including being named "man of the year" by the Society of Fire Protection Engineers. In 1983, the Center for Fire Research honored him at its annual conference, calling him "Mr. Fire Research."

He supported the Fire Safety Science program at Worcester Polytechnic Institute, and WPI has an annual Howard W. Emmons Distinguished Lecture, and also gives the Howard Wilson Emmons Distinguished Scholar Award.

SCOPE AND CONTENT

There are materials in this collection from 1931 to 1998. The bulk of the collection is from the 1960s through 1980s. The largest part of the collection is Howard Emmons' own work, including his notes, notebooks and handbooks; many papers and reports he wrote; the Harvard Home Fire Project which he
directed and wrote many papers for; presentations and consultations he did; and committees he chaired and served on.

A large part of the collection is also made up of papers and reports on fire safety science written by other people. Emmons had organized many of these papers, including some of his own, by subject categories. These categories are maintained in the collection; there may be other papers which fit these categories which will be found elsewhere. The categories are: Fire Modeling, Test Methods, Radiation, Mass Fire, Pyrolysis, Sprinklers, and Extinguishants and Retardants.

Also part of the collection are photographs and slides; films related to the Home Fire Project; computer manuals, print-outs, and disks; and files of legal cases Howard Emmons worked on as a consultant.

Series I: Biographical Materials

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### Series V: Papers and Reports by Howard W. Emmons

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<td>Paper - &quot;Effect of Variable Viscosity on Boundary Layers, with a Discussion of Drag Measurements&quot;</td>
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"Flow of a Compressible Fluid past a Symmetrical Airfoil in a Wind Tunnel & in Free Air"

Box 3 Folder 10 c. 1946 Paper - "The Present Status of Axial Flow Compressor Design"

by Emmons & George Ball

Box 3 Folder 11 1947 Publication - Gas Dynamics Tables for Air

Box 3 Folder 12 9/1/1949 Technical Memorandum - "Transient Aerodynamic Heating"

Box 3 Folder 13 12/1949 Report - "Thermal Flame Propagation"

by Emmons, Harr & Strong

Box 3 Folder 14 6/1950 Paper - "Note on Aerodynamic Heating"

Box 3 Folder 15 6/1950 Paper - "The Laminar-Turbulent Transition in a Boundary Layer - Part I"

Box 3 Folder 16 c. 1951 G. I. Taylor's Chapter for Princeton Series - "Solid & Liquid Explosives"

with Emmons' and others' notes and equations

Box 3 Folder 17 1950s G. I. Taylor - "Taylor's original stuff" [this was title of envelope]

Box 3 Folder 18 1950s G. I. Taylor - Emmons' figures and tables

Box 3 Folder 19 1950s Papers on Detonation - with G. I. Taylor materials

see also photos at end of collection

Box 4 Folder 1 1951-1953 Reports and Papers

"Flow Instabilities in Compressor Rows" & "Compressor Surge & Stall Propagation" and related materials

Box 4 Folder 2 1951-1953 Paper - "Discontinuity Properties of Flames & the Measurement of Flame Speeds"

by R. A. Gross & H. W. Emmons [1 page]

Box 4 Folder 3 1953 Paper - "Compressor Surge & Stall Propagation"

by H. W. Emmons, C. E. Pearson & H. P. Grant

Box 4 Folder 4 4/1953 Paper - "The Film Combustion of Liquid Fuel"

Box 4 Folder 5 11/1953 Report - "Tabulation of the Blasius Function with Blowing & Suction"

by H. W. Emmons & D. Leigh

Box 4 Folder 6 6/1954 Paper - "Shear Flow Turbulence"

Box 4 Folder 7 7/1954 Paper - "The non-steady aerodynamic heating of a plate"

Box 4 Folder 8 11/1954 Paper - "Amplification of Waves on Thin Liquid Film"

Box 4 Folder 9 4/1955 Paper - "Dimensional Analysis of Air Knife Film Coating Machine Operation"

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Box 4 Folder 11 1/1956 Paper - "The film Combustion of Liquid Fuel"
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  by F. Gravalos, I. Edelfelt & H. Emmons
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  by H. W. Emmons, R. E. Kronauer & J. A. Rockett
Box 4 Folder 16 5/1959  Paper - “Taylor instability of finite surface waves”  
  by H. W. Emmons, C. T. Chang & B. C. Watson
Box 4 Folder 17 11/1959  Paper - “The Stability of Luminar Flames”  
  by R. E. Petersen & H. W. Emmons
Box 4 Folder 18 1/1960  Paper - “ Natural Convection Above Fires”  
  by M. P. Murgai & H. W. Emmons
Box 4 Folder 20 4/1961  Paper - “A study of natural convection above a line fire”  
  by Shao-Lin Lee & H. W. Emmons
  2 copies
Box 4 Folder 22 2/1962  Paper - “Poiseuille Plasma Experiment”  
  by H. W. Emmons & R. I. Land
Box 4 Folder 23 1962  Article - “Recent Developments in Plasma Heat Transfer”  
  2 copies
Box 4 Folder 24 1963  Paper - “Plasma Heat Transfer”
Box 4 Folder 25 1/17/1963  Paper - “Can the Scientist Help the Fire Protection Engineer?”
Box 5 Folder 1 n.d.,  Paper - “Fire Storms and Conflagrations associated with Nuclear Weapon Attack”
Box 5 Folder 2 1964  Paper - “Experiments on high pressure plasmas”  
  2 copies
Box 5 Folder 3 2/1964  Report - “The Theory of AC Characteristics of a DC Arc”  
  by H.W. Emmons & K. Gopalakrishna
Box 5 Folder 4 1965  Paper - “Magnetohydrodynamics”  
  2 copies
Box 5 Folder 5 1965  Paper - “Fundamental Problems of the Free Burning Fire”
Box 5 Folder 6 8/1965  Paper - “Fire Development Theory - An Overview”  
  2 copies
Box 5 Folder 7 12/1965  Paper - “The Continuum Properties of Fiber Suspensions”  
  3 copies
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Box 5  Folder 9  1965-1982  Appendix of Harvard Reports
Box 5  Folder 11  1967  Paper - “The Fire Whirl”
                           by Howard W. Emmons & Shuh-Jing Ying [2 copies]
                           2 copies
Box 5  Folder 14  5/1967  Paper - “Fire Research Abroad”
                           2 copies
Box 5  Folder 15  12/1969  Paper - “Investigation of Helium Arcs at 10 atm Pressure”
                           by C. C. Hwang & Howard W. Emmons [2 copies]
Box 5  Folder 16  1970  Paper - “Critique of Numerical Modeling of Fluid Mechanics Phenomena”
Box 5  Folder 17  7/1970  Paper - “Ignition in a Boundary Layer”
                           plus draft and notes
Box 5  Folder 19  8/1970  Paper - “Fire Spread in Paper Arrays”
                           by Howard W. Emmons & Tom Shen [2 copies]
Box 5  Folder 20  1972  Paper - “The Drying of Porous Media”
                           by Kun Min & Howard W. Emmons [2 copies]
Box 5  Folder 21  1972  Notes -- Calculations for Water Evaporation
                           Volume Contraction on Cooling Hot Gas by water evaporation/rate constants for evaporating water
Box 5  Folder 22  8/15/1974  Paper - “Transpiration Drying of Porous Hygroscopic Materials”
                           by Phani P. K. Raj & Howard W. Emmons
Box 5  Folder 23  1/1975  Abstract - “The Detonation of Methane-Air Mixtures”
Box 5  Folder 24  1975  Drafts of Paper - “On the Burning of a Large Flammable Vapor Cloud”
                           by Emmons & Raj
Box 6  Folder 1  Summer 1975  Paper - “Layering of Fire Gases”
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Box 6  Folder 2  1975  Drafts/other articles - re. paper by Emmons & Raj
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                           by J. Prahl & H. W. Emmons [2 copies]
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                           by Howard W. Emmons & P. K. Raj

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Box 6 Folder 5 1976 Paper - "Combustion of Wood Charcoal"

by D. D. Evans & H. W. Emmons [2 copies]

Box 6 Folder 6 8/12/1976 Report - "The Modeling of Fires"

Home Fire Project Report #18


Box 6 Folder 8 n.d., c. 1978 Paper - "Fire"

Box 6 Folder 9 n.d. Paper & Notes - "The Analysis of a Tragedy"

Beverly Hills Supper Club

Box 6 Folder 10 10/1980 Paper - "Diffusion Flame Data & Interpretation for Burning in Hot Vitiated Air"

Box 6 Folder 11 1980 Paper - "The Growth of Fire Science"

2 copies

Box 6 Folder 12 c. 1980 Paper - "The Parts of a Building Fire" - draft

Box 6 Folder 13 1980 Paper - "Scientific Progress on Fire"

Box 6 Folder 14 n.d., c. 1980 Report

"Note on the temperature of the surface of an object heated by heat flux & cooled by convection and radiation"

Box 6 Folder 15 n.d., c. 1980s Notes - Characteristics and Function of Variables

Box 6 Folder 16 1981 Paper - "The Calculation of a Fire in a Large Building"

Box 6 Folder 17 1981 Paper - "Spontaneous Ignition of Styrene-Butadiene Rubber"

2 copies

Box 6 Folder 18 12/1981 Papers - "Code Models"

flow through vent/heating of thick & thin targets - 4 short Papers

Box 6 Folder 19 1982 Report - "The Ignition & Burning of Hot Layer Gases"

Home Fire Project No. 51 [2 copies & notes]

Box 6 Folder 20 3/1982 Paper - "The Computer Fire Codes & Required New Data"

