Fire Science and Technology Inc.

# VYTENIS BABRAUSKAS, Ph.D.

CURRICULUM VITAE
*(revised 2 August 2025)*

## Education

*Graduate*

University of California, Berkeley, Ph.D., Fire Protection Engineering, 1976. Dr. Babrauskas was the first person ever to be awarded a Ph.D. degree in Fire Protection Engineering.

University of California, Berkeley, M.S., Structural Engineering, 1972.

*Undergraduate*

Swarthmore College, A.B., Physics, 1968. Also, concentration in electrical engineering.

## Professional experience

1993 - present : Fire Science and Technology Inc., President. Dr. Babrauskas founded FSTI in 1993 as an organization devoted to fire safety research & development and for consulting on fire safety issues.

2025: Worcester Polytechnic Institute. Adjunct Full Professor, Fall Semester. Taught Case Studies in Explosions in the Dept. of Fire Protection Engineering.

2002: Worcester Polytechnic Institute. Adjunct Full Professor, Spring Semester. Taught Special Topics—Ignition Phenomena in the Dept. of Fire Protection Engineering.

1998: University of British Columbia. Lecturer, Winter Session. Taught fire dynamics to Master's degree students in the Fire Protection Engineering program.

1977 - 1993 : National Institute of Standards and Technology (NIST), Center for Fire Research/BFRL, Fire Prevention Engineer (note that prior to 1988 NIST was called the U.S. National Bureau of Standards). At NIST, Dr. Babrauskas headed up various programs and research groups in the area of materials flammability, fire toxicity, test method development, upholstered furniture flammability, building code fire safety requirements, and fire resistance.

1973 - 1976 : U. of California, Fire Test Laboratories, Research Specialist. During his work at UCB, Dr. Babrauskas specialized in fire modeling, test furnace design and fundamental studies on fire endurance.

1969 - 1971 : U. S. Army Corps of Engineers, Philadelphia, Civil Engineer. Dr. Babrauskas designed roads, bridges, and waterworks for the Army Corps of Engineers.

1968 - 1969 : University of Pennsylvania, Assistant instructor, Physics department. Dr. Babrauskas taught laboratory courses to physics undergraduates at the University of Pennsylvania.

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## Highlights of professional achievements

Dr. Babrauskas is a ranking international authority on the measurement of heat release from fires (which tries to answer the question, *How fast do things burn?*). In 1982 he developed the large-scale oxygen consumption calorimeter, which became specified in various ASTM, NORDTEST, and Underwriters Laboratories standards. He then developed the primary method currently being used on a world-wide basis for bench-scale measurement of heat release rates. For the development of this instrument, the Cone Calorimeter, he was awarded the Department of Commerce Bronze medal in 1986. His invention was also recognized in his receiving the *R&D 100 Award* for it in 1988. The Cone Calorimeter is today considered the most important bench-scale tool for determining "how fast things burn." It is used in over 400 laboratories worldwide. The Cone Calorimeter standards issued by ASTM and ISO were based on his works.

In 1992, the textbook **Heat Release in Fires**, Babrauskas and Grayson, eds., was published. This major work reviews the entire state of the art of measuring and predicting the growth of fires, based on quantitative engineering methods and on the newest experimental techniques, many of which were developed by Dr. Babrauskas. This is the only available monograph on the subject today.

Dr. Babrauskas has contributed significantly to advancing the state of the art in quantifying the fire hazards associated with **toxicity**. He headed the research team developing the radiant-heating test method for toxic potency, the first such to be based on effective full-scale validation with room fires. He also developed a methodology for consistently handling carbon monoxide in relation to toxicity contributions from other fire gases. The dominant role of carbon monoxide in fire gas toxicity can now be more easily studied with another of Dr. Babrauskas' instruments, the phi-meter. In 2008 he was editor for the reference book on toxicity and the hazards of combustion products, **Hazards of Combustion Products**.

Fires from furniture and furnishings were first quantified in the course of Dr. Babrauskas research at NIST. The first predictive methods in this area were also his contribution. He remains active in this area and served as consultant to European laboratories investigating furniture flammability. Some of his contributions to this area are contained in the textbook **Fire Behavior of Upholstered Furniture and Mattresses**, published in 2000.

In the fire modeling area, Dr. Babrauskas was the first U.S. scientist to develop and make available to the public a computer program for modeling fires—COMPF was released in 1975. Subsequently, he released an enhanced version, COMPF2, in 1979. The enhanced version was the first fire model to include a realistic representation of the burning of liquid pool fires in rooms. He also contributed material to the NIST fire model HAZARD I.

Dr. Babrauskas' earliest contributions to fire safety were in the fire endurance area. His Ph.D. dissertation was on this topic, and it remains one of the essential references in the scientific study of post-flashover fires and of fire resistance test methods.

Since his founding of FSTI, Dr. Babrauskas specialized in fire safety R&D and in serving as a fire science consultant to fire investigations and fire litigations. In the R&D area, he has been a technical consultant to three major, multi-national fire safety research projects organized by the European Commission: CBUF, TOXFIRE, and FIPEC. CBUF (Combustion Behaviour of

Upholstered Furniture) focused on characterizing furniture fire performance and developing fire models and fire test methods for this category of product. TOXFIRE focused on developing firefighting guidance for fires in chemical and pesticide warehouses, with an emphasis on toxic products of combustion and pollution of air and water. FIPEC (Fire Performance of Electric Cables) was organized to develop fire testing and fire modeling techniques for proper assessment of electric cable flammability. In addition, under the auspices of his own firm, Dr. Babrauskas organized numerous full-scale and bench-scale fire tests on diverse construction products, where the focus has been in assessing strategies for describing the fire toxicity aspects of products.

