The Building Code Effectiveness Grading Schedule (BCEGS®)

Colorado CRS Committee

August 25, 2016 - Denver Colorado

ISO

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Presenter: Dale K. Thomure, CBO, CFM
Community Hazard Mitigation Manager - ISO

About the presentation today……

- Who are we? What do we do?
- The Building Code Effectiveness Grading Schedule (BCEGS)
- BCEGS classifications in Colorado
- Application and use of BCEGS
- Academic studies about building code enforcement
- Future development of BCEGS

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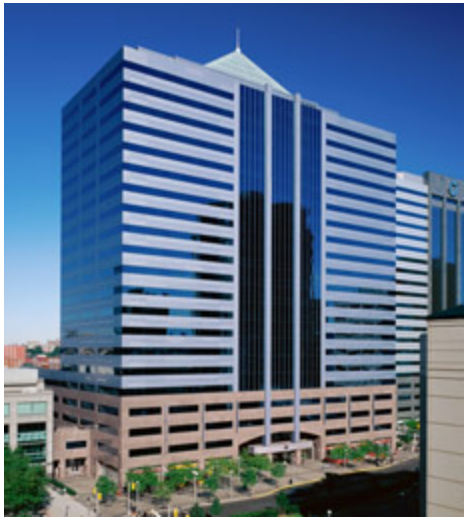
- Actuarial data
- Underwriting information
- Standardized coverage forms
- Class & rating programs
- Advisory services



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ISO – Community Mitigation Programs

Fire Suppression Rating Schedule (FSRS)

- Public Protection Classification (PPC ®) Program

Building Code Effectiveness Grading Schedule (BCEGS®)

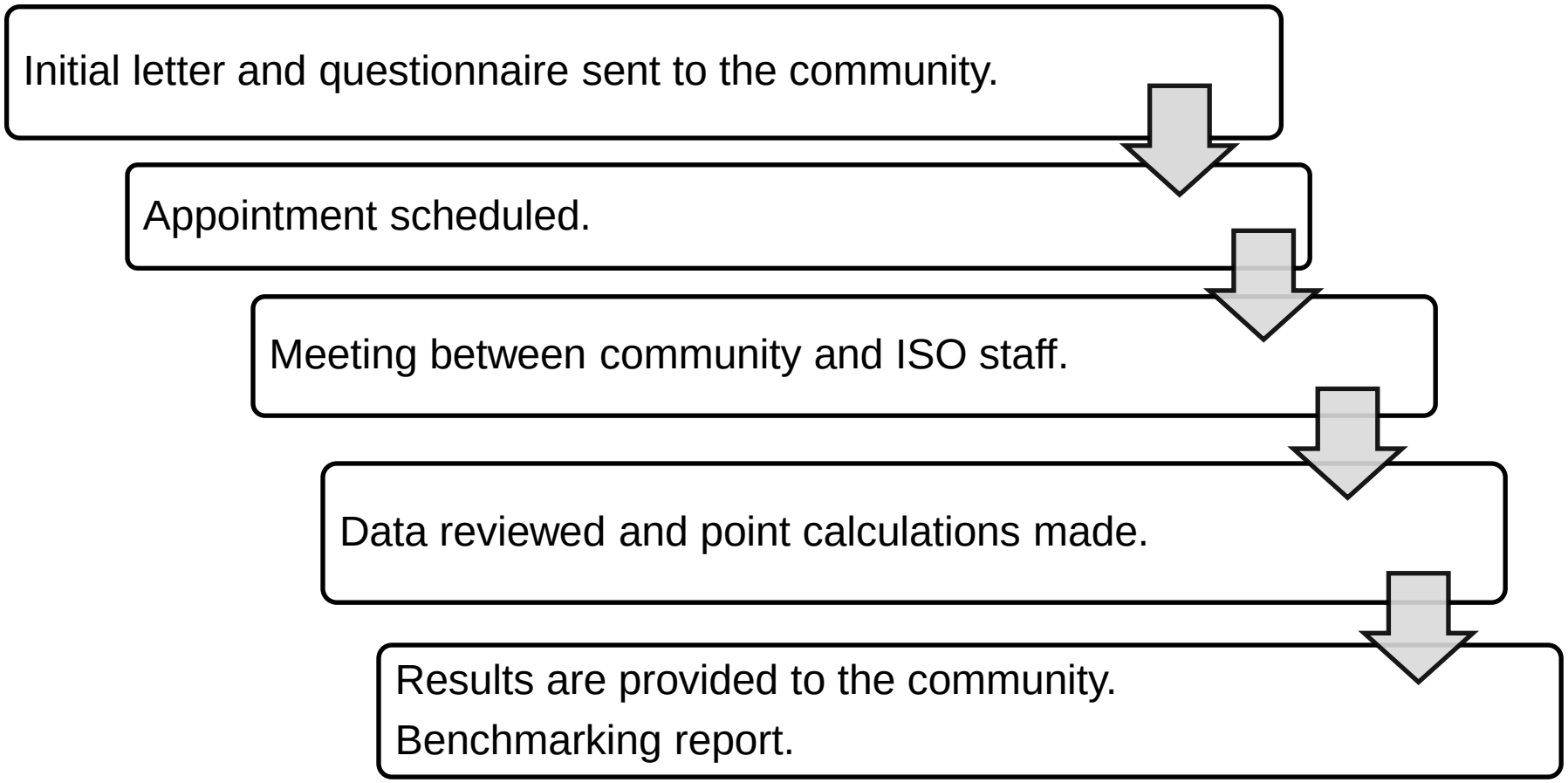
FEMA/NFIP Community Rating System (CRS)