Box 6 Folder 21 8/20/1982 Manuscript - "Fire Detectors for Public Fire Safety"

Box 7 Folder 1 12/1982 Paper - "The Science of Wood Combustion"

by Howard W. Emmons & Arvind Atreya [2 copies]

Box 7 Folder 2 1982 & 1983 Correspondence - with John Lyons, National Bureau of Standards & Comtex Science Corp.

re. electronic version of "The Two Layer Fire Model"

Box 7 Folder 3 1983 Paper - "The Further History of Fire Science"

Box 7 Folder 4 8/30/1983 Paper & Calculations - "Fire Growth at the MGM"

Box 7 Folder 5 1984-1992 Calculations - MGM Fire

Box 7 Folder 6 1984 Paper - "The Further History of Fire Science"
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| Box 7 | Folder 10 | c. 1987 | Paper - "Experiments with a Fire Math Model" |
| Box 7 | Folder 11 | c. 1987 | Formulation - "Application of fractional Effective Dose Model to Smoke from Materials" for Gordon Hartzell’s paper |
| Box 7 | Folder 12 | 1987 | Paper - "Wood Ignition and Pyrolysis" by Arvind Atreya & Howard W. Emmons |
| Box 7 | Folder 13 | 1987 | "Why Fire Model? The MGM Fire & Toxicity Testing" |
| Box 7 | Folder 15 | 1988 | Paper - "Phenomena of a Comprehensive Fire Model" -2nd draft |
| Box 8 | Folder 1 | c. 1989 | Paper - "Progress in Fire Modeling" |
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<td>Consultation - &quot;Prediction of Fire in Buildings&quot; for FMRC grant to National Bureau of Standards</td>
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## Series IX: Home Fire Project

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<td>Notes - Home Fire Project - Full Scale Fire Test by Howard W. Emmons</td>
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<td>Technical Reports - Numbers 1-10</td>
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<td>1: &quot;Natural Convection Flow through an Opening&quot; by Howard W. Emmons - 12/1973</td>
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<td>2: &quot;The Value Destruction of a Home by Fire&quot; by Neville Fowkes &amp; Richard Land - 1/1975</td>
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<td>3: &quot;Dynamics of Pyrolysis of Cellulosic Materials&quot; by Kun Min -- 2/1975</td>
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<td>5: &quot;Fire Spread in Paper Arrays&quot; by Howard W. Emmons &amp; Tom Shen - 1970</td>
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<td>5A: &quot;The Fire Whirl: Theory and Experiment&quot; by Robert Mayle -- 2/1973</td>
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<td>6: &quot;A Theoretical and Experimental Study of Nonpropagating Free-Burning Fires&quot; by James A. Block, n.d.</td>
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<td>7: &quot;Fluid Mechanics and Combustion&quot; by Howard W. Emmons -- 1970</td>
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<td>8: &quot;The Drying of Porous Media&quot; by Kun Min &amp; Howard W. Emmons -- 1972</td>
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<td>9: &quot;Heat Transfer in Fire&quot; by H. W. Emmons -- 5/1973</td>
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<td>10: &quot;Thermal Degradation and Spontaneous Ignition of Paper Sheets in Air by Irradiation&quot; by Ubbayakar K. Shivadev &amp; Howard W. Emmons -- 1974</td>
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<td>12: &quot;Fire Induced Flow Through an Opening&quot; by J. Prahl &amp; H. W. Emmons - 1975</td>
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<td>14: &quot;Density of Wood Charcoal&quot; by D. D. Evans - c. 1975</td>
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<td>16: &quot;Flow through the Doorway&quot; by Lloyd N. Trefethen - 3/1976</td>
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<td>17: &quot;Layering of Fire Gases&quot; by J. Backovsky &amp; H. W. Emmons - Summer 1975</td>
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<td>Committee on Fire Research - &quot;A Proposed Fire Research Program&quot;</td>
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<td>Committee on Fire Research - &quot;A Study of Fire Problems&quot; - Woods Hole</td>
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<td>Committee on Fire Research - &quot;Study Results - A Study of Fire Problems - Woods Hole Study&quot;</td>
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<td>Committee on Fire Research - Final Report - &quot;A Study of Fire Problems&quot;</td>
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<td>Box 17</td>
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<td>Committee on Fire Research - Comments on Study of Fire Problems Conference at Woods Hole</td>
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<td>Box 17</td>
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<td>Committee on Fire Research - Final Report 1959-1962</td>
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<td>Committee on Fire Research - Report written by H. W. Emmons</td>
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<td>Committee on Fire Research - Symposium on Needs of the Fire Services</td>
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<td>Committee on Fire Research - &quot;Events Leading Up to Present in Fire Research&quot;</td>
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<td>Committee on Fire Research - &quot;Some Observations on the Education of Firefighters&quot; by Howard Emmons</td>
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<td>Space Science &amp; Technology Panel - Correspondence</td>
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<td>Box 17</td>
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<td>1/22/1968</td>
<td>Space Science &amp; Technology Panel - &quot;A Proposal for Planetary Engineering&quot; by Howard Emmons</td>
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<td>Space Science &amp; Technology Panel - &quot;Statement on Space Program&quot; by Howard Emmons</td>
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<td>Space Task Group Report to the President -- &quot;Post-Apollo Space Program: Directions for the Future&quot;</td>
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<td>President's Science Advisory Committee - &quot;The Next Decade in Space&quot;</td>
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<td>Box 17</td>
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<td>8/30/1972</td>
<td>National Academy of Sciences Ad Hoc Fire Panel Report</td>
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<td>Box 18</td>
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<td>Massachusetts Commission on Nuclear Safety</td>
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<td>Box 18</td>
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<td>1970s</td>
<td>Committee on Fire &amp; Smoke Resistant Materials for Commercial Aircraft Interiors</td>
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**Series IX: Committees Howard W Emmons served on**

*MS 06_0009*  
*Personal Papers*

for National Bureau of Standards [Howard Emmons Chair]

*Aircraft: Civil & Military - Fire Safety Aspects of Polymeric Materials*
<table>
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<th>Box 18 Folder 3</th>
<th>9/1990</th>
<th>Committee on Fire &amp; Smoke Resistant Materials for Commercial Aircraft Interiors</th>
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<td>Aircraft Material Fire Test Handbook, FAA</td>
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<td>Committee on Fire &amp; Smoke Resistant Materials for Commercial Aircraft Interiors</td>
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<tr>
<td>&quot;FAA Fire Safety Mission&quot; by Thomas E. McSweeney [2 copies]</td>
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<td>1991-1995</td>
<td>Committee on Fire &amp; Smoke Resistant Materials for Commercial Aircraft Interiors</td>
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<td>National Research Council/National Academy of Sciences - Guidelines</td>
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<td>&quot;Fire and Smoke Resistant Materials: Improving Aircraft Safety&quot; [draft]</td>
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<td>Final Publication: Fire &amp; Smoke-Resistant Interior Materials for Commercial Transport Aircraft</td>
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<td>1981-1985</td>
<td>Ad Hoc Mathematical Fire Modeling Group</td>
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<td>1988</td>
<td>Massachusetts Governor's Commission on Fire Safety, Combustion, Toxicity &amp; Combustibility</td>
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<td>Fire Technology - Editorial Review Board</td>
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<td>Fire Safety Board of Advisors/WPI Firesafety Studies</td>
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<td>Correspondence/papers re. WPI's Fire Protection Engineering Program</td>
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<td>Box 21 Folder 1</td>
<td>1946-1949</td>
<td>American Physical Society - Committee on Fluid Dynamics</td>
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<td>Howard W. Emmons was first Secretary/Treasurer - Early records</td>
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Box 21 Folder 4 1980-1990 Combustion Institute

Box 21 Folder 5 1971-1978 American Society of Mechanical Engineers

Correspondence & honoring Howard W. Emmons

Box 21 Folder 6 4/1976 UJNI (United States/Japan Cooperative Program on Natural Resources) Panel on Fire Research & Safety

First Joint Meeting - Minutes

Box 21 Folder 7 4/7-8/1976 UJNI Panel on Fire Research & Safety

First Joint Meeting - Research Programs & Fire Research Facilities

Box 21 Folder 8 n.d., probably 4/1976 UJNI Panel on Fire Research & Safety

Probably First Joint Meeting - Smoke Control

Box 21 Folder 9 n.d., probably 4/1976 UJNI Panel on Fire Research & Safety

Probably First Joint Meeting - Fire Protection & Detection

Box 21 Folder 10 10/19-22/1976 UJNI Panel on Fire Research & Safety

2nd Joint Meeting - Theme: Human Behavior

Box 22 Folder 1 10/1976 UJNI Panel on Fire Research & Safety

2nd Joint Meeting - General Reports

Box 22 Folder 2 10/1976 UJNI Panel on Fire Research & Safety

2nd Joint Meeting - Theme: Toxicity

Box 22 Folder 3 10/1976 UJNI Panel on Fire Research & Safety

2nd Joint Meeting - Theme: Smoke Control

Box 22 Folder 4 10/1976 UJNI Panel on Fire Research & Safety

2nd Joint Meeting - Theme: Modeling of Fire

Box 22 Folder 5 10/1976 UJNI Panel on Fire Research & Safety

2nd Joint Meeting - Theme: Building Systems

Box 22 Folder 6 10/1976 UJNI Panel on Fire Research & Safety

2nd Joint Meeting - Theme: Fire Detection & Smoke Properties

Box 22 Folder 7 3/13-17/1978 UJNI Panel on Fire Research & Safety

3rd Joint Meeting - Theme: Human Behavior in Fires

Box 22 Folder 8 3/1978 UJNI Panel on Fire Research & Safety

3rd Joint Meeting - Theme: Building Systems

Box 23 Folder 1 3/1978 UJNI Panel on Fire Research & Safety

3rd Joint Meeting - Theme: Smoke Properties & Detection

Box 23 Folder 2 3/1978 UJNI Panel on Fire Research & Safety

3rd Joint Meeting - Theme: Fire Modeling

Box 23 Folder 3 3/1978 UJNI Panel on Fire Research & Safety

3rd Joint Meeting - Theme: Toxicity
Box 23 Folder 4 2/5-9/1979 UJNR Panel on Fire Research & Safety
   4th Joint Meeting - Resolutions
Box 23 Folder 5 2/1979 UJNR Panel on Fire Research & Safety
   4th Joint Meeting - Theme: Building Systems & Smoke Control
Box 23 Folder 6 2/1979 UJNR Panel on Fire Research & Safety
   4th Joint Meeting - Theme: Fire & Smoke Retardants
Box 23 Folder 7 2/1979 UJNR Panel on Fire Research & Safety
   4th Joint Meeting - Theme: Human Behavior
Box 23 Folder 8 2/1979 UJNR Panel on Fire Research & Safety
   4th Joint Meeting - Theme: Fire Investigation Technique