In 2003, Dr. Babrauskas published the massive **Ignition Handbook**. This 1116-page handbook was the first ever to be published on this topic and was developed as a resource intended to serve fire safety engineers, fire investigators, forensic scientists, insurance company personnel, chemical engineers, and other professionals concerned with fire and explosion safety. When published, it was, by far, the largest treatise in the fire safety science area ever authored by a single individual.

In 2005, the became the first-ever consultant that ASTM formally retained to assist in the process of development of their fire test standards and was tasked with distilling recommendations for ASTM standards from the research findings on the fire and collapse of the World Trade Center.

Dr. Babrauskas served as editor for three editions (2003, 2007, and 2014) of **Fire Science Applications to Fire Investigations**. This is the only extensive collection of research papers on the topics of fire investigation and forensic applications of fire science.

During 2016 – 2019, he was a Visiting Scholar at the Dept. of Mechanical & Aerospace Engineering, University of California, San Diego (UCSD), in the combustion research group of Prof. Forman Williams.

In 2019, he was appointed as a Fellow at The Christian Regenhard Center for Emergency Response Studies at the John Jay College of Criminal Justice, City University of New York.

In 2021, Dr. Babrauskas published a new book, **Smoldering Fires**. More than half of structure fires are believed to originate in the smoldering mode, thus, this mode of burning can be very important for fire investigations. Dr. Babrauskas' new book becomes the first book published on this topic. The focus is specifically to give guidance to fire investigators, forensic engineers, and other personnel endeavoring to unravel what happened in real-life fires.

Also in 2021, after 10 years of preparation, Dr. Babrauskas release the **Electrical Fires and Explosions** book. At close to 1300 pages, this becomes the largest fire safety treatise ever authored by a single individual. In the US, electrical fires account for roughly 20% of all structure fires, and constitute the 2$^{nd}$ most common cause of fires, after cooking. A great many diverse phenomena can come into play to create an electrical fires, and until there has not been a comprehensive reference source exploring details of the various failure modes leading to an electrical fire. The new book is intended to be valuable both to engineers—with extensive theoretical treatments—and to empirical practitioners—with copious illustrations and descriptions of failure modes. The new treatise also encompasses electrical explosions, which has been a neglected area of investigation.

In 2024, his development of the Cone Calorimeter was recognized by NFPA, who awarded him their highest honor, the Philip J. DiNenno Prize to this achievement. Also, the Asia-Oceania Association for Fire Science and Technology, AOSFST, awarded him their Lifetime Contribution Award.

## Society memberships

ASTM International (since 1973)
The Combustion Institute (1975-2020)
International Association of Fire Safety Science (since 1989)
International Association of Arson Investigators (since 1996)
International Association of Wildland Fire (since 2019)
International Code Council; formerly ICBO (1993-2020)
International Institute of Electrical and Electronics Engineers, IEEE (since 2020)
National Fire Protection Association (since 1975)
Society of Fire Protection Engineers (since 1991; grade of Fellow)

## Technical committee participation

ANSI US National Committee Technical Advisory Group for IEC/TC 108 Safety of Electronic Equipment, Member (2012-2022).
ASTM Committee D-9 on Electrical and Electronic Insulating Materials, Member (1991- ).
ASTM Committee D-20 on Plastics, Member (1996- ).
ASTM Committee E-5 on Fire Standards (1973 - ); served as Chairman of Subcommittee E-5.21 on Smoke and Combustion Products (1998 – 2003).
ASTM Committee E-27 on Hazard Potential of Chemicals, Member (1999- ).
ASTM Committee E-30 on Forensic Sciences, Member (2004- ).
International Association of Fire Safety Science – management Committee (2005-2014)
ISO Technical Commission of Fire Safety, TC 92/SC 1/WG 2 Working Group on Ignitability, Assigned U.S. expert (1987-1998).
NFPA Technical Committee on Fire Investigations, NFPA 921, Principal Member (2006- ).
NFPA Technical Committee on Fire Reporting, NFPA 910, Principal Member (2015- ).
NFPA Safety to Life/Technical Committee on Furnishings and Contents, Member (1994- ).
SFPE Standards Making Committee on Calculating Fire Exposures to Structures Calculating Fire Exposures to Structures, Member (2004- ).
SFPE Task Group on Fire Exposures, Member (2002-2004).
UL Standards Technical Panel STP 217 Smoke Detectors and Alarms (2014- ).
UL Standards Technical Panel STP 723 Surface Burning Testing of Building Materials, Member (2003- ).
UL Standards Technical Panel STP 1040 Fire Tests of Insulated Wall Constructions, Member (2004- ).
UL Standards Technical Panel STP 1395 Test Methods for Fire Safety Equipment (2022- ).
UL Standards Technical Panel STP 1820 Fire Tests of Pneumatic Tubing and Plastic Sprinkler Pipe for Flame and Smoke Characteristics (2005- ).
UL Standards Technical Panel STP 2580 Batteries for Use in Electric Vehicles (2024- ).
UL Standards Technical Panel STP 6065 Audio, Video and Similar Electronic Apparatus – Safety Requirements (2012- ).

## Editorial positions

FIRE, Member of Editorial Board (2023- )
FIRE AND FLAMMABILITY BULLETIN, Member of Editorial Board (1987-2003)
FIRE SAFETY JOURNAL, Regional Editor for North America (1989-2009)
FIRE AND MATERIALS, Member of Editorial Board (1990- )
FIRE SCIENCE REVIEWS, Member of Editorial Board (2012-2017)
FLAME RETARDANCY AND THERMAL STABILITY OF MATERIALS, Member of Editorial Board (2016-2019)
JOURNAL OF FIRE SCIENCES, Member of Editorial Board (2005-2012); Associate Editor (2012- )
JOURNAL OF CIVIL ENGINEERING AND MANAGEMENT, Member of Editorial Board (2006- )
EUROPEAN JOURNAL OF ENVIRONMENTAL AND SAFETY SCIENCES, Member of Editorial Board (2013-2015).