* Administrator of program

What is BCEGS?

- Rating Program
  - Measures resources and support made available to the enforcement of building codes and the utilization of those resources.
    - Objectives:
      - Improved enforcement of building codes
      - Better catastrophe-resistant buildings
      - Reduce insurance losses.
  - Born from high-loss events in 1992 and 1994.
  - Modeled after the PPC Program.
  - Created as a cooperative effort between government and industry.
  - National implementation started in 1995 - Colorado in 1998.
  - Approved or licensed in all 50 states.
    - Bureau States
    - State Filings
  - BCEGS Schedule
    - Second Edition

BCEGS Survey Workflow



Preparing for a BCEGS Survey

Information reviewed during the survey:

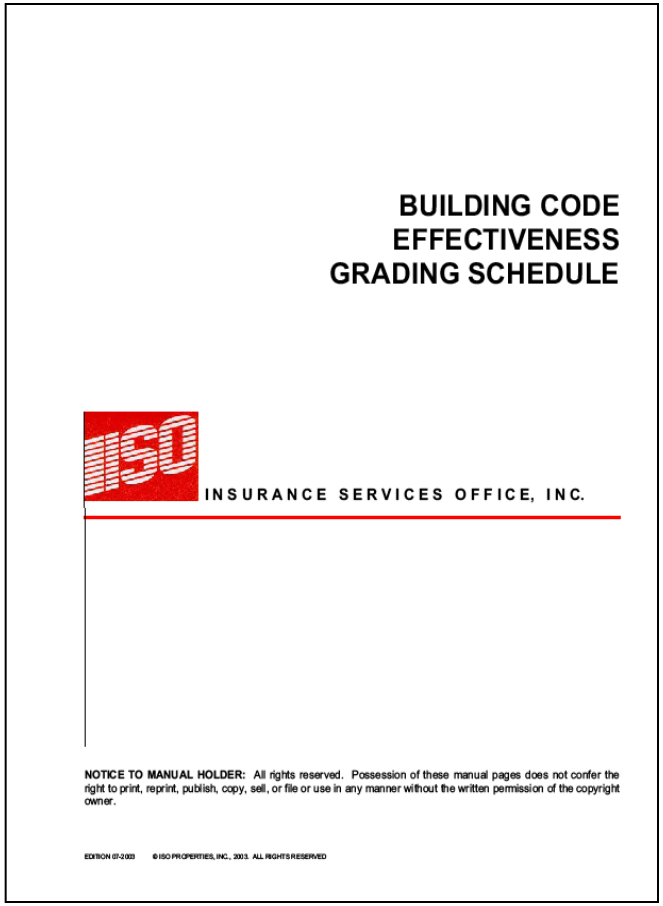
- BCEGS questionnaire
  - Data for a 12-month period
- Code adoption ordinances
- Job descriptions
- Budget information
- Employee Data Sheets (EDS)