Box 24 Folder 1 2/1979 UJNR Panel on Fire Research & Safety
   4th Joint Meeting - Theme: Toxicity of Fire Gas
Box 24 Folder 2 2/1979 UJNR Panel on Fire Research & Safety
   4th Joint Meeting - Theme: Fire Modeling
Box 24 Folder 3 2/1979 UJNR Panel on Fire Research & Safety
   4th Joint Meeting - Theme: Fire Detection and Smoke Properties
   5th Joint Meeting
Box 24 Folder 5 5/10-14/1982 UJNR Panel on Fire Research & Safety
   6th Joint Meeting - Resolutions & General Information
Box 24 Folder 6 5/1982 UJNR Panel on Fire Research & Safety
   6th Joint Meeting - Theme: Fire Investigation Techniques
Box 24 Folder 7 5/1982 UJNR Panel on Fire Research & Safety
   6th Joint Meeting - Theme: Sprinklers
Box 24 Folder 8 5/1982 UJNR Panel on Fire Research & Safety
   6th Joint Meeting - Theme: Fire Detection
Box 24 Folder 9 5/1982 UJNR Panel on Fire Research & Safety
   6th Joint Meeting - Theme: Fire & Smoke Retardants
Box 24 Folder 10 5/1982 UJNR Panel on Fire Research & Safety
   6th Joint Meeting - Theme: Toxicity
Box 24 Folder 11 5/1982 UJNR Panel on Fire Research & Safety
   6th Joint Meeting - Theme: Building Systems & Smoke Control
Box 24 Folder 12 5/1982 UJNR Panel on Fire Research & Safety
   6th Joint Meeting - Theme: Human Behavior
Box 25 Folder 1 5/1982 UJNR Panel on Fire Research & Safety
   6th Joint Meeting - Theme: Modeling of Fire [includes Emmons' paper "The Computer Fire Codes and Required New Data"]

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Box 25  Folder 2  10/1983  UJNR Panel on Fire Research & Safety  
7th Joint Meeting

Box 25  Folder 3  c. 1983  UJNR Panel on Fire Research & Safety  
probably 7th Joint Meeting - "An Example of Human Behavior in a Hotel Fire" by Soichiro Okishio, Takashi Handa & Kano Kawagoe

Box 25  Folder 4  c. 1983  UJNR Panel on Fire Research & Safety  
probably 7th Joint Meeting - "Analysis of the Fire Protection Cost Index" by H. Nakamura & Y. Yashiro

Box 25  Folder 5  c. 1983  UJNR Panel on Fire Research & Safety  
probably 7th Joint Meeting - "The Models to be developed in Fire Safety Design Project" by Takeyashi Tanaka

Box 25  Folder 6  10/1983  UJNR Panel on Fire Research & Safety  
7th Joint Meeting - "Fire Spread Research in the U.S." - report by Howard W. Emmons

Box 25  Folder 7  10/1983  UJNR Panel on Fire Research & Safety  
7th Joint Meeting - Theme: Materials Fire Properties & Test Methods

Box 25  Folder 8  10/1983  UJNR Panel on Fire Research & Safety  
7th Joint Meeting - Theme: Measurement Methods

Box 25  Folder 9  10/1983  UJNR Panel on Fire Research & Safety  
7th Joint Meeting - Theme: Combustion Toxicity

Box 25  Folder 10  10/1983  UJNR Panel on Fire Research & Safety  
7th Joint Meeting - Theme: Fire Hazard/Risk Management Methods

Box 25  Folder 11  5/4-8/1987  UJNR Panel on Fire Research & Safety  
9th Joint Meeting

Box 26  Folder 1  6/9-10/1988  UJNR Panel on Fire Research & Safety  
10th Joint Meeting

Box 26  Folder 2  10/19-24/1989  UJNR Panel on Fire Research & Safety  
11th Joint Meeting - Papers, program, correspondence

Box 26  Folder 3  10/27-11/2/1992  UJNR Panel on Fire Research & Safety  
12th Joint Meeting

Box 26  Folder 4  1996  UJNR Panel on Fire Research & Safety  
13th Joint Meeting - 2 papers

14th Joint Meeting

Box 26  Folder 6  1998  UJNR Panel on Fire Research & Safety  
14th Joint Meeting - papers

Box 26  Folder 7  1998  UJNR Panel on Fire Research & Safety  
14th Joint Meeting - papers
### Series X: Conferences, Symposiums, Workshops

Howard W. Emmons participated

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<td>Symposium on Combustion - Abstracts of contributed papers&lt;br&gt;<strong>Tianjin, China</strong></td>
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<td>Fourth CB Workshop on Fire Modeling&lt;br&gt;<strong>NIST - program</strong></td>
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<td>Box 27</td>
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<td>Papers - for Special Conference&lt;br&gt;&quot;Recent Advances in Flame Retardancy of Polymeric Materials&quot;</td>
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| Box 27    | Folder 4 | 1/16/1991 | Abstract - "Strategies for Performance Codes in the U.S."
  *by H. W. Emmons, and related Materials for Conference on Firesafety Design in the 21st Century*
| Box 27    | Folder 5 | 10/1993   | Papers - Annual Conference on Fire Research - National Institute of Standards & Technology |
| Box 27    | Folder 6 | 10/7-9/1993 | '93 Asian Fire Seminar                                      |
| Box 27    | Folder 7 | 5/1996   | 7th Annual BCC (Business Communications Company) Conference on Flame Retardancy |
| Box 27    | Folder 8 | 6/20-21/1996 | Technical Symposium: Computer Applications in Fire Protection Engineering<br>**Society of Fire Protection Engineers & WPI Center for Fire Safety Studies** |
| Box 27    | Folder 9 | 3/1997   | Fifth International Symposium on Fire Safety Science                  |
| Box 27    | Folder 10| 11/11-14/1997 | International Conference on Fire Research for Fire Investigation |

### Series XI: Papers and reports on Fire Modeling

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| Box 28    | Folder 1 | 1930s | Paper - "Wind Pressure on a model of the Empire State Building"
  *by Hugh L. Dryden & George C. Hill*
  *and Emmons' notes on Wind Flows*
  *Folder labeled "DuPont Plaza"* |
| Box 28    | Folder 2 | 2/1961 | Report - "A Mathematical Study of the Mechanism of Wood Burning"
  *by William Squire & Connie Foster* |
| Box 28    | Folder 3 | 1969 | Paper - "Thermal Ignition in Two-Component Systems, Theoretical Model"
  *by P. C. Bowes* |
| Box 28    | Folder 4 | 8/1971 | Report - "Modeling the Dynamic Behavior of Building Fires"
  *by Billy T. Lee* |

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Box 28 Folder 5  c. 1972 Paper - "Modeling Fires" by Patrick J. Pagni

Box 28 Folder 6  1973 Paper - "Consideration of Fire Development in an Enclosed Space"

  by Marian Visich, Jr.