## Professional awards

Asia-Oceania Association for Fire Science and Technology (AOAFST) Lifetime Contribution Award, 2024
Philip J. DiNenno Prize, NFPA, 2024 (the highest NFPA honor)
FPRF Ronald K. Mengel Award, NFPA, 2016 (with Joseph Fleming)
Howard W. Emmons Lectureship, IAFSS, 2008 (the Society's highest award)
Arthur B. Guise Medal, Society of Fire Protection Engineers, 2004 (the Society's highest award)
Vilhelm Sjölin Award, Forum for International Cooperation on Fire Research, 2002
Jack Bono Engineering Communications Award, SFPE, 1997
Research Award for Foreign Specialists, Building Research Institute, Japan, 1997
The S. H. Ingberg Award, ASTM, 1995
The Edward Bennett Rosa Award, NIST, 1992
ASTM Award of Recognition, 1991
Interflam Trophy Award, Interflam Conferences, 1990
Building and Fire Research Laboratory Communicator Award, NIST, 1990
ASTM Award of Appreciation, 1989
R&D 100 Award, for developing the Cone Calorimeter, 1988
Research Award for Foreign Specialists, Building Research Institute, Japan, 1988
U.S. Department of Commerce Bronze Medal, 1986

## Inventions

**The Cone Calorimeter**. An instrument for measuring fire properties of materials and products in bench scale. It is currently in the main technique for making this measurement that is in use by laboratories worldwide.

**The furniture calorimeter (open-burning products calorimeter)**. This instrument measures the fire property of furniture items, stored goods, appliances, and other less-than-room sized commodities. It is currently in use in several dozen laboratories worldwide.

**The radiant furnace fire toxicity test**. This apparatus was jointly developed at several institutions. Dr. Babrauskas headed the NIST development team. It is a bench-scale test used to determine the fire toxicity properties of materials and products.

**The phi-meter**. This instrument determines the real-time combustion equivalence ratio of fires. It

is used in studies of fire toxicity.

## Engineering standards

The following standards in the fire safety area were primarily developed by Dr. Babrauskas or were based on his inventions:

- ASTM E1354 (Cone Calorimeter)
- ISO 5660 (Cone Calorimeter)
- NFPA 271 (Cone Calorimeter)
- NFPA 269 (fire toxicity)
- ASTM E1474 (furniture test, bench-scale)
- NFPA 272 (furniture test, bench-scale)
- UL 1056 (furniture test, large-scale)
- NFPA 267 (mattress test)
- ASTM E1590 (mattress test)
- ASTM E1357 (furniture test, large-scale)
- NFPA 266 (furniture test, large-scale)
- NORDTEST NT FIRE 032 (furniture test, large-scale)
- CAN/ULC-S135 (combustibility of materials and products)
- MIL-STD-2031 SH (naval composites)
- NASA NHB 8060.1C (elevated oxygen material test)
- ASTM F1550M (bench-scale test for prison mattresses and furniture)

## Science and engineering expertise and work areas

- instrument design
- physics
- heat transfer
- civil/structural engineering
- electrical engineering
- combustion science
- analytical chemistry: methods for gas analysis
- infrared spectroscopy
- full-scale engineering performance testing

*Within fire safety science and fire protection engineering:*

- major fire or explosion incidents
- wildfire indents, patterns, and investigation
- fire investigation
- fire resistance
- fire toxicity
- fire testing
- marine and ship fires/explosions
- electrical fires; metallurgy of electrical artifacts
- electrical explosions
- electrical arcs
- hazardous materials (hazmat) explosions

- furniture flammability
- fire corrosivity
- ignitability
- self-heating and spontaneous combustion
- failure analysis
- ignition of fires from electric faults and failures
- flame spread
- explosions
- heat release rate
- computer fire modeling
- pool fires
- smoke production
- computer methods for handling of fire test data
- design and development of fire test apparatuses and instrumentation

## Fire modeling

Dr. Babrauskas was the first U.S. scientist to publish a computer fire model (COMPF, issued in 1975). He contributed material to the major NIST fire model HAZARD I. His model for liquid pool fires is the most commonly used one. During 1993-1994, as technical consultant for the major European research program on upholstered furniture flammability CBUF, he played a pivotal role in developing the three different furniture fire models which were produced. He has developed numerous methods for fire hazard analysis which have been published in various technical journals.

## Teaching

Dr. Babrauskas has given hundreds of lectures and presentations. He has taught graduate-level engineering courses at the University of British Columbia and at Worcester Polytechnic Institute. In recent years, he has been regularly teaching classes to fire investigators on fire science principles, as applied to origin-and-cause investigation of fires. He developed the unique **Principles of Electrical Fires** course, which is the only advanced course on investigation of electrical fires focusing on the fundamental underlying principles.

## Publications

Dr. Babrauskas has published more than 400 papers and reports in the field of fire safety science and engineering. His textbook **Heat Release in Fires** is the first and only book on this important subject. His **Ignition Handbook** is the only handbook on the topic of ignition and is one of the largest handbooks published on any safety topic. He authored the first monograph devoted to the topic of upholstered furniture flammability while at NIST; a second edition of this work was published commercially in 2000. He also authored the first comprehensive state-of-the-art review of flammability test methods for wires and cables. His Ph.D. dissertation on **Fire Endurance in Buildings** is still considered as one of the pivotal references in its field. His newest books are **Electrical Fires and Explosions**, and **Smoldering Fires**. His electrical fires book is the single-largest treatise in fire safety ever published by a single author. The book on smoldering fires is the first-ever devoted entirely to this subject. Dr. Babrauskas has contributed chapters to various editions of the NFPA and the SFPE Handbooks.

