

# Building Data Recorders

Black Boxes for Buildings

## An Introduction to BDR Technology

(protected by US Patents 5,680,329 and 5,950,150)

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"Our failure has not been in writing and developing of fire codes but in our inability to ensure code compliance."

Bill Manning, Editor  
Fire Engineering Magazine  
Volume: 149 Issue: 6  
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# Why is there a need for a Building Data Recorder?

- No way to measure Fire/Life safety system performance
- No offsite storage for Fire/Life safety related data
- Lack of manpower to enforce code compliance

# What is a Building Data Recorder?

A “Black Box” for buildings. A proactive system serving as an independent 3rd-party that quantifies the performance of a building’s entire Fire/Life safety system. Based on this, the state of operational readiness and degree of code compliance can be determined.

Good -- Determines what went wrong

Better -- Determines what is wrong

Best -- Determines what will go wrong

All Fire/Life safety systems are monitored

- Sprinkler
- Fire Alarm
- Elevator Recall
- Dust/Particle
- Chem/Bio
- Smoke Evac
- Can incorporate additional systems/sensors as needed

# How does a Building Data Recorders work?

- A system of sensors “on top of” existing infrastructure
  - Wireless
  - Mesh networks
  - Zigbee
- On site data collection
- Real time data transmission
- Off site data storage and analysis
- Real time notification of Fire/Life safety system trouble

# Who can make the Building Data Recorder happen?

- Consortium of Interested Parties
  - Building Owners/Managers
  - Fire Protection companies
  - Code Promulgators
  - State and Federal Govt.
  - Insurance companies
  - Fire Safety Organizations
  - Enforcement Entities
  - Other interested parties
- Develop an industry standard for Building Data Recorder implementation
  - IEEE 1616 “Motor Vehicle Event Data Recorders”

# When can Building Data Recorders become a reality?

- Planes have have Black Boxes
  - Ships have Black Boxes
  - Cars have Black Boxes
- Building are next
- BDRs can be implemented immediately-all the technology is here now
  - Internet, sensors, computers, databases, etc. all exist

# Meeting the Need

## National Construction Safety Team Act (PL 107-231)

- NCST teams are modeled after the National Transportation Safety Board (NTSB) teams that investigate airline crashes
- NTSB teams look for “black boxes” - Flight Data Recorder, Voice (Cockpit) Data Recorder
- NCST teams have no “black box for buildings” to help them determine the cause of building failures
- BDRs will provide the forensics for building fire investigations

# Meeting the Need

Building Data Records can contribute to implementation of the following WTC recommendations:

**Recommendation 13.** NIST recommends that fire alarm and communications systems in buildings should be developed to provide continuous, reliable, and accurate information on the status of life safety conditions at a level of detail sufficient to manage the evacuation process in building fire emergencies, and that standards for their performance be developed.

**Recommendation 14.** NIST recommends that control panels at fire/emergency command stations in buildings should be adapted to accept and interpret a larger quantity of more reliable information from the active fire protection systems that provide tactical decision aids to fireground commanders, including water flow rates from pressure and flow measurement devices, and that standards for their performance be developed.

**Recommendation 15.** NIST recommends that systems should be developed and implemented for: (1) real-time off-site secure transmission of valuable information from fire alarm and other monitored building systems for use by emergency responders, at any location, to enhance situational awareness and response decisions and maintain safe and efficient operations; and (2) preservation of that information either off-site or in a black box that will survive a fire or other building failure for purposes of subsequent investigations and analysis. Standards for the performance of such systems should be developed, and their use should be required.

# Meeting the Need

Building Data Records can contribute to implementation of the following WTC recommendations:

**Recommendation 25.** Nongovernmental and quasi-governmental entities that own or lease buildings and are not subject to building and fire safety code requirements of any governmental jurisdiction are nevertheless concerned about the safety of the building occupants and the responding emergency personnel. NIST recommends that such entities should be encouraged to provide a level of safety that equals or exceeds the level of safety that would be provided by strict compliance with the code requirements of an appropriate governmental jurisdiction. To gain broad public confidence in the safety of such buildings, NIST further recommends that it is important that as-designed and as-built safety be certified by a qualified third party, independent of the building owner(s). The process should not use self-approval for code enforcement in areas including interpretation of code provisions, design approval, product acceptance, certification of the final construction, and post-occupancy inspections over the life of the buildings.

**Recommendation 27.** NIST recommends that building codes should incorporate a provision that requires building owners to retain documents, including supporting calculations and test data, related to building design, construction, maintenance and modifications over the entire life of the building. Means should be developed for offsite storage and maintenance of the documents. In addition, NIST recommends that relevant building information should be made available in suitably designed hard copy or electronic format for use by emergency responders. Such information should be easily accessible by responders during emergencies.

# For Further Information

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# Short Biographies

## John P. Couch

- 18 years with U.S. Department of State's Bureau of Diplomatic Security, serving as a Security Engineering Officer. Currently, the Director of Security Technology Operations - South America
- Bachelor of Electrical Engineering, Villanova University, 1980
- Masters of Science in Electrical Engineering, Georgia Tech, 1982

## Steven J. Lloyd

- 20 years in the fire sprinkler/fire alarm trade
- 4 years with U.S. Department of State's Bureau of Overseas Building Operations, serving as their first-ever Fire Sprinkler Technician (92-96)