All in the Numbers

- Permits
- Plan reviews
- Inspections
- Responsibilities
- Training
- Certification
- Continuing education
- Budget information
- Public awareness
- Property value

BCEGS Key Program Elements

- Minimum criteria for inclusion
- Assigns a rating of 1-10
  - Personal Lines Rating
  - Commercial Lines Rating
- Updated on a 5-year cycle
- Areas of review
  - Administration of codes (54%)
  - Review of building plans (23%)
  - Field inspections (23%)


BUILDING CODE
EFFECTIVENESS
GRADING SCHEDULE

INSURANCE SERVICES OFFICE, INC.

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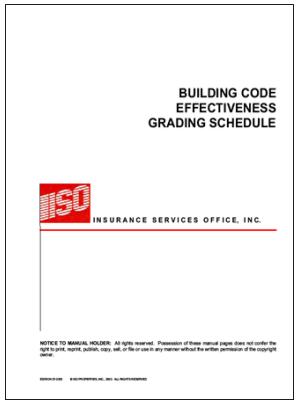
Section I: Administration of Codes – 54%

Overview:

- Adoption of building codes
- Training of staff
- Certification of staff
- Incentive programs
- Building official qualifications



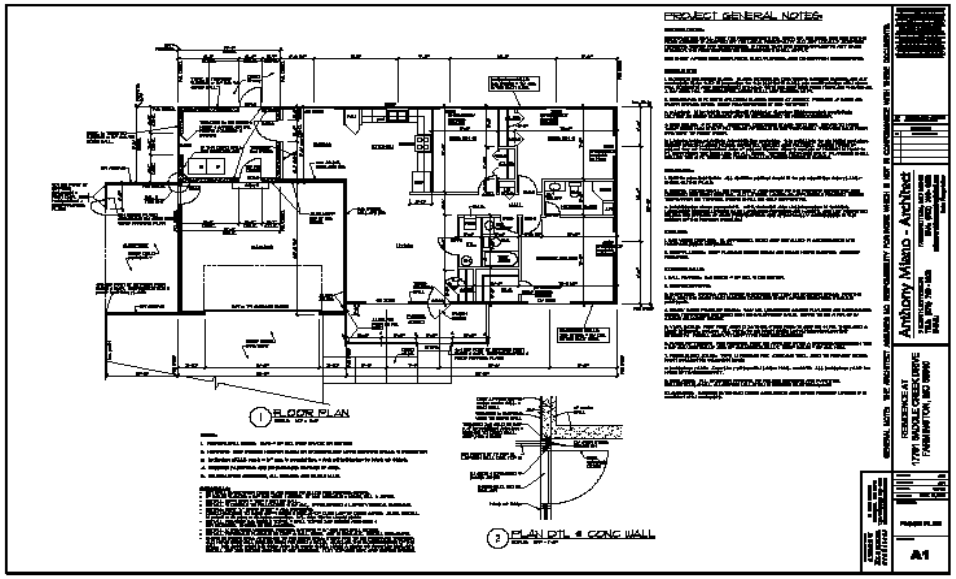
BCEGS Schedule - Section I

SECTION	ITEM	POINTS POSSIBLE
105	Adopted Codes	8.00
108	Additional Code Adoptions	4.00
110	Modification to Adopted Codes	4.00
112	Method of Code Adoption	1.00
115	Training	13.00
120	Certification	12.00