A selected list of publications is given below; the complete listing is available on request.

Babrauskas, V., The Palisades Fire of Los Angeles: Lessons to Be Learned, *Fire* **8**, 303 (2025).

Babrauskas, V., The National Electrical Safety Code, Powerline Clearances, and Wildfires, *Fire & Materials* **49**, 517-522 (2025).

Babrauskas, V., Electricity-Caused Wildland Fires: Costs, Social Fairness, and Proposed Solution, *Fire* **7**, 442 (2024).

Babrauskas V., Prudent Management of Downed Electrical Power Line Incidents, *Fire Engineering* **177**:6, 60,62 (June 2024).

Parker, K., and Babrauskas, V., Validation of NWCG Wildfire Directional Indicators in Test Burns in Coastal California, *Fire* **7**, 5 (2024).

Babrauskas, V., and Mowrer, F., Calibration Problems with the ASTM E108 Fire Test, *Fire & Materials* **47**, 629-637 (2023).

Babrauskas, V., Proper and Improper Use of Science in Fire Investigations, *Fire & Arson Investigator* **73**:4, 14-16 (2023)

Babrauskas, V., How NOT to Investigate Fires, *Fire Engineering* **176**:1, 50-51 (Jan. 2023).

Babrauskas, V., Minimum Values of Voltage, Current, or Power for the Ignition of Fire, *Fire* **5**, 201 (2022).

Babrauskas, V., Electrical or Unknown? Electrical Fires and Explosions, *Fire Engineering* **175**:3, 69-70, 72-73 (Mar. 2022).

Babrauskas, V., Smoldering Fires: Factors and Fuels, *Fire Engineering* **175**:6, 56-59 (June 2022).

Babrauskas, V., The Early History of the Cone Calorimeter, *Fire Science and Technology (Tokyo)* **41**:1, 21-31 (2022).

Babrauskas, V., A Twenty-First Century Approach to Fire Resistance, pp. 41-59 in **Handbook of Cognitive and Autonomous Systems for Fire Resilient Structures**, M. Z. Naser and G. Corbett, eds., Springer, Cham, Switzerland (2022).

Babrauskas, V., Ignition of Walls, *Fire & Arson Investigator* **72**:4, 16-20 (Spring 2022); and **73**:1, 16-20 (Summer 2022).

Babrauskas, V., Forced Combustion: Cone Calorimetry, pp. 73-90 in **Analysis of Flame Retardancy in Polymer Science**, H. Vahabi, M. R. Saeb, and G. Malucelli, eds., Elsevier, Amsterdam (2022).

Babrauskas, V., Electrical or Unknown? Electrical Fires and Explosions, *Fire Engineering* **175**:3, 69-70, 72-73 (Mar. 2022).

Babrauskas, V., Analyzing Ignition Data for Fire Modeling Purposes, *Fire & Materials* **46**, 896-904 (2022).

Babrauskas, V., Ignition of Gases, Vapors, and Liquids by Hot Surfaces, *Fire Technology* **58**, 281–310 (2022).

Babrauskas, V., How to Protect Houses from Ignition from Wildfires, *Fire Engineering* **174**:6, Wildland Urban Interface Suppl., 2-13 (June 2021).

Babrauskas, V., **Electrical Fires and Explosions**, Fire Science Publishers, New York (2021).

Babrauskas, V., **Smoldering Fires**, Fire Science Publishers, New York (2021).

Babrauskas, V., The Emergency Response Guidebook (ERG): Not Good Enough, Not Safe Enough, *Fire Engineering* **173**:11, 55-58 (Nov. 2020).

Babrauskas, V., Fire Safety—A Remarkable Success Story, *Fire Protection Engineering* No. 88, 12, 14 (Q4, 2020).

Babrauskas, V., Fire Safety Is the Key to Ammonium Nitrate Explosion Safety, *Process Safety Progress* 2020; https://doi.org/10.1002/prs.12200

Babrauskas, V., and Leggett, D., Thermal Decomposition of Ammonium Nitrate, *Fire & Materials* **44**, 250-268 (2020).

Babrauskas, V., Combustion Toxicity Regulations for Construction Products, *J. Fire Sciences* **38**, 96-100 (2020).

Babrauskas, V., Water Streams, Power Lines, and Shock: How Serious a Hazard? *Fire Engineering* **172**:2, 41-44 (Feb. 2019).

Babrauskas, V., Fires Originating in Branch-Circuit NM Cables due to Installation Damage, *J. Fire Sciences* **36**, 438-450 (2018).

Babrauskas, V., Arc Mapping: A Critical Review, *Fire Technology* **54**, 749-780 (2018).

Babrauskas, V., An Avoidable Tragedy (West, Texas Ammonium Nitrate Disaster), *Fire Protection Engineering*, No. 77, 24-26, 28, 30-31 (Q1 2018).

Babrauskas, V., Firebrands and Embers, **Encyclopedia of Wildfires and Wildland-Urban Interface (WUI) Fires**, S. L. Manzello, ed., Springer International Publishing, http://doi.org/10.1007/978-3-319-51727-8_2-1 (2018).

Babrauskas, V., Hot Metal Particles, **Encyclopedia of Wildfires and Wildland-Urban Interface (WUI) Fires**, S. L. Manzello, ed., Springer International Publishing, http://doi.org/10.1007/978-3-319-51727-8_3-1 (2018).

