



RESEARCH FOUNDATION

RESEARCH FOR THE NFPA MISSION

Economic Impact of Building Regulations

Resources from NFPA and the Fire Protection
Research Foundation

May 9, 2017 | Amanda Kimball, P.E.: Research Director

Agenda

Background – NFPA’s statistical activities to benchmark fire loss

Anecdotal resources – impact of regulation on mitigating fire loss

Total Cost of Fire

2016 Workshop – Economic Impact of Fire

Enveco Tool – Measuring the environmental and cost impact of fire and fire fighting for communities

Current Initiatives:

- The total cost of fire

- The cost of firefighter injury

- Cost impact of residential sprinkler regulation

- Environmental impact of fires in residences

Project Participants

- Funding (Sponsors): *Where does it come from?*
Manufacturers, trade associations, NFPA, federal agencies, research organizations, nowhere, etc...
- Contractors: *Who Does the Work?*
Consultants, research organizations, test labs, universities, NFPA Fire Analysis, volunteers
- Advisory Oversight: *Project Technical Panel*
Typically small (6 to 15)
Meet at important stages of project
(start/end/other)



National
Fire Protection Association
(INTERNATIONAL)

Executive Office, 40 Central Street, Boston, U. S. A.

PROCEEDINGS

—OF—

TWENTY-SEVENTH ANNUAL MEETING

CHICAGO

May 8th, 9th and 10th, 1923

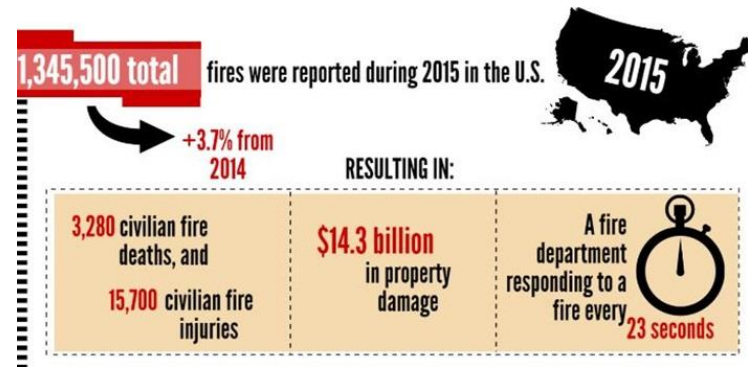
FOR MEMBERS ONLY

Historical Context

- *“to collect sufficient data to enable us to draw general conclusions and to analyze the various factors of the problem of fire waste”*
- R.S. Moulton, 1923

Benchmarking Fire Loss

- Overall fire experience
- Large fires (large dollar loss, catastrophic multiple death)
- On-duty firefighter fatalities and injuries
- National Estimates based on NFIRS data:
 - Home
 - Major causes
 - Fire protection systems
 - Victim Patterns
 - Regional and state patterns
 - Fire department resources



Anecdotal Resources: Impact of regulation on fire safety

- Studies on loss reduction effectiveness of:
 - Code compliance
 - Inspection
 - Smoke alarm installation
 - Home fire sprinkler installation
 - Tamper proof receptacles
 - Firefighter apparatus safety features
- Studies over time on impact of regulation on reducing large loss in:
 - Schools
 - Nursing homes
 - Hospitals



Total Cost of Fire 2014

Core Costs	Billions of Dollars
Economic loss	\$14.9
Local fire department expenditures	\$42.3
Net insurance (premiums minus NFA estimate of reported direct damages)	\$20.2
New building costs for fire protection	\$31.0
Total core costs	\$108.4
Other Costs	
Other economic cost	\$48.9
Cost of statistical deaths and injuries, civilian and firefighter	\$31.7
Cost of coverage by career firefighters of areas now protected by volunteer firefighters	\$139.8
Total	\$328.7

Workshop on Economic Decision Making in Fire and Electrical Safety 2016

- Goal: Explore the resources currently in the fire and electrical safety community, what we might learn from other fields of endeavor that are exploring related questions, and most importantly hear from our stakeholders about their needs in this regard.
- Discussion Questions
 - Do we see the need emerging for dollars and cents types of arguments related to fire safety decision making?
 - What types of economic tools are needed?
 - What data sets are needed?
 - How could NFPA help?



Workshop Key Issues

- There is an increasing need to demonstrate return on investment related to fire and electrical safety requirements to demonstrate the value of fire protection systems, fire department interventions, and community risk reduction efforts.
- There is no standard approach toward this type of evaluation. Simple models that can be used by non-economics trained individuals are needed, with relatively simple inputs but with rigorous back end independent models.
- Outputs need to be in a form that can be used at the local jurisdiction level.
- Data is needed for all of these applications and includes both direct and indirect costs, opportunity costs, more sophisticated assumptions related to injuries, life cycle costs, and various community related data sets.
- NFPA can play an important role as an independent source of fire related data and tools that are standardized and can be used across jurisdictions.
- Collaboration with other organizations with similar needs can extend the resources and the impact of these activities.