Box 28 Folder 7  1973 Paper - "Modeling Techniques for Prediction of Fires"

  by J. De Ris

Box 28 Folder 8  c. 1959-1974 Papers - by G. I. Taylor, H. C. Hottel & P. H. Thomas, and extensive notes by H. W. Emmons

  includes Emmons' published questions in Thomas paper

Box 28 Folder 9  1975 Paper - "Model of the Developing Fire in a Compartment"

  by Edwin E. Smith & Michael H. Clark, with comments by H. W. Emmons


  by C. T. Crowe, M. P. Sharma, D. E. Stock

Box 28 Folder 11  6/1977 Graphs - "Curves by Fire Code IV - Composition - notes of Howard W. Emmons

Box 28 Folder 12  8/1977 Report - "Computer Simulation of Full Scale Room Fire Experiments"

  IITRI Report - Prepared by Ronald Pape


  Home Fire Project Tech. Report No. 25

  by H. W. Emmons, H. E. Mitler & L. N. Trefethen


  by E. N. Tangren, W. S. Sargent & E. E. Zakoski

Box 28 Folder 15  7/15/1978 Report by V. K. Liu & K. T. Yang

  "UNSAFE-II - A Computer Code for Buoyant Turbulent Flow in an Enclosure with Thermal Radiation"

Box 28 Folder 16  1978 Paper - "The Status of Fire Modeling in the United States"


Box 28 Folder 17  1978 Paper - "A Theoretical Model for the Upward Laminar Spread of Flames over vertical fuel surfaces"

  by A. C. Fernandez-Pello

Box 28 Folder 18  1978 Report - "HSLAB - An Interactive Program for One-dimensional Heat Flow Problems"

  by Leif Abrahamsson, Bengt Haggland, Krister Jazon, Stockholm

Box 28 Folder 19  1980-1985 Papers by Robert Brady Williamson - fire modeling/wood char/concrete & mortars

  these were all together in Emmons' papers

Box 29 Folder 1  c. early 1980s Paper - "Some Analysis of the FAA Post Crash Fire Scenario"

  by James Quintiere & T. Tanaka [2 copies]

Box 29 Folder 2  1981 Paper - "Models for Cryogenic Liquid Spill Behavior on Land & Water"

  by Phani K. Raj

Box 29 Folder 3  5/1981 Paper by B. J. McCaffery, J. G. Quintiere & M. F. Harkleroad

  "Estimating Room Temperatures and the Likelihood of Flashover using Fire Test Data Correlations"
| Box 29 Folder 4 | 7/1981 | Paper - "Stochastic Modelling of Fire Growth"
by Dr. G. Ramachandran |
| Box 29 Folder 5 | 7/1981 | Report - "Fire Spread Analysis of Buildings"
by D. G. Elms & A. H. Buchanan, Building Research Assoc. of New Zealand |
| Box 29 Folder 6 | 7/1981 | Report - "Survey of Fire Modeling Efforts with Application to Transportation Vehicles"
by William T. Hathaway |
| Box 29 Folder 7 | 7/1981 | Tests & Data - "Experimental Enclosure Fires for Enclosure Fire Model Validation"
by Lawrence Livermore Lab et. al. |
| Box 29 Folder 8 | 8/1981 | "Modeling of the NBS Mattress Tests with the Harvard Fire Code"
by John A. Rocket |
by H. E. Mitler & H. W. Emmons |
| Box 29 Folder 10 | 10/1981 | Report - "A Computational Model for Subsonic Compressible Flow in Diffusers"
by R. E. Childs, J. H. Ferziger & S. J. Kline |
by Leonard Y. Cooper |
| Box 29 Folder 12 | 6/18/1982 | Paper - "Numerical Modeling of One-Dimensional Enclosed Homogeneous & Heterogeneous Deflagrations"
by Leonard Y. Cooper |
by Leonard Y. Cooper |
| Box 29 Folder 14 | 12/1982 | Thesis - "Mathematical Model of a Ventilation Controlled Compartment Fire"
by James M. Sauer |
by Walter W. Jones |
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| Box 29 Folder 17 | 6/1983 | Paper - "A Simple Correlation for Predicting Temperature in a Room Fire"
by James Quintiere |
| Box 29 Folder 18 | 8/1983 | Report - "A Model of a Multiroom Fire Spread"
by Takeyoshi Tanaka |
| Box 29 Folder 19 | 9/2/1983 | Paper - "Analysis of the Forced Ventilation in Containership Holds"
by Howard K. Baum & John A. Rockett |
| Box 30 Folder 1 | 12/1983 | Report - "Computer Fire Code VI - Volume 1"
by J. B. Gahm |
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### Series XII: Papers, Reports and Computer Software

**Guides on Fire Modeling**

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<td>Paper - &quot;Refinement of a Multiroom Fire Spread Model&quot;</td>
<td><em>by T. Tanaka &amp; K. Nakamura [2 copies]</em></td>
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<td>Paper - &quot;Heat Transport in Fire Compartment Prediction and Experiment with Small Scale Model&quot;</td>
<td><em>by Tokiyoshi Yamada</em></td>
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<td>Report - &quot;Data Sources for Parameters Used in Predictive Modeling of Fire Growth &amp; Smoke Spread&quot;</td>
<td><em>by Daniel Gross, National Bureau of Standards</em></td>
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Box 31 Folder 5 10/1985 Report - "Comparison of Several Compartment Fire Models: An Interim Report"
   by H. E. Mitler

Box 31 Folder 6 10/3/1985 Computer Program - FAST - Source Code

   by Leonard Y. Cooper, John A. Rockett, Henri E. Mitler & David W. Stroup

Box 31 Folder 8 11/1985 Report by David W. Stroup
   "The Establishment of a Catalog of Compartment Fire Model Algorithms and Associated Computer Subroutines"

Box 31 Folder 9 n.d., c. 1985 Notes - Predicted Flow of Water from a Tube - computations, graphs, etc.
   by Howard W. Emmons

Box 31 Folder 10 n.d. Notes - H. W. Emmons

   "A Physically Based Fire Suppression Computer Simulation for Post-Flashover Compartment Fires"

   by Harold E. Nelson

Box 31 Folder 13 5/1986 Report - "The NBS/Harvard Mark VI Multi-Room Fire Simulation"
   by John A. Rockett & Masahiro Monta

Box 31 Folder 14 8/1986 Paper - "Salt Water Modeling of Fire Induced Flows in Multicompartment Enclosures"
   by K. D. Steckler, H. R. Baum & J. G. Quintiere

   by L. Y. Cooper, J. A. Rockett, H. E. Mitler & D. W. Stroup

Box 31 Folder 16 n.d., c. 1987 Paper - "Predicting Capability of a Multiroom Fire Model"
   by Kazuhito Nakamura

Box 31 Folder 17 9/1986 Guide - "Users' Guide to FIRST, a Comprehensive Single-Room Fire Model"
   by Henri Mitler & John Rockett

Box 31 Folder 18 1987 Paper - "Room Fire Modeling with a Computer-Aided Design Framework"
   by Frederick W. Mowrer & Robert Brady Williamson

Box 31 Folder 19 1987 Paper - "Analyzing Far Field Effects"
   by Howard W. Emmons

Box 31 Folder 20 1987 Paper - "A Summary of the Assumptions and Limitations in Hazard I"
   by Richard W. Bukowski

Box 31 Folder 21 1/1987 Paper by Glenn P. Forney & Leonard Y. Cooper
   Compartment Fire Model Computer Code"

Box 32 Folder 1 8/1987 Report - "A Catalog of Compartment Fire Model Algorithms & Associate Computer Subroutines"
   by David W. Stroup
Box 32 Folder 2  8/1987  Report - WPI Qualifying Project Report - "Monte Carlo Fire Simulation"
by Warren E. Blaisdell - 5/1987


Box 32 Folder 4  7/1987  Guide - "Hazard I - Vol. 2: Representative Example Case Documentation"
by R. W. Bukowski & A. J. Shibe, NBS

Box 32 Folder 5  n.d., c. 7/1987  Guide - "Hazard I - Getting Started"
by Richard W. Bukowski

Box 32 Folder 6  7/1987  Guide - "Hazard I. Vol. 3: Data Base Listing"
by R. W. Bukowski & E. Braun, NBS

Box 33 Folder 1  7/1987  Report - "Comparisons of NBS/Harvard VI Simulations & Full-Scale, Multi-Room Fire Test Data"
by John A. Rockett, Masahiro Morita & Leonard Y. Cooper

Box 33 Folder 2  8/1987  Thesis - WPI Thesis by Douglas K. Beller

Box 33 Folder 3  9/1987  Guide - "Users' Guide to FIRST, a Comprehensive Single-Room Fire Model"
by Henri E. Mitler & John A. Rockett

Box 33 Folder 4  11/1987  Paper - "Computer Model of a Smoldering Cigarette"
by H. E. Mitler & W. D. Davis

by John H. Klote

Box 33 Folder 6  1987 & 1988  Correspondence - re. Hazard 1 Computer Program
H. W. Emmons, Doug Walton, Richard Bukowski

Box 33 Folder 7  c. 1987-1989  Letters - to colleagues re. FIRST program
from H. W. Emmons

Box 33 Folder 8  1988  Paper - "Two-Dimensional Modeling of Flame Propagation in Fuel Stream Arrangements"
by R. H. Rangel & W. A. Sirignano

Box 33 Folder 9  12/1987  Report - "Algorithm for the Mass-Loss Rate of Burning Wall"
by Henri E. Mitler [2 copies]

Box 33 Folder 10  n.d., c. 1988  Paper - "Plume Analysis above Finite Size Fire Sources"
by A. K. Gupta, Surendra Kumar & Bani Singh

Box 33 Folder 11  1988  Paper - "The Fractional Effective Dose Model for Assessment of Toxic Hazards in Fires"
by Gordon E. Hartzell & Howard W. Emmons

Box 33 Folder 12  3/1988  Computer Data - Cathedral Hills Data Summary, University of California Fire Research Laboratory

Box 33 Folder 13  6/6/1988  Memo - re. Radiation Modeling of Large Scale Fires
from J. de Ris, Factory Mutual
Box 33  Folder 14  8/26/1988  Memo - "Compatibility of Tewarson data and FIRST"
from Craig Beyler to H. Emmons, H. Mitler, J. Rockett, J. Barnett, P. Sherman, A. Tewarson

Box 33  Folder 15  9/1988  Evaluation - "Hazard I - Results of a User Evaluation of the Prototype Software"
by T. W. Bukowski, and letter to H. W. Emmons

Box 33  Folder 16  1/1989  Paper - "Counterflow Spray Combustion Modeling"
by G. Continillo & W. Sirignano

Box 33  Folder 17  1989  Paper - "An Evaluation of the Point-Source Approximation in Spray Calculations"
by R. H. Rangel & W. A. Sirignano