Babrauskas, V., and Britton, L. G., Errors in the Compilations of Minimum Explosion Concentration Values for Dust Clouds, *Fire Technology* **54**, 37-55 (2018).

Babrauskas, V., The Grenfell Tower Fire and Fire Safety Materials Testing, *Fire Engineering* **171**:1, 43-44, 46-48 (Jan. 2018).

Babrauskas, V., The West, Texas Ammonium Nitrate Explosion: A Failure of Regulation, *J. Fire Sciences* **35**, 396-414 (2017).

Babrauskas, V., and Dyer, R., Wildfire Investigation, *Fire Engineering* **170**:8, 36-37 (Aug. 2017).

Babrauskas, V., Electric Arc Explosions—A Review, *Fire Safety J.* **89**, 7-15 (2017).

Babrauskas, V., Phosphorus Explosions, *Process Safety & Environmental Protection* **107**, 87-93 (2017).

Babrauskas, V., Engineering Variables to Replace the Concept of 'Noncombustibility,' *Fire Technology* **53**, 353-373 (2017).

Babrauskas, V., The Ammonium Nitrate Explosion at West, Texas: A Disaster That Could Have Been Avoided, pp. 1-11 in *Interflam 2016*, Interscience Communications Ltd., London (2016).

Babrauskas, V., Gas-Fired Space Heaters: Defective Products, Defective Standards, and Burned Victims, *Fire & Arson Investigator* **67**:1, 40-50 (July 2016).

Babrauskas, V., Explosions of Ammonium Nitrate Fertilizer in Storage or Transportation Are Preventable Accidents, *J. Hazardous Materials* **304**, 134-149 (2016).

Babrauskas, V., UN Test O.1 Errors in Quantifying the Behavior of Solid Oxidizers, *J. Loss Prevention in the Process Industries* **39**, 1-6 (2016).

Babrauskas, V., Electrical Fires, pp. 662-704 in **SFPE Handbook of Fire Protection Engineering**, 5th ed., Springer, New York (2016).

Babrauskas, V., Heat Release Rates, pp. 799-904 in **SFPE Handbook of Fire Protection Engineering**, 5th ed., Springer, New York (2016).

Babrauskas, V., The Cone Calorimeter, pp. 952-980 in **SFPE Handbook of Fire Protection Engineering**, 5th ed., Springer, New York (2016).

Babrauskas, V., Will Firefighters Be Any Safer Under the New Hazardous Materials Code? *Fire Engineering* **168**:11, 66-70 (Nov. 2015).

Babrauskas, V., and Stapleton, H., Halogenated Flame Retardant Use in Residential Settings—Are They Safe for Our Health? *Fire Protection Engineering* No. 68, 11-16, 18, 20, 22 (4th Q., 2015).

Fleming, J. M., and Babrauskas, V., Investigating Smoke Alarm Effectiveness in Fatal Fires, *Fire Engineering* **168**:7, 45-46, 48-54 (2015).

Babrauskas, V., Using Modern Fire Science…to Put Undeserving Persons in Prison, *The National Fire Investigator (NAFI)* 7-8 (Winter 2015). Reprinted in: *Flash Point* (Fire Investigation Association of Alberta) **40**, 9-10 (Spring 2015).

Babrauskas, V., Arc Breakdown over Very Small Gap Distances, *Fire & Arson Investigator* **65**:3, 40-46 (Jan. 2015).

Babrauskas, V., Fuoco, R., and Blum, A., Flame Retardant Additives in Polymers: When Do the Fire Safety Benefits Outweigh the Toxicity Risks? pp. 87-118 in **Polymer Green Flame Retardants**, C. D. Papaspyrides and P. Kiliaris, eds., Elsevier, Amsterdam (2014).

Babrauskas, V., Some Neglected Areas in Fire Safety Engineering, *Fire Science & Technology (Tokyo)* **32**:1, 35-48 (2013).

Babrauskas, V., Arc Breakdown in Air over Very Small Gap Distances, pp. 1489-1498 in *Proc. Interflam 2013*, vol.2, Interscience Communications Ltd., London (2013).

Babrauskas, V., Lucas, D., Eisenberg, D., Singla, V., Dedeo, M., and Blum, A., Flame Retardants in Building Insulation: A Case for Re-Evaluating Building Codes, *Building Research & Information* **40**, 738-755 (2012).

Babrauskas, V., Rich, D., Singla, V., and Blum A., Toxic Chemicals and Toxic Money: The Science and Politics of Flammability Standards, *Fire Safety Science News* No. 33, 21-23 (2012).

Babrauskas, V., Blum, A., Daley, R., and Birnbaum, L., Flame Retardants in Furniture Foam: Benefits and Risks, pp. 265-278 in *Fire Safety Science—Proc. 10th Intl. Symp.*, Intl. Assn. for Fire Safety Science, London (2011).

Babrauskas, V., and Wichman, I. S., Fusing of Wires by Electrical Current, pp. 769-778 in *Proc. Fire & Materials 2011*, Interscience Communications Ltd, London (2011).

Babrauskas, V., Fleming, J. M., and Russell, D. B., RSET/ASET, A Flawed Concept for Fire Safety Assessment, *Fire & Materials* **34**, 341-355 (2010).

Babrauskas, V., Fire Damage, or Equipment Breakdown? pp. 119-130 in *ISFI 2010 – Proc. 4th Intl. Symp. on Fire Investigation Science and Technology*, Natl. Assn. of Fire Investigators, Sarasota FL (2010).