Environmental and Economic Assessment Tool (Enveco Tool) for Fire Events

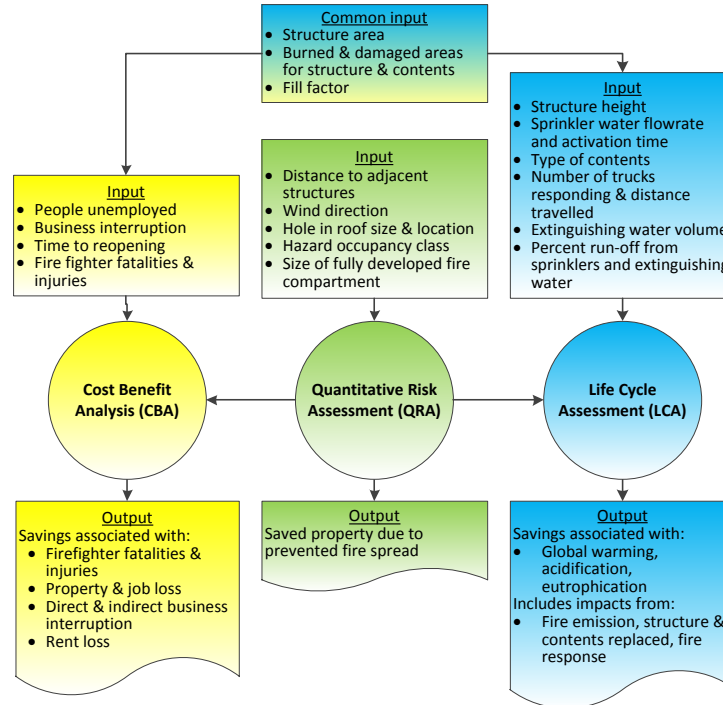
- Goal: determine whether it is feasible to develop a tool that provides a consistent methodology for assessing the performance of the fire service with respect to two impacts of fire on communities:
 - Environmental impacts
 - Economic impacts
- Work completed by SP
- Report available on Foundation website

Enveco Approach

- Quantitative Risk Assessment (QRA)
- Life Cycle Assessment (LCA)
- Cost Benefit Analysis (CBA)
- Warehouse fire case study
- Compares actual case of a warehouse fire with a hypothetical case of no fire service response



Enveco Approach



Initial Feedback

- Need to simplify inputs for use in the fire service
- Consider other occupancy types – specifically residential
- Focus more on the economic analysis
- The report and prototype tool are available through the Foundation

Next Steps on Economic Decision Making

- As a result of input and recommendations from the workshop we will be launching a series of projects over the next year designed to develop some resources for the community. They are:
 - Goal: To develop a toolkit of data and information related to the issue of the economic impact of fire.
 - Goal: To compile available information on the impact of codes and standards on safety (not necessarily economic impact)
 - Goal: To develop a tool for fire departments to illustrate the economic savings to the community they provide through firefighting/interventions and pilot with three or more fire departments (enhancements/simplification of the Enveco tool)
 - Goal: To conduct an assessment of the economic impact of home fire sprinkler regulation in California – five years later.
 - Goal: Conduct a workshop focusing on developing guidance on approaches to evaluate the impact of code changes in collaboration with other stakeholder organizations



Current Initiatives

- Total Cost of Fire – SUNY Buffalo
- Cost impact of residential sprinkler regulation in CA – Harvard School of Public Health
- The cost of firefighter injury – National Institute of Standards and Technology (proposed)
- Environmental impact of fires in residences – RISE (Swedish Fire Research Institute) (proposed)

Total Cost of Fire - 2017

- Goal: To develop a toolkit of data and information related to the issue of the economic impact of fire.
- Tasks:
 - Data gathering: relevant studies and analysis methods
 - Expand data resources on indirect losses due to fire
 - Update of the NFPA report “Total Cost of Fire”

Total Cost of Fire (cont.)

- Output:
 - Expanded set of data on economic impact of fire
 - Most up to date information on the total cost of fire
 - Foundation of information for other project initiatives
- Contractor: University of Buffalo
- Report available in summer of 2017



“California Study”

- Goal: To conduct an assessment of the economic impact of home fire sprinkler regulation in California – five years later.
- CA has had a home fire sprinkler regulation in place for 5 years, have data to conduct an economic impact assessment



“California Study” (cont.)

- The proposed assessment will explore the economic impact of home fire sprinklers as it relates to the housing market and fire prevention
 - Home affordability
 - Housing starts
- Intent is for research to compare the economic impact when sprinklers were not required against when they were, presenting a factual economic picture that is useful beyond California.
- Report available in Summer 2017
- Harvard School of Public Health



Planned Initiatives

- Develop tool for FDs to illustrate cost savings from interventions to the community – pilot with 3-4 departments
- Conduct a workshop focusing on developing guidance on approaches to evaluate the impact of code changes



Economic Tool for FDs

- Goal: To develop a tool for fire departments to illustrate the economic savings to the community they provide through firefighting/interventions and pilot with three or more fire departments
- Work with the Urban Fire Forum for pilot FDs and for communication

Economic Tool for FDs (cont.)

- Same premise as the Enveco project – a generalized tool that can be used by any FD
 - Enhancements/simplification of the Enveco tool
 - Will use the initial feedback on the Enveco tool to enhance this effort
- Report by end of 2017
- Initial focus on FDs, but possibility that this type of analysis could be applied to other stakeholder groups in the future

Proposed 2017 Workshop

- Goal: Conduct a workshop focusing on developing guidance on approaches to evaluate the impact of code changes in collaboration with other stakeholder organizations
- Workshop will attempt to focus on the research needs relating to economic impact around code adoption and code change activities

Proposed 2017 Workshop (cont.)

- Date TBD
- Feedback and ideas from this group is certainly welcome as we plan the next steps





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Questions



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Thank You