

Obituary



Harold E 'Bud' Nelson (1929–2011)

During his 60+ years as a fire protection engineer, Bud Nelson changed the practice of fire protection engineering in a positive and significant way. Bud Nelson, 82, was born in Chicago, IL, USA, on 9 February 1929 and passed away in Fairfax, VA, USA, on 21 July 2011.

Bud attended what is now the Illinois Institute of Technology, beginning in 1946. Upon graduation 4 years later, he was drafted by the US Army. He served at Aberdeen Proving Ground, where he co-founded the 'Scientific and Professional Personnel of Aberdeen Proving Ground Society.'

Following his Army service, Bud accepted a position with the E.I. Dupont Co. While at DuPont, he observed that requirements for fire safety in buildings focused on individual building components – such as beams, columns, partitions, or finish materials – without regard for how fires would start or grow or how those fires would impact the building, its contents or its occupants. This observation started what would become a lifetime quest to improve fire safety design in buildings through an improved understanding of fire science. The approach that he advocated is presently known as 'performance-based design.'

After working for Dupont, Bud accepted a civilian position with the US Navy in what is now known as the Naval Facilities Engineering Command. Shortly thereafter, Bud moved to the US General Services Administration, the agency of the US government that manages real property used by the government, where he was the chief of the accident and fire protection division. While at the General Services

Administration, Nelson chaired the committees of the Federal Fire Council on design and on protection of records.

Following a fire in a computer room in a basement of the pentagon in 1959, Mr Nelson was tasked with investigating the causes and contributing factors of the fire. The fire burned 4,000 square feet (372 m²) of the building and caused \$30 million (USD) in damage. The results of his investigation led to National Fire Protection Association standard number 75, 'Standard for the Protection of Information Technology Equipment.'

Concern in the late 1960s about fire safety in high-rise buildings turned Bud's attention to that subject. He called a series of conferences that brought together some of the nation's leading fire safety experts to develop a strategy for ensuring that high-rise buildings were sufficiently safe from fire. He once again advocated developing fire safety designs based on how fire, the building, and its occupants would interact. Bud also pioneered the use of smoke control in high-rise buildings and the use of voice notification with fire alarms – two fire safety measures that are commonly used today.

Bud's work on fire safety design in high-rise buildings led him to develop the 'goal-oriented systems approach' to fire safety design. The 'goal-oriented systems approach' evaluated the contributions of individual fire safety systems – such as fire suppression, fire detection, or fire compartmentation – to the overall level of fire safety in a building. Ultimately, the results of this work led to the development of National Fire Protection Association guide number 550 – 'Guide to the Fire Safety Concepts Tree.' His 'goal-oriented systems approach' was used as the design methodology in the Henry M Jackson Federal Building in Seattle, WA, USA, and the Smithsonian Air and Space Museum in Washington, DC, USA.

Bud later worked for what is now the National Institute of Standards and Technology in the field of fire research. Unease with fire safety in hospitals led him to develop the 'fire safety evaluation system,' a methodology where points were awarded based on the presence, absence, and performance of individual fire safety systems. The sum of the points for a hospital was used to judge the overall level of fire safety. Bud's 'fire safety evaluation system' was later published as National Fire Protection Association guide number 101A – 'Guide on Alternative Approaches to Life Safety.'

While at the National Institute of Standards and Technology, Bud was an early developer of computer-based fire simulation tools. He developed one of the first fire simulation programs – called 'FIREFORM' – which was a program that would solve simple algebraic equations used to predict the effects of a fire. During this time, he also directed two of his subordinates – Drs Leonard Cooper and David Evans – to develop two pioneering fire simulation tools. 'Available Safe Egress Time,' a program used to determine the rate at which smoke would fill a compartment, was developed by Cooper, while 'Detector Activation – Quasi Steady,' a program to predict the actuation of thermally activated fire detectors, was developed by Evans.

Also while at the National Institute of Standards and Technology, Bud was asked to investigate the fire at the Dupont Plaza hotel in San Juan, Puerto Rico. The fire, which occurred on New Year's eve in 1986, killed 98 people. As part of the fire investigation, Bud was one of the first people to use fire simulation tools to recreate the fire for the purpose of understanding the causes and contributing factors.

In 1992, Bud left the National Institute of Standards and Technology to work for Hughes Associates, a fire protection consulting firm in Baltimore, MD, USA. Subsequently, he served the US government to investigate the fire-related contributing factors that led to the collapse of the buildings at the World Trade Center site on 11 September 2001.

Bud Nelson was a Fellow and past-president of the Society of Fire Protection Engineers, which he joined in 1950 when the Society was founded. Bud was awarded the Kunio Kawagoe Gold Medal for life-long contributions to and career achievements in fire science and the International Association for Fire Safety Science and received gold medals from the US Department of Commerce and the US General Services Administration. The National Fire Protection Association awarded the Standards Medal – their highest award – to Bud for his volunteer service to that organization. He received the National Engineering Award from the American Association of Engineering Societies for 'inspired leadership and devotion to the improvements of fire protection engineering and the reduction of building fire threats to lives and property.' Bud Nelson is the first recipient of the Society of Fire Protection Engineers' Harold E Nelson Service Award.

Survivors include his wife, Theresa, and four children: Theresa, Kathleen, David, and Christopher.

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