Babrauskas, V., Electrical Fires: Research Needed to Improve Fire Safety, *Fire Protection Engineering* No. 46, 20-22, 24-26, 28-30 (2nd Q. 2010).

Babrauskas, V., Unexposed-Face Temperature Criteria in Fire Resistance Tests: A Reappraisal, *Fire Safety J.* **44**, 813-818 (2009).

Babrauskas, V., and Krause, U., Ignition Sources, pp. 13-31 in **Fires in Silos**, U. Krause, ed., Wiley-VCH Verlag, Weinheim (2009).

Babrauskas V., Research on Electrical Fires: The State of the Art (The Emmons Plenary Lecture), pp. 3-18 in *Fire Safety Science—Proc. 9th Intl. Symp.*, Intl. Assn. for Fire Safety Science, London (2009).

Babrauskas, V., Smoke Detectors: Technologies Are NOT of Equal Value or Interchangeable, *Fire Safety & Technology Bull.* **3**:12, 2-4 (Dec. 2008).

Babrauskas, V., Quantifying the Combustion Product Hazard on the Basis of Test Results, pp. 339-353 in **Hazards of Combustion Products: Toxicity, Opacity, Corrosivity and Heat Release**, V. Babrauskas, R. G. Gann, and S. J. Grayson, eds., Interscience Communications Ltd., London (2008).

Babrauskas, V., and Grayson, S. J., Heat Release Test Methods, pp. 255-282 in **Hazards of Combustion Products: Toxicity, Opacity, Corrosivity and Heat Release**, V. Babrauskas, R. G. Gann, and S. J. Grayson, eds., Interscience Communications Ltd., London (2008).

Babrauskas, V., Gann, R. G., and Grayson, S. J., eds., **Hazards of Combustion Products: Toxicity, Opacity, Corrosivity and Heat Release**, Interscience Communications Ltd., London (2008).

Babrauskas, V., Ignition of Gases, Vapors, and Liquids by Hot Surfaces, pp. 5-13 in *ISFI 2008—Proc. 3rd Intl. Symp. on Fire Investigation Science & Technology*, Natl. Assn. of Fire Investigators, Sarasota FL (2008).

Babrauskas, V., Upholstered Furniture and Mattresses, pp. 6-103 to 6-128 in **Fire Protection Handbook**, 20th ed., National Fire Protection Assn., Quincy MA (2008).

Babrauskas, V., Tables and Charts, pp. 6-269 to 6-294 in **Fire Protection Handbook**, 20th ed., National Fire Protection Assn., Quincy MA (2008).

Babrauskas, V., Ignition: A Century of Research and an Assessment of Our Current Status, *J. Fire Protection Engineering* **17**, 165-183 (2007).

Babrauskas, V., Gray, B. F., and Janssens, M. L., Prudent Practices for the Design and Installation of Heat-Producing Devices near Wood Materials, *Fire & Materials* **31**, 125-135 (2007).

Babrauskas, V., Engineering Design and Analysis Using Computer Models: Are We Going Too Fast or not Fast Enough?, pp. 1-9 in *Proc. Interflam 2007*, Vol. 1, Interscience Communications Ltd., London (2007).

Babrauskas, V., ed., **Fire Science Applications to Fire Investigations**, 2nd ed. (CD-ROM book), Interscience Communications Ltd., London (2007).

Babrauskas, V., Unexposed-face Temperature Criteria in Fire Resistance Tests: A Reappraisal, *Proc. Fire and Materials 2007*, Interscience Communications Ltd., London (2007).

Babrauskas, V., The Principles of Electrical Fires, pp. 45-51 in *IFSI 2006 - Proc. 2nd Intl. Symp. on Fire Investigation Science and Technology*, Natl. Assn. of Fire Investigators, Sarasota FL (2006).

Babrauskas, V., Mechanisms and Modes for Ignition of Low-voltage, PVC-insulated Electrotechnical Products, *Fire & Materials* **30**, 150-174 (2006).

Babrauskas, V., Effective Heat of Combustion for Flaming Combustion of Conifers, *Canadian J. Forest Research* **36**, 659-663 (2006).

Babrauskas, V., Ignition of Solids—What Have We Learned in a Half-Century of Research? pp. 89-97 in *Flame Retardants 2006*, Interscience Communications Ltd, London (2006).

Babrauskas, V., Charring Rate of Wood as a Tool for Fire Investigations, *Fire Safety J.* **40**, 528-554 (2005).

Babrauskas, V., Risk of Ignition of Forest Fires from Black Powder or Muzzle-Loading Firearms, report prepared for the U.S. Forest Service, San Dimas T&D Center (2005).

Babrauskas, V., Some Basic Facts About Ignition Events During Fueling of Motor Vehicles at Filling Stations, *California Fire/Arson Investigator* 16, 25 (Apr. 2005).

Babrauskas, V., Truck Insurance v. MagneTek: Lessons to Be Learned Concerning Presentation of Scientific Information, *Fire & Arson Investigator* **55**:2, 9-10 (Oct. 2004).

Armstrong, A., Babrauskas, V., Holmes, D. L., Martin, C., Powell, R., Riggs, S., and Young, L. D., The Evaluation of the Extent of Transporting or "Tracking" an Identifiable Ignitable Liquid (Gasoline) throughout Fire Scenes during the Investigative Process, *J. Forensic Sciences* **49**, 741-748 (2004).

Babrauskas, V., Arc Beads from Fires: Can 'Cause' Beads Be Distinguished from 'Victim' Beads by Physical or Chemical Testing? *J. Fire Protection Engineering* **14**, 125-147 (2004).

Babrauskas, V., Electrical Discharges through Air: What Voltage Is Required to Cause Arcs and Sparks? *Fire Findings* **12**:1, 1-4 (Winter 2004).