Box 33  Folder 18  1989  Papers by Emmons and related materials
"Use of Fire Test Data in Fire Models," "Introduction to the Phenomena of a Comprehensive Fire Model,"
"Comprehensive Building Fire Model"

Box 34  Folder 1  c. 1989  Computer Programs - and related materials - Harvard Mark VI, FIRST

Box 34  Folder 2  5/29/1989  Report - "Using the Harvard/NIST MARK VI Fire Simulation"
by John A. Rockett

Box 34  Folder 3  12/14/1989  Paper - "Modeling the Flow-Assisted Flame Spread along Conveyor Belt Surfaces"
by C. C. Hwang, C. D. Litton, F. J. Perzak & C. P. Lazzara


Box 34  Folder 5  1/1990  Paper - "Fire Hazard Prediction - Hazard I and its role in fire codes and standards"
by Richard W. Bukowski

Box 34  Folder 6  n.d., c. 1990  Paper - "Mathematical Modeling of Enclosure Fires"
by Henri E. Mitler

Box 34  Folder 7  1990  Paper - "Scale Modeling of fires with Emphasis on Room Flashover Phenomenon"
by S. Jolly & K. Saito

Box 34  Folder 8  1990  Paper - "Numerical Modeling of a Vaporizing Multicomponent Droplet"
by C. M. Megardis & W. A. Sirignano

Box 34  Folder 9  7/1990  Paper - "Prediction of a Liquid Jet in a Gaseous Crossflow"
by F. Tsau, S. Eighobashi & W. A. Sirignano

Box 34  Folder 10  8/1990  Report - "Development of the WPI/Harvard Version 2 Computer Fire Model"
[draft] by David B. Satterfield - M. S. Thesis

Box 34  Folder 11  8/1990  Letter & Summary - Consolidated Compartment Fire Model (CCFM.VENTS)

by Leonard Y. Cooper & Glenn P. Forney [plus disk]

by Glenn P. Forney & Leonard Y. Cooper

ed. by Leonard Y. Cooper & Glenn P. Forney
"A Simplified Theory for Generalizing Results from a Radiant Panel Rate of Flame Spread Apparatus"  [final]

Report - "Reduced-Scale Modeling of Mobile-Home Fires: A Progress Report"

"Calculations of the Heat Release Rate by Oxygen Consumption for Various Applications"

"Further Development of a Test Method for the Assessment of the Acute Inhalation Toxicity of Combustion Products"

Correspondence - on Proposed Bench-Scale Material Flammability Test

"A Room Fire Screening Test Procedure"

"New Concepts for Measuring Flame Spread Properties"

"Fire Safety Inspection & Testing of Air Moving Systems"

Series XIV: Papers, Reports and Data on Properties

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Folder 9: Report - "Physico-Chemical & Combustion/Pyrolysis Properties of Polymeric Materials" By A. Tewarson
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Spread Under to Influence of Externally Applied Thermal Radiation

by Bengt Hagglund

c. 1977

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Paper - "The heat radiation from petroleum fires"


1978

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Paper - "Radiation from Burning Hydrocarbon Clouds"

by L. Orloff, A. T. Modak & G. H. Markstein

8/1978

Box 38 Folder 13

Paper - "Radiation from Smoke Layers"

by Giulio Santo & Francesco Taminini, Factory Mutual

12/1979

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Paper - "Influence of oxygen depletion on the radiative properties of PMMA Flames"

by George H. Markstein, Factory Mutual

3/1982

Box 38 Folder 16

Report - "Flame Heights, Flame Radiation & Flame Spread"

by G. H. Markstein & J. de Ris

11/1984

Box 38 Folder 17

Report - "Radiant Emission & Absorption by Laminar Ethylene & Propylene Diffusion Flames"

by Toru Fusegi & Bakhhtier Farouk

1988

Box 38 Folder 18

Paper - "Numerical Study on Interactions of Turbulent Convection & Radiation in Compartment Fires"

no author given

c. 1990

Box 38 Folder 19

Report - "Long-Range Research Plan for Fire Suppression"

by Frederick W. Mowrer & Robert Brady Williamson

1990

Box 38 Folder 20

Report - "Methods to Characterize Heat Release Rate Data"

by M. I. Flik, B. I. Choi, & K. E. Goodson

1991

Box 38 Folder 21

Report - "Heat Transfer Regimes in Microstructures"

1961-1964

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Reports 1, 2, & 3

- 1 & 2 by A. A. Putnam & C. F. Speich

- 3 by I. M. Grinberg & A. A. Putnam

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Personal Papers

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| Box 38    | Folder 24 | 10/19/1967 | Report - "Urban Mass Fire Scaling Considerations" |
|           |         |            | by W. J. Parker                                           |
| Box 39 | Folder 1 | 3/1968 | Report - "Mass Fire Life Hazard"
by A. J. Pryor, F. A. Fear & R. J. Wheeler |
| Box 39 | Folder 2 | 7/10/1968 | Report - "An Experimental Test of Mass Fire Scaling Principles"
by W. J. Parker, R. C. Corlett, B. T. Lee |
| Box 39 | Folder 3 | 1969 | Final Report Vols. 1, 2, 3.
Vol. 1 by Clive Countryman,
Vol. 2 Catalog by Thomas Palmer,
Vol. 3 Appendixes by Theodore Storey & others
Report - "Project Flambeau...An Investigation of Mass Fire" (1964-1967) |
| Box 39 | Folder 4 | 1969 | Report - "Mass Fire Scaling with small electrically heated models"
by B. T. Lee |
| Box 39 | Folder 5 | 2/1970 | Report - "Non-Gray Thermal Radiation from a Flame above a pool of Liquid Natural Gas"
by David C. Wilcox |

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by William s. McEwan & Daniel B. Lovett, U. S. Navy |
| Box 39 | Folder 7 | 1956 & n.d. | Papers - re. textiles and combustibility
Papers - re. textiles and combustibility |
| Box 39 | Folder 8 | 1958/1963 | Report - "Theories of the Combustion of Wood and Its Control"
by F. L. Browne |
| Box 39 | Folder 9 | 7/1959 | Report - "High Temperature Behavior of Teflon"
by Tunis Wentink, Jr. |
| Box 39 | Folder 10 | c. 1962-1971 | Papers - 5 papers re. moisture and/or heat transfer in wood |
| Box 39 | Folder 11 | 1965 | Report - "Some Research Pertaining to the Problem of Predicting the Burning Rate of Cellulosic Fuels"
by P. L. Blackshear, Jr., K. A. Murty & N. Murayama |
| Box 39 | Folder 12 | n.d., c. 1965 | Report by K. Akita & M. Kase
"Determination of Kinetic Parameters for Pyrolysis of Cellulose & Cellulose Treated with Ammonium Phosphate by Differential Thermal Analysis and Thermal Gravimetric Analysis"
| Box 39 | Folder 13 | 1-3/1968 | Papers - 3 Papers from Fluid Dynamic Laboratory by G. Drennan, R. Matula, R. Bright
"Pyrolysis of Tetrafluoroethylene," "Thermal Decomposition of Perfluoropropene" & "Gas Chromatographic Separation of Low Molecular Weight Fluorocarbons"
| Box 39 | Folder 14 | 2/1968 | Paper - "Thermal Decomposition Products of Polyvinyl Chloride"
by Yoshio Touchiya & Kikuo Sumi |
Box 39  Folder 15  4/1968  Paper - "High Temperature Moisture Relations to Grand Fir"
   by M. D. Strickler, & letter from Strickler

Box 39  Folder 16  8/1968  Paper - "Study on Smoke Generation from Building Materials"
   by Fumiharu Saito

   by A. R. Fairbairn

Box 39  Folder 18  1968  Paper - "Thermodestruction & Thermooxidative Destruction of Polyurethanes"
   by O. G. Tarakanov, V. A. Orlov & V. K. Beljakov - U.S.S.R.

Box 40  Folder 1  5/1969  Paper - "Structural Design & Thermal Properties of Polymers"
   by G. F. D’Alelio

Box 40  Folder 2  8/1969  Report - "Pyrolysis Products of Untreated & Flame Retardant Treated a-cellulose & levoglucosan"
   by Frank A. Wodley

Box 40  Folder 3  1969-1971  Reports - re. decomposition of PVC & phenol-formaldehyde resins
   from Fire Research Station, Hertfordshire

Box 40  Folder 4  1970s  Reports - re. Insulating Board
   5 papers

Box 40  Folder 5  1/1970  Paper - "Elevated Temperature Tensile & Creep Properties of Some Structural & Prestressing Steels"
   by T. Z. Harmathy & W. W. Stanzak

Box 40  Folder 6  1970  Papers - 2 papers re. cellulose by A. Broido & M. Weinstein
   "Thermogravimetric Analysis of Ammonia-Swelled Cellulose" & "Pyrolysis-Crystallinity Relationships in Cellulose"

Box 40  Folder 7  1971  Paper - "Influence of Temperature & Time upon Pyrolysis of Untreated & Fire Retardant Treated Wood"
   by K. M. Knudson & R. B. Williamson

Box 40  Folder 8  10/1974  Paper - "Char Yield on Pyrolysis of Cellulose"
   by A. Broido & Maxine A. Nelson

   "Fire hazards of plastics in Furniture & Furnishings: characteristics of the burning" and "...ignition studies"

Box 40  Folder 10  1975 & 1976  Reports & Papers - Flame/Combustion & Excess Pyrolyzate Production by Cellular Plastics
   Fire Research Group, UC Berkeley

Box 40  Folder 11  1975-1979  Reports - re. flammability and plastics for Factory Mutual Research Corp.
   by Archibald Tewarson and others