125	Building Official – Qualifications / Experience / Education	4.00
130	Selection Procedures for Building Official	.50
135	Design Professionals	2.0
140	Zoning Provisions	1.0
145	Contractor / Builder Licensing and Bonding	1.0
155	Public Awareness Programs	2.50
160	Participation in Code Development Activities	.50
165	Administrative Policies and Procedures	.50
TOTAL POINTS IN SECTION I		**54.00**

Section II: Plan Review– 23%

Overview:

- Staffing
- Qualifications of plan review staff
- Detail of plan review
- Quality assurance



BCEGS Schedule - Section II

SECTION	ITEM	POINTS POSSIBLE
205	Existing Plan Review Staffing	9.00
210	Experience of Personnel	1.50
215	Detail of Plan Review	11.50
220	Performance Evaluations for Quality Assurance	1.0
TOTAL POINTS IN SECTION II		**23.00**

Section III: Inspection – 23%

Overview:

- Staffing
- Qualifications
- Level of detail of inspections
- Final inspections and occupancy permits
- Quality assurance


BUILDING CODE
EFFECTIVENESS
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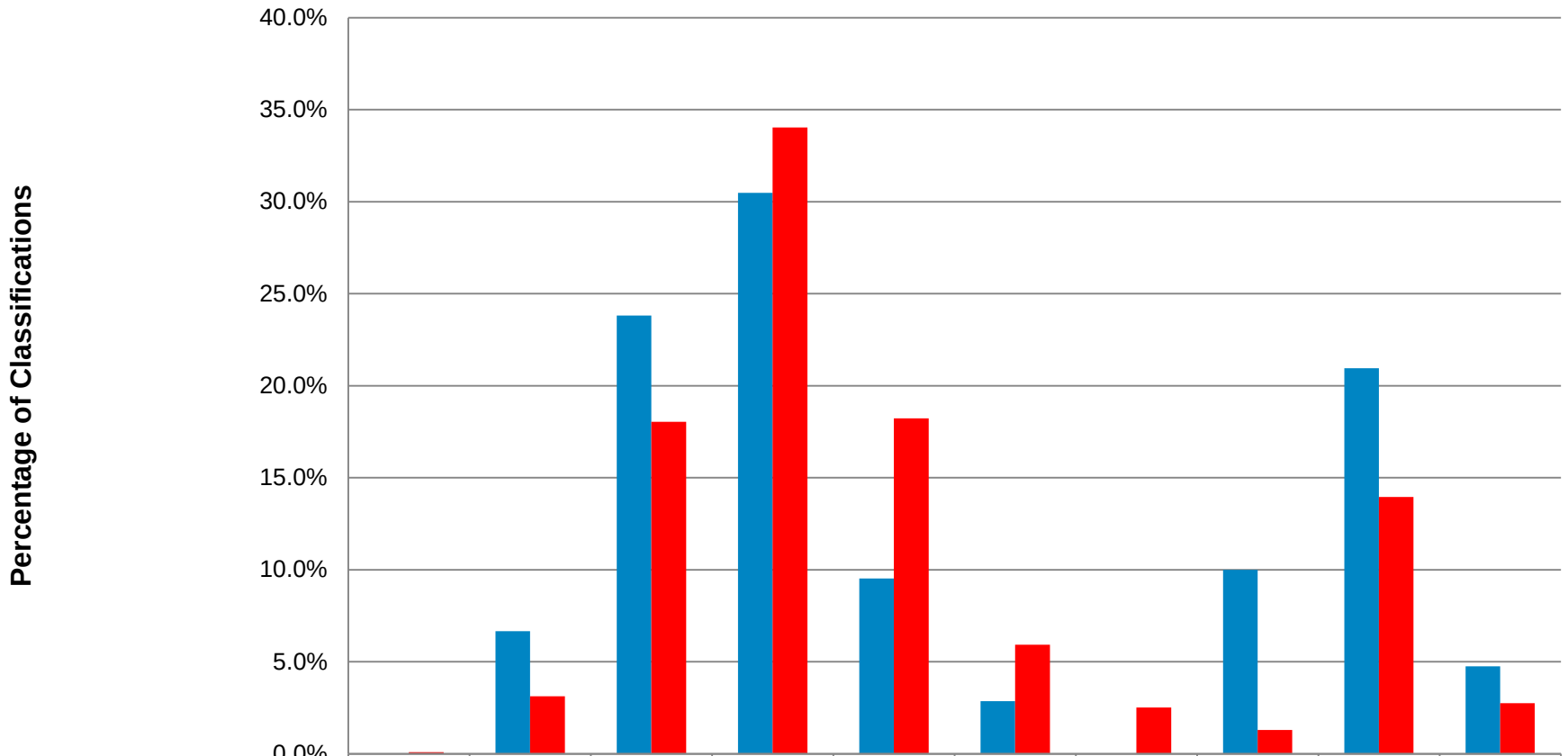
BCEGS Schedule - Section III