Babrauskas, V., Cone Calorimeter Annotated Bibliography, 2003 edition, Fire Science Publishers, Issaquah WA (2004).

Babrauskas, V., Peacock, R. D., and Reneke, P. A., Defining Flashover for Fire Hazard Calculations. Part II. *Fire Safety J.* **38**, 613-622 (2003).

Babrauskas, V., A Hazardous Electrical Connector, *Fire & Arson Investigator* **53**:4, 9 (July 2003).

Babrauskas, V., **Ignition Handbook**, Fire Science Publishers/Society of Fire Protection Engineers, Issaquah WA (2003).

Babrauskas, V., **Ignition Handbook Database** (CD-ROM), Fire Science Publishers, Issaquah WA (2003).

Babrauskas, V., Ignition of Wood: A Review of the State of the Art, *J. Fire Protection Engineering* **12**, 163-189 (2002).

Babrauskas, V., How Do Electrical Wiring Faults Lead to Structure Ignitions? *Fire and Arson Investigator* **52**:3, 39-45, 49 (Apr. 2002).

Krasny, J. F., Parker, W. J., and Babrauskas, V., **Fire Behavior of Upholstered Furniture and Mattresses**, William Andrew Publishing, Norwich NY (2000).

Babrauskas, V., Positive-Pressure Door Testing: Research and Code Implementation, *Building Standards* **69**, 26-28, 30, 41 (Jul./Aug. 2000).

Babrauskas, V., Fire Test Methods for Evaluation of Fire-Retardant Efficacy in Polymeric Materials, pp. 81-113 in A. F. Grand and C. A. Wilkie, eds., **Fire Retardancy of Polymeric Materials**, Marcel Dekker, New York (2000).

Babrauskas, V., No Exit: The Performance Track of the Coming International Building Code Will Be Good for Engineers and Property Owners, but Will It Be Good for Fire Safety? *Fire Chief* **44**, 50-58 (Mar. 2000).

Babrauskas, V., Daems, D., and Berrier, R., Large-Scale Fire Tests Examining the Safety of Various Insulated Steel Roof Deck Constructions, pp. 355-366 in *Interflam '99*, Interscience Communications Ltd., London (1999).

Babrauskas, V., Ensuring the Public's Right to Adequate Fire Safety under Performance-Based Building Codes, pp. 167-175 in *Proc. 1998 Pacific Rim Conf. and 2nd Intl. Conf. on Performance-Based Codes and Fire Safety Design Methods*, International Code Council/SFPE (1998).

Babrauskas, V., and Krasny, J. F., Upholstered Furniture Transition from Smoldering to Flaming, *J. Forensic Sciences* **42**, 1029-1031 (1997).

Babrauskas, V., The Role of Heat Release Rate in Describing Fires, *Fire and Arson Investigator* **47**, 54-57 (June 1997).

Babrauskas, V., Fire Modeling Tools for Fire Safety Engineering: Are They Good Enough? *J. Fire Protection Engineering* **8**, 87-95 (1996). [This paper was awarded the *Jack Bono Engineering Communications Award* by SFPE for the best paper published in their Journal during 1996.]

Babrauskas, V., Facade Fire Tests: Towards an International Test Standard, *Fire Technology* **32**, 219-230 (1996).

Babrauskas, V., The Results of a Major Upholstered Furniture Fire Study, *NFPA J.* **90**, 84-88 (July/Aug 1996).

Babrauskas, V., A Comparative Examination of the Fire Performance of Pipe Insulation, *Process Safety Progress* **15**, 114-120 (1996).

Babrauskas, V., Wall Insulation Products: Full-Scale Tests versus Evaluation from Bench-Scale Toxic Potency Data, pp. 257-274 in *Interflam '96*, Interscience Communications Ltd, London (1996).

Babrauskas, V., Sandwich Panel Fire Performance—Full-scale and Bench-scale Assessments, pp. 1-21 in *Proc. Fourth Intl. Fire and Materials Conf.*, Interscience Communications Ltd., London (1995).

Babrauskas, V., The Generation of CO in Bench-scale Fire Tests and the Prediction for Real-scale Fires, *Fire and Materials* **19**, 205-213 (1995).

Babrauskas, V., Designing Products for Fire Performance: The State of the Art of Test Methods and Fire Models, *Fire Safety J.* **24**, 299-312 (1995).

Babrauskas, V., The Development and Evolution of the Cone Calorimeter: A Review of 12 Years of Research and Standardization, pp. 3-22 in *Fire Standards in the International Marketplace, ASTM STP 1163,* Arthur F. Grand, Ed., American Society for Testing and Materials, Philadelphia (1995).

Peacock, R. D., Reneke, P. A., Jones, W. W., Bukowski, R. W., and Babrauskas, V., New Concepts for Fire Protection of Passenger Rail Transportation Vehicles, *Fire and Materials* **19**, 71-87 (1995).

Bukowski, R. W., and Babrauskas, V., Developing Rational, Performance-based Fire Safety Requirements in Model Building Codes, *Fire and Materials* **18**, 173-191 (1994).

Grayson, S. J., Babrauskas, V., and Hirschler, M. M., New International Standard will Have Major Impact on Japanese Plastics Standards, *J. Japanese Assn. for Fire Science and Technology* **44**, No. 3 (whole number 210), 6-10 (May/June 1994). Text is in Japanese.

Babrauskas, V., Toxic Hazard from Fires: A Simple Assessment Method, *Fire Safety J.* **20**, 1-14 (1993).

Snell, J. E., Babrauskas, V., and Fowell, A. J., Elements of a Framework for Fire Safety Engineering, pp. 447-456 in INTERFLAM '93, Interscience Communications Ltd, London (1993).