Box 41  Folder 1  c. 1976  Paper - "Excess Pyrolyzate"
   by P. J. Pagni & T. M. Shih

Box 41  Folder 2  c. 1976  Report - "Flammability Testing of Polymers"
   by A. Marty Kanury, Norman J. Alvares, Stanley B. Martin

Box 41  Folder 3  1977  Paper - "Vapor-phase Thermal Analysis of Pyrolysis Products from Cellulosic Materials"
   by Kun Min

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<td>Box 41</td>
<td>Folder 8</td>
<td>6/1991</td>
<td>Report by Leonard Y. Cooper &quot;Applications of the Generalized Global Equivalence Ratio Model (GGERM) for Predicting the Generation Rate &amp; Distribution of Products of Combustion in Two-Layer Fire Environments - Methane &amp; Hexanes&quot;</td>
</tr>
</tbody>
</table>
Box 44  Folder 1  published 1919  Paper - "Dilution Limits of Inflammability of Gaseous Mixtures"
by H. F. Coward, A.W. Carpenter & W. Payman

Box 44  Folder 2  12/1936  Paper - "The Mechanical Solution of Simultaneous Equations"
by John B. Wilbur, MIT

Box 44  Folder 3  3/1942  Report - "Design of a Nozzle Producing Uniform Supersonic Airflow"
by Andrew Vazsonyi

Box 44  Folder 4  1940-1950  Papers - on Relaxation Methods
includes two notes to Howard Emmons & Emmons' lecture notes

Box 44  Folder 5  1946 & 1947  Papers by Arthur Kantrowitz and by Paul W. Huber & A. Kantrowitz
"Heat Capacity Lag in Gas Dynamics"
"Heat Capacity Lag Measurements in Various Gases"

Box 44  Folder 6  reprinted 1947  Book - The General Principles of Wave Mechanics by W. Pauli
book in German and typed pages in English

Box 44  Folder 7  3 & 6/1947, 1956  Papers by W. C. Johnston, Westinghouse Electric, plus letter from author
"Flame Velocities of Gases & Vapors by the Bunsen Burner Method"
"Flame Propagation Rates at Reduced Pressures"

Box 44  Folder 8  6/1947  Report - "Flame Propagation - Critical Review of Existing Theories"
by George H. Markstein & Michael L. Polanyi - 6/1947

Box 44  Folder 9  1948-1953  Reports - "The Theory of Flame Propagation"
6 volumes - by J. O. Hirschfelder & Others

Box 44  Folder 10  1950 & 1951  Memoranda - "The Combustion of Drops in a Fuel Spray" & "A Note on Radiation Heat Transfer"
by G. A. E. Godsaves

Box 45  Folder 1  1950-1952  Reports - "The Burning of Single Drops of Fuel"
5 parts [5 reports] by G. A. E. Godsaves, National Gas Turbine Est., England

Box 45  Folder 2  2/1951  Memorandum - "An Experimental Study of the Evaporation & Combustion of Falling Droplets"
by J. E. C. Topps

Box 45  Folder 3  4/1951  Memorandum - "The Evaporation of Spheres in a Hot Air Stream"
by W. Gohrbandt, England

Box 45  Folder 4  1952  Paper - "Experiments on the Burning & Extinction of Liquid Fuel Spheres"
by A. B. Spalding

Box 45  Folder 5  c. 1953  Report - "Experimental Studies of Transport Phenomena in Highly Ionized Gases"
by Beryl Edward Clotfetter

Box 45  Folder 6  1953  Publication - "References to Scientific Literature on Fire - Part VII 1953, Library Bibliography"
by Miss E. M. Shakeshaft & Mrs. B. F. W. Rogowski

Box 45  Folder 7  7/1953  Report - "Theory of Laminar Flame Stability"
by J. B. Rosen
Box 45 Folder 8 c. 1954 Paper - “The Effects of Chemical and Physical Parameters on the Burning Rate of a Liquid Droplet” by Henry Wise, Jack Lorell & Bernard J. Wood


Box 45 Folder 10 1954 & 1955 Reports by G. Klein “Equations of a Simple Flame Solved by Successive Approximations to the Solution of an Integral Equation” - 3 papers

Box 45 Folder 11 1/1956 Report - “An Experimental Investigation of Impact & Shock Wave Break-Up of Liquid Drops” by A. R. Hanson, F. G. Domich & H. S. Adams

Box 45 Folder 12 c. 1956 Paper - “Flame Temperatures of Limit Mixtures” by M. G. Zabetakis, S. Lambiris & G. S. Scott


Box 45 Folder 15 1956 Paper - “Dynamics of a dissociating gas - Part I Equilibrium Flow” by M. J. Lighthill


Box 45 Folder 17 6/1957 Paper - “Apparent emission intensities from a turbulent flame composed of wrinkled Laminar flames” by F. Williams & A. E. Fuhs

Box 45 Folder 18 6/1957 Technical Note - “A Theory of Flame Propagation Limits due to Heat Loss” by E. Mayer

Box 45 Folder 19 9/1957 Report - “Non-Stationary Combustion Studies” by D. Bitondo, N. Thomas & D. Perper


Box 46 Folder 2 10/18/1957 Paper - “Study of the Mechanism of Flame Extinguishment by Aluminum Chloride” by Joseph B. Levy & Raymond Friedman

Box 46 Folder 3 1/1958 Report by D. B. Spalding & M. D. Samain “The analogue solution of temperature distribution and extinction in an idealised cylindrical flame”


Box 46  Folder 6  1958  Paper by D. B. Spalding
"Approximate solutions of transient & two-dimensional flame phenomena: constant-enthalpy flames"

Box 46  Folder 7  1958  Paper - "Production and Measurement of Single Drops, Sprays & Solid Suspensions"
  by James A. Browning

Box 46  Folder 8  1958 & 1959  Reports by Combustion Group - Instituto Nacional de Technica Aeronautica
"Homogeneous Combustion & Characteristics of Laminar Flames"
"Heterogeneous Combustion & Combustion of Monopropellant Droplets & "Fuel Sprays"

Box 46  Folder 9  1/31/ 1959  Report - "Distribution of Radicals in Laminar Flames"
  Parts 1 & 2, by G. Millan & I. DaRiva, Instituto Nacional de Technica Aeronautica

Box 46  Folder 10  1959 & 1960  Reports by Joseph O. Hirschfielder & others University of Wisconsin
"Value of Diffusion Coefficients which produce constant enthalpy in flames & detonations" & "The Propagation of A-B-C Flames"

Box 46  Folder 11  7/25/19  Paper - "Theory of flame-front stability"
  by Wiktor Eckhaus

Box 46  Folder 12  9/26/1960  Paper - "Recent Developments of Fire Research"
  by D. I. Lawson

Box 46  Folder 13  1960  Papers by D. C. Drucker, R. S. Rivlin and B. Sternberg
"Plasticity"
 "Some Topics in Finite Elasticity"
 "On Some Recent Developments in the Linear Theory of Elasticity"

Box 46  Folder 14  1960  Papers by L. W. Morland & E. H. Lee, and by E.H. Lee
"Stress Analysis for Linear Viscoelastic Materials with Temperature Variation"
 "Viscoelastic Stress Analysis"

Box 46  Folder 15  2/1962  Paper - "The Burning Rate of Liquid Fuels from Open Trays by Natural Convection"
  by D. B. Spalding

Box 46  Folder 16  c. 1962  Paper - "Flame Heights & Burning Rates of Liquid Fuels in Open Tanks"
  by Sami Atallah

Box 47  Folder 1  6/1/1964  Report - "Effect of Moisture on Surface Flammability of Coated & Uncoated Cellulosic Materials"
  by T. G. Lee, J. J. Loftus & D. Gross

Box 47  Folder 2  6/1965  Report - "Investigation of the High Pressure Helium Arc Plasma by Microwave Cavity Techniques"
  by William T. Maloney

Box 47  Folder 3  9/1965  Report - "Nonequilibrium Anomalies in the Development of Diffusion Flames"
  by P. M. Chung, F. E. Fendell & J. F. Holt

Box 47  Folder 4  1/1966  Paper - "Thin-flame theory for a fuel droplet in slow viscous flow"
  by Francis E. Fendell, Maureen L. Sprankle & David S. Dodson

Box 47  Folder 5  12/1966  Report by Richard Shao-lin Lee
"Turbulent Natural Convection Plume above a Finite Circular Source of Mass Momentum & Buoyancy"
Box 47  Folder 22  1,3.4/1974 & c. 1975  Notes  
3 Technical Notes re. Turbulent Jets, by R. A. Antonia, R. W. Bilger & R. E. Beck,  
“A Note on Favre Averaging in Variable Density Flows” by R. W. Bilger

Box 47  Folder 23  1974  Paper - “The Burning of Vertical Wooden Slabs”  
by Hsiang-Cheng Kung

“The Physiological & Toxicological Aspects of Smoke Produced during Combustion of Polymeric Materials”

by T. Z. Harmathy

Box 48  Folder 3  8/1974  Report by Donald N. Chi  
“Mathematical Study of a Propagating Flame & Its Induced Aerodynamics in a Coal Mine Passageway”

Box 48  Folder 4  9/1974  Paper - “Toward an Understanding of Fire-Scar Formation: Field Observation & Laboratory Simulation”  
by A. Malcolm Gill

Box 48  Folder 5  1974  Papers - 2 Papers on Buildings  
"A Probabilistic Approach to Structural Fire Safety” by T. T. Lie  
“Fire Resistance of Reinforced Concrete Columns” by T. T. Lie & Dr. E. Allen

by T. T. Lie & W. W. Stanzak

Box 48  Folder 7  2/6/1975  Report - “Understanding Hostile Fire”  
Society of Fire Protection Engineers- draft

by A. Muraszew & J. B. Feder, Aerospace Corp. for USDA Fire Service

Box 48  Folder 9  1975  Paper - “Turbulent Ceiling-Jet Induced by Large Scale Fires”  
by R. L. Alpert

by C. C. Hwang, R. F. Chaiken, J. M. Singer & D. N. H. Chi

Box 48  Folder 11  c. 1975  Paper - “Behavior of Fire in Compartments”  
by Raymond Friedman

Box 48  Folder 13  3/1976  Paper - “The Response of buildings to accidental explosions”  
by R. J. Mainstone

“Investigation of Smoke Particulates Generated during the Thermal Degradation of Natural and Synthetic Materials”

by T. Z. Harmathy

Box 48  Folder 16  8/1976  Paper - “Buoyant Diffusion Flames”  
by J. de Ris
Box 48  Folder 17  1976  Paper - "Some experimental studies of vortex rings"
by T. Maxworthy

Box 48  Folder 18  8/1977  Paper - "The Importance of Externally Imposed Heat Flux on the Burning Behavior of Materials"
by J. W. Rowen & J. W. Lyons

Box 48  Folder 19  10/7/1977  Paper - "Infrared Mean Absorption Coefficients of Luminous Flames & Smoke"
by L. Hubbard & C. L. Tien

Box 48  Folder 20  1975-1978  Reports & Papers - Flame spread/combustion
by professors at Case Western Reserve University

Box 49  Folder 1  7/1977  Proposal - "Investigation of the Properties of the Combustion Products Generated by Building Fires"
by Ben T. Zinn

Box 49  Folder 2  1977 & 1978  Papers - 4 papers on Cable Tray Fires by L. W. Hunter

Box 49  Folder 3  1977-1979  Reports - re. buildings - by T. Z. Harmathy
"Relationship between Fire Resistance & Fire Tolerance"
"Effect of the Nature of Fuel on the Characteristics of Fully Developed Compartment Fires"
"Building Design & Fire Hazard"

Box 49  Folder 4  7/14/1978  Proposal - "Quantitative Smoke Measurement in ICBO Room Test Procedure"
by Jack Kracklauer

Box 49  Folder 5  1978  Paper - "Modeling Radiative Ignition of Fabrics in Air"
by C. C. Ndubizu & P. Durbetaki

Box 49  Folder 6  1978  Paper - "Visualization of Room Fire Induced Smoke Movement & Flow in a Corridor"
by J. G. Quintiere, B. J. McCaffery & W. Rinkinen

Box 49  Folder 7  4/1979  Paper - "Flammability Limits" A Re-Examination"
by Andrej Macek

Box 49  Folder 8  1979  Report by M. M. Birky et. al., with tables & appendices
"Development of Recommended Test Method for Toxicological Assessment of Combustion Products"

Box 49  Folder 9  1979  Paper - "Model Coal Tunnel Fires in Ventilation Flow"
by Robert F. Chaiken, Joseph M. Singer & Calvin K. Lee

Box 49  Folder 10  1979  Paper - "Safety Factors for Fire Loads"
by T. T. Lie

Box 49  Folder 11  3/6/1980  Paper - "Extinguishment of Burning Wood Charcoal Surfaces"
by Phiroz M. Bhagat

Box 49  Folder 12  3/11/1980  Correspondence - "Gas Sampling Probes"
from J. de Ris to L. Orloff, Factory Mutual System

Box 49  Folder 13  3/1980  Paper - "Fire ventilation Reconsidered"
by Richard Land

Box 49  Folder 14  4/14/1980  Paper - "Entrainment in Fire Plumes"
draft by E. e. Zukoski, Toshi Kubota & Baki Cetegen
Box 51 Folder 2 1984 Paper - "Ignition & Burning of a Layer of Incomplete Combustion Products"
by C. L. Beyler

Box 51 Folder 3 1984 Paper by Leonard Y. Cooper
"The Thermal Response of Aircraft Cabin Ceiling Materials during a Post-Crash External Fuel Spill, Fire Scenario"

Box 51 Folder 4 1984 Paper - "Prediction of Corridor Smoke Filling by Zone Models"
by Walter W. Jones & James G. Quintiere

Box 51 Folder 5 1984 Paper - "Smoke Movement in Rooms of Fire Involvement & Adjacent Spaces"
by Leonard Y. Cooper

Box 51 Folder 6 2/1985 Report - "An Experimental Study of Negatively Buoyant Flows Generated in Enclosure Fires"
by Y. Jaluria & D. Goldman

Box 51 Folder 7 9/19/1985 Paper - "Wall Flames and Implications for Upward Flame Spread"
by James Quintiere & Margaret Harkleroad & Yuji Hasemi

Box 51 Folder 8 10/1985 Paper - "Microbursts: a hazard for aircraft"
by P. F. Linden & J. E. Simpson

Box 51 Folder 9 11/1985 Abstract - "A PDF Method for Calculating Major Species Concentrations in Turbulent Fires"
by M. A. Delichatsios & M. K. Mathews

Box 51 Folder 10 1985 Paper - "Effect of opposing buoyancy on the flow in free and wall jets"
by Daniel Goldman & Yogesh Jaluria

Box 51 Folder 11 c. 1985 Paper - "Major Species Production by Solid Fuels in a Two Layer Compartment Fire Environment"
by C. L. Beyler

Box 51 Folder 12 3/1986 Manuscript - "Experimental Study of Thermally Generated Reverse Stratified Layers in a Fire Tunnel"
by C. C. Hwang & J. D. Wargo

Box 51 Folder 13 3/1986 Paper - "Experimental Study of Thermally Generated Reverse Stratified Layers in a Fire Tunnel"
by C. C. Hwang & J. D. Wargo

Box 51 Folder 14 9/1986 Paper - "Estimating room temperatures from fires along walls and in corners"
by Frederick W. Mowrer & Robert Brady Williamson

Box 51 Folder 15 1986 Paper - "Microscales of turbulence & heat transfer correlations"
by Vedat S. Arpaci

Box 51 Folder 17 7/23/1987 Paper - "The Application of Flame Spread Theory to Predict Material Performance"
by J. G. Quintiere

Box 51 Folder 18 1987 Paper - "Droplet Vaporization Model for Spray Combustion Calculations"
by B. Abramzon & W. A. Sirignano

Box 51 Folder 19 1987 Paper - "Experimental Augmentation of Turbulent Flames Through Free Radicals Delivered In Situ"
by Alberto Schirmer, Jack Green & Kumar Ramoahalli

Box 51 Folder 20 1987-1989 Papers & reports - Prevention of Electrical Fires
Box 51  Folder 21  4/1988  Paper - "An Analysis of the Influence of Piston Effect on Elevator Smoke Control"
   by John H. Klote

Box 51  Folder 22  5/1988  Paper by L.Y. Coope
   "Calculating Flows Through Vertical Vents in Zone Fire Models under Conditions of Arbitrary Cross-Vent Pressure Difference"

Box 51  Folder 23  12/8/1988  Paper - "Scaling Applications in Fire Research"
   by James G. Quintiere

Box 51  Folder 24  1988  Paper - "Study of Molecular Mixing and a Finite Rate Chemical Reaction in a Mixing Layer"
   by B. M. Cetegen & W. A. Sirignano

Box 51  Folder 25  1988  Papers - 2 papers on flame propagation
   "Unsteady Flame Propagation in a Spray with Transient Droplet Vaporization" by R. H. Rangel & W. A. Sirignano
   "Numerical Study of Multicomponent Fuel Spray Flame Propagation in a Spherical Closed Volume" by G. Continillo & W. A. Sirignano

Box 51  Folder 26  1/1989  Paper - "Numerical Analysis of Convecting, Vaporizing Fuel Droplet with Variable Properties"
   by C. H. Chiang, M. S. Raja & W. A. Sirignano

   by George N. Walton

Box 51  Folder 28  6/1989  Report - "Extinction of Tubular Premixed Laminar Flames with Complex Chemistry"
   by M. D. Smooke & V. Giovangigli

Box 51  Folder 29  7/1989  Paper - "Fundamentals of Enclosure Fire 'Zone' Models"
   by James G. Quintiere

Box 51  Folder 30  10/1989  Paper by Leonard Y. Cooper
   "Estimating the Environment & the Response of Sprinkler Links in Compartment Fires with Draft Curtains and Fusible Link-Actuated Ceiling Vents -Theory"

   by E. E. Zukoski, J. H. Morehart, T. Kubota & S. J. Toner

Box 51  Folder 32  1989  Outline - Fire Plume Model
   Drafts 0, 1, & 2, by Ed Zukoski

Box 51  Folder 33  1989  Thesis - "Mixing in Density-Stratified Conjugate Flows"
   by Marco Rasi

Box 51  Folder 34  n.d., c. 1989  Paper - "Concurrent Turbulent Flame Spread"
   by L. Zhou & A. C. Fernandez-Pello

Box 52  Folder 1  5/1990  Paper - "The linear & nonlinear shear instability of a fluid sheet"
   by R. H. Rangel & W. A. Sirignano

Box 52  Folder 2  7/1990  Paper - "Numerical & Experimental Assessments of the Thermal Response of a Thin Filament"
   by T. H. Chen, M. E. Post & L. P. Goss

Box 52  Folder 3  7/1990  Paper by M. Bui & K. Seshadri
   "Comparison between experimental measurements & numerical calculations of the heptane-air diffusion flames"
| Box 52 Folder 4 | 7/1990 | Paper - "Monochromatic Absorption of Luminous Flames"  
by Ahmet Selamet and Vedat S. Arpaci |
| Box 52 Folder 5 | 8/1990 | Paper - "Lag Times Associated with Fire Detection & Suppression"  
by Frederick W. Mowrer |
| Box 52 Folder 6 | 1990 | Paper - "Study of Mixing & Reaction in the field of a Vortex"  
by B. M. Cetegen and W. A. Sirignano |
| Box 52 Folder 7 | c. 1990 | Paper - "Use of Small-Scale Test Data in Hazard Analysis"  
by Harold E. Nelson & Eric W. Forssell |
| Box 52 Folder 8 | 1990 & 1991 | Papers by J. P. Delplanque, R. H. Rangel & W. A. Sirignano  
"Liquid-Waste Incineration in a Parallel-Stream Configuration: Parametric Studies"  
"Liquid Waste Incineration in a Parallel-Stream Configuration: Effect of Auxiliary Fuel" |
| Box 52 Folder 9 | 1/1991 | Paper - "Ignition Delay of a Gas Mixture Above a Liquid Fuel Pool"  
by D. N. Schiller & W. A. Sirignano |
| Box 52 Folder 10 | 1/1991 | Paper - "Vaporization and Combustion of Metal Slurry Droplets"  
by R. Bhatia & W. A. Sirignano |
by K. Saito, A. S. Gordon, F. A. Williams & W. F. Stickle |
| Box 52 Folder 12 | 4/10/1991 | Notes - "Comparison of 2-D Computations & Experiments on Gravity Currents"  
"Comparison of 2-D Computations & Experiments on Gravity Currents" by R. G. Rehm |
| Box 52 Folder 13 | 6/1991 | Paper - "The Role of Laminar-Turbulent Transition in Gas Turbine Engines"  
by Robert Edward Mayle |
| Box 52 Folder 14 | 1991 | Paper by A. Ito, K. Saito & T. Inamura  
"Holographic Interferometry Temperature Measurements in Liquids for Pool Fires Supported on Water" |
| Box 52 Folder 15 | 1991 | Paper - "Measuring Rate of Heat Release by Oxygen Consumption"  
by Marc L. Janssens |
| Box 52 Folder 16 | 1991 | Paper - "A Study of Flame Spread over Alcohols using Holographic Interferometry"  
by A. Ito, D. Masuda & K. Saito |
| Box 52 Folder 17 | 1991 | Paper - "Buoyancy-Driven Turbulent & Diffusion Flames"  
by Vedat S. Arpaci & Ahmet Selamet |
| Box 52 Folder 18 | c. 1991 | Paper - "Gaseous Product Emissions from Fires"  
by A. Tewarson |
| Box 52 Folder 19 | c. 1991 | Paper - "Fire-Induced Reverse Stratified Flow in a Mine Heading"  
by V. B. Apte & J. H. Kent & A. R. Green |
| Box 52 Folder 20 | 1992 | Request for Comments, Underwriters Lab, includes Emmons' comments  
| Box 52 Folder 21 | 1992 | Paper - "Flow through a Horizontal Vent in an Enclosure Fire"  
by Q. Tan & Y. Jaluna |
Box 52 Folder 22 1992  Paper - "Formulation of the Statistical Equations of Turbulent Flows with Variable Density"
   by Alexandre J. A. Favre

Box 52 Folder 23 10/1992  Paper - "Development of Composite Heat Release Rate Curves for Multiple Burning Items"
   by Arthur J. Parker

Box 52 Folder 24 1992  Paper by S. Venkatesh & K. Saito
   "Estimates on the effect of chlorine on the global soot production rates in Laminar hydrocarbon-air diffusion flames"

Box 52 Folder 25 1993  Publication - Encyclopedia of Fluid Mechanics - Supplement 1 - "Applied Mathematics in Fluid Dynamics"
   ed. by Nicholas P. Cheremisinoff

Box 52 Folder 26 c. 1993  Paper - "Effects of Viscosity on Gravity Currents in the Inertial Regime"
   by W. R. Chan, T. Kubota & E. E. Zukoski

Box 52 Folder 27 11/24/1993  Paper - "Simulation of Smoke Plumes from Large Pool Fires"
   by H. R. Baum, K. B. McGrath & R. G. Rehm, & Emmons' review

Box 52 Folder 28 1993  Papers - 3 papers on incineration by Thomas B. Shen
   "Burning Stabilization in a Rotary Kiln Incinerator"
   "Incineration Systems"
   "Burning of Multisized Element Fuel Assembly with Interactions in Rotary Incinerator"

Box 52 Folder 29 1994  Proposal - "Numerical Simulation & Experimental Study of Smoke in Uncontrolled Fire"
   by Shuh-Jing Ying

Box 52 Folder 30 1994  Paper - "Smoke Movement Driven by a Fire under a Ceiling"
   by Graham Atkinson & Gabriel Rooney - 2 drafts

Box 52 Folder 31 c. 1994  Paper - "Flow of Smoke & Hot Gases due to a Fire in Open Vertical Shafts"
   by A.P. Mercier & Y. Jaluria

Box 52 Folder 32 1995  Dissertation Abstract by Yongsheng Yang, U. of Arizona
   "Free-Radicals Augmentation and large Eddy Probability Density Simulation for High-Speed Turbulent Combusting Jets"

Box 52 Folder 33 c. 1995  Paper - "Fire Growth: An Overview"
   by J. G. Quintiere

Box 53 Folder 1 Summer 1995  Report - "Modern Solid Waste Incineration - A Combustion Application"
   by Thomas B. C. Shen

Box 53 Folder 2 8/1995  Paper - "Combined Buoyancy & Pressure-Driven Flow through a Shallow, Horizontal, Circular Vent"
   by L. Y. Cooper

Box 53 Folder 3 1995  Paper - "Flow of Smoke & Hot Gases Across Horizontal Vents in Room Fires"
   by Y. Jaluria, W. K. S. Chia & S. H. K. Lee

Box 53 Folder 4 1995  Paper - "Compartment Fire Experiments: Comparison with Models"
   by N. A. Dembsey, I. J. Pagni & R. B. Williamson

Box 53 Folder 5 1995  Paper - "Wall fires and the approach to flashover in an enclosure"
   by Henri E. Milner & Kenneth D. Steckler
### Series XXIV: Print Photographs of Fire-related subjects, 1950s-1994

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<th>Container List</th>
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<th>Date</th>
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<td>Box 55</td>
<td>Folder 6</td>
<td>1950's</td>
<td>Photographs - Spinning Detonation were with G. I. Taylor materials</td>
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<td>Box 55</td>
<td>Folder 7</td>
<td>c. 1950s</td>
<td>Photographs - these were with 1950s materials 1951-53...Flow instabilities in compressors, etc.</td>
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<tr>
<td>Box 55</td>
<td>Folder 8</td>
<td>c. 1965</td>
<td>Photographs not labeled, but found with 1965 report by H. W. Emmons: &quot;The Arc Measurement of High Temperature Gas Transport Properties&quot;</td>
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<tr>
<td>Box 55</td>
<td>Folder 9</td>
<td>c. 1973-1980</td>
<td>Photographs - from Notebook Folder - course materials, includes information on properties photocopies are with notebook materials</td>
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<td>Box 55</td>
<td>Folder 10</td>
<td>1983</td>
<td>Photographs - Fire Growth at the MGM</td>
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<td>Box 55</td>
<td>Folder 11</td>
<td>8/1986</td>
<td>Photographs - &quot;Salt Water Modeling of Fire Induced Flows in Multicompartment Enclosures&quot; by Steckler, Baum &amp; Quintiere</td>
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<td>Box 55</td>
<td>Folder 12</td>
<td>1994</td>
<td>Photograph - sent with paper &quot;Smoke Driven by a Fire under a Ceiling&quot; by Atkinson &amp; Rooney</td>
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### Series XXIV: Photographic Slides of Fire-related subjects

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<td>Box 55</td>
<td>Folder 13</td>
<td>c. 1982/1983</td>
<td>Slides - from Slide Box 1 [arbitrary number] - box said &quot;Emmons/Miller 'good&quot;</td>
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<td>Box 55</td>
<td>Folder 14</td>
<td>c. 1982/1983</td>
<td>Slides - from Slide Box 2 [these may go with Slide Box 1]</td>
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<td>Slides - C J Jump [Emmons' label] - from Slide Box 3</td>
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<td>Slides - MGM [Emmons' label]- from Slide Box 3</td>
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<td>Folder 18</td>
<td>n.d.</td>
<td>Slides - Jokes [Emmons' label] - from Slide Box 3</td>
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<td>Box 55</td>
<td>Folder 19</td>
<td>n.d.</td>
<td>Slides - Vent Flow [Emmons' label] &amp; The Home Fire [Emmons' label] -from Slide Box 4</td>
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### Series XXV: Films

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<td>Box 56</td>
<td>Folder 1</td>
<td>1974</td>
<td>Film - 16 mm, 7&quot; reel - Home Fire Project &quot;1974 Full-Scale Fire Test - Harvard FMRC&quot;</td>
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<td>Box 56</td>
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<td>Film - 16 mm, 7&quot; reel - Home Fire Project</td>
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### Series XXVI: Computer Print-Outs (not listed)

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### Series XXVII: Computer Disks 5"

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### Series XXIIX: Computer Handbooks

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### Series XXIX: Legal Cases

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### Series XXX: Legal - Sandra K. Thornhill vs. Ronnie's Truck Stop

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