SECTION	ITEM	POINTS POSSIBLE
305	Existing Inspection Staffing	9.00
310	Experience of Personnel	3.0
315	Managing Inspection and Re-inspection Activity	1.0
320	Inspection Checklists	2.0
325	Special Inspections	1.0
330	Inspections for Natural Hazard Mitigation	1.50
335	Final Inspections	2.50
340	Certificate of Occupancy Programs	2.0
345	Performance Evaluations for Quality Assurance	1.0
TOTAL POINTS IN SECTION III		**23.00**

National BCEGS Classifications

Distribution of Building Code Enforcement Departments by BCEGS Classifications
Personal Lines Only
State of Colorado compared to the Nation

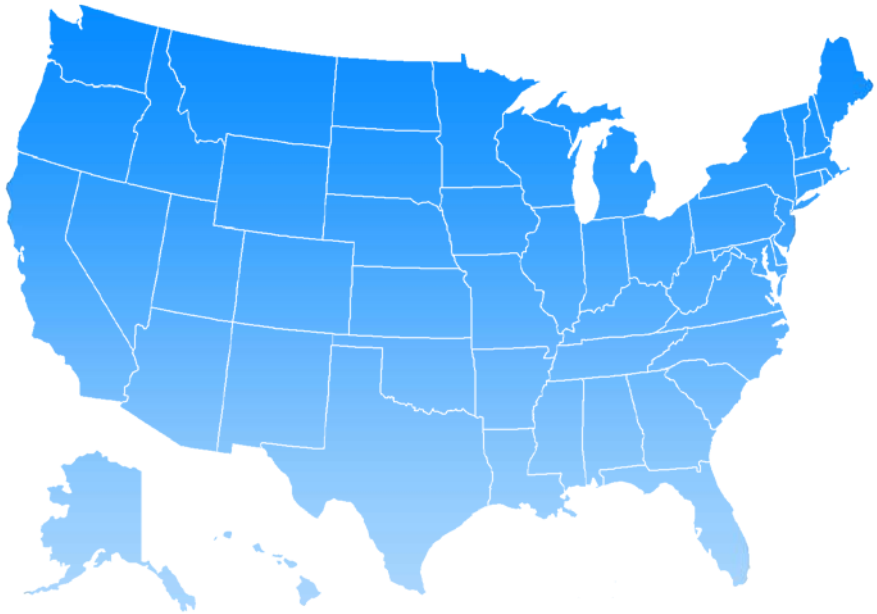


	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10
Colorado	0.0%	6.7%	23.8%	30.5%	9.5%	2.9%	0.0%	10.0%	21.0%	4.8%
National BCEGS Classifications	0.1%	3.1%	18.0%	34.0%	18.2%	5.9%	2.5%	1.3%	14.0%	2.8%

BCEGS At-A-Glance

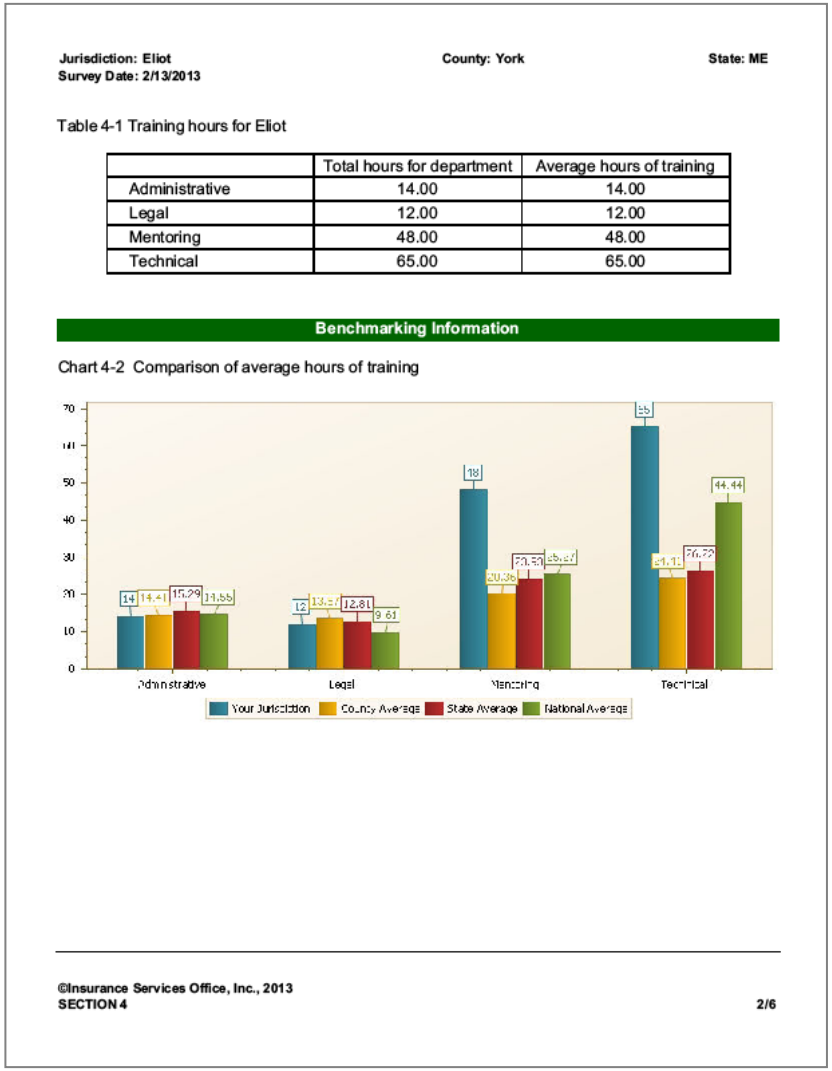
Classifications covering approximately 17,000 unique departments that are protecting 20,000 communities the population of which comprises 87% of U.S. population.

Each BCEGS survey collects 1,243 individual data elements – The BCEGS database contains over 43 Million individual data elements.



Benchmarking Report

- Section by section results
  - Staffing
  - Training
  - Code Adoption
- Peer comparisons
  - County, State and National
- Comparison to previous result
- Natural hazard frequency
- Unique customized report



Jurisdiction: Eliot **County: York** **State: ME**
Survey Date: 2/13/2013

Table 4-1 Training hours for Eliot

	Total hours for department	Average hours of training
Administrative	14.00	14.00
Legal	12.00	12.00
Mentoring	48.00	48.00
Technical	65.00	65.00

Benchmarking Information