Babrauskas, V., How Will Europe's Unified Standards Affect US Building Products? *NFPA J.* **86**, 45-49 (Sep. /Oct. 1992).

Babrauskas, V., and Grayson, S. J., eds., **Heat Release in Fires**, Elsevier Applied Science Publishers, London (1992).

Babrauskas, V., Peacock, R. D., Braun, E., Bukowski, R. W., and Jones, W. W., Fire Performance of Wire and Cable: Reaction-to-fire Tests—A Critical Review of the Existing Methods and of New Concepts (NIST T.N. 1291), NIST (1991).

Babrauskas, V., and Peacock, R. D., Heat Release Rate: The Single Most Important Variable in Fire Hazard, *Fire Safety J.* **18**, 255-272 (1992).

Babrauskas, V., and Richardson, L., Determining Non-combustibility through Heat Release Rate Measurement, pp. 11-12 in *Heat Release and Fire Hazard: First US Symposium*, Interscience Communications Ltd, London (1991).

Babrauskas, V., Damant, G., and Nurbakhsh, S., Heat Release Rate Testing of Mattresses: Full-Scale Measurements and Bench-scale Predictions, pp. 61-63 in *Heat Release and Fire*

*Hazard: First US Symposium*, San Diego, CA, 1991. Interscience Communications Ltd, London (1991).

Babrauskas, V., Effective Measurement Techniques for Heat, Smoke, and Toxic Fire Gases, *Fire Safety J.* **17**, 13-26 (1991).

Ryan, J. D., Babrauskas, V., O'Neill, T. J., and Hirschler, M. M., Performance Testing for the Corrosivity of Smoke, pp. 75-88 in *Characterization and Toxicity of Smoke* (STP 1082), ASTM (1990).

Babrauskas, V., Smoke and Gas Evolution Rate Measurements on Fire-retarded Plastics with the Cone Calorimeter, *Fire Safety J.* **14**, 135-142 (1989).

Babrauskas, V., Harris, R. H., Jr., Gann, R. G., Levin, B. C., Lee, B. T., Peacock, R. D., Paabo, M., Twilley, W., Yoklavich, M. F., and Clark, H. M., Fire Hazard Comparison of Fire-Retarded and Non-Fire-Retarded Products (NBS Special Publication SP 749), NBS (1988).

Nyden, M. R., and Babrauskas, V., Use of FTIR Spectroscopy for Multi-Component Quantitation in Combustion Technology, pp. 107-1 to 107-4 in 1987 Combined Technical Meetings: Eastern Section, the Combustion Institute, and The Center for Fire Research Annual Conference on Fire Research, Gaithersburg MD (1987).

Babrauskas, V., Smoke and Gas Evolution Rate Measurements on Plastics with the Cone Calorimeter, pp. 20-1 to 20-10 in *Flame Retardants '87* Conference, The Plastics and Rubber Institute, London (1987).

Babrauskas, V., Fire-Related Standards and Testing, pp. 31-41 and 119-130 in *Spacecraft Fire Safety* (NASA Conference Publication 2476), NASA Lewis Research Center, Cleveland OH (1987).

Babrauskas, V., and Parker, W. J., Ignitability Measurements with the Cone Calorimeter, *Fire and Materials* **11**, 31-43 (1987).

Babrauskas, V., Chapter 21.5, Fire Modeling and Analysis—Room Fire Temperature Computations, pp. 21-31 to 21-35 in *Fire Protection Handbook*, A. E. Cote and J. L. Linville, eds., NFPA (1986).

Babrauskas, V., and Krasny, J. F., Fire Behavior of Upholstered Furniture (NBS Monograph 173), NBS (1985).

Quintiere, J. G., Babrauskas, V., Cooper, L., Harkleroad, M., Steckler, K., and Tewarson, A., The Role of Aircraft Panel Materials in Cabin Fires and Their Properties. Federal Aviation Admin. Report DOT/FAA/CT-84/30. FAA, Atlantic City Airport (1985).

Babrauskas, V., Pillow Burning Rates, *Fire Safety J.* **8**, 199-200 (1984/85).

Babrauskas, V., Development of the Cone Calorimeter – A Bench Scale Heat Release Rate Apparatus Based on Oxygen Consumption, *Fire and Materials* **8**, 81-95 (1984).

Babrauskas, V., Estimating Large Pool Fire Burning Rates, *Fire Technology* **19**, 251-261 (1983).

Babrauskas, V., Will the Second Item Ignite? *Fire Safety J.* **4**, 281-292 (1981/82). Also issued as report NBSIR 81-2271.

Babrauskas, V., Estimating Room Flashover Potential, *Fire Technology* **16**, 94-103, 112 (1980).

Babrauskas, V., Flame Lengths Under Ceilings, *Fire and Materials* **4**, 119-126 (1980).

Babrauskas, V., Fire Tests and Hazard Analysis of Upholstered Chairs, *Fire J.* **74**, 35-39 (March 1980).

Babrauskas, V., and Wickström, U. G., Thermoplastic Pool Compartment Fires, *Combustion and Flame* **34**, 195-201 (1979).

Babrauskas, V., and Williamson, R. B., The Historical Basis of Fire Resistance Testing (Parts I and II), *Fire Technology* **14**, 184-194, 205, 304-316 (1978).

Babrauskas, V., Fire Endurance in Buildings (Ph. D. dissertation). Univ. of California, Berkeley (1976).

Babrauskas, V., COMPF: A Program for Calculating Post-flashover Fire Temperatures (UCB FRG 75-2). Fire Research Group, University of California, Berkeley (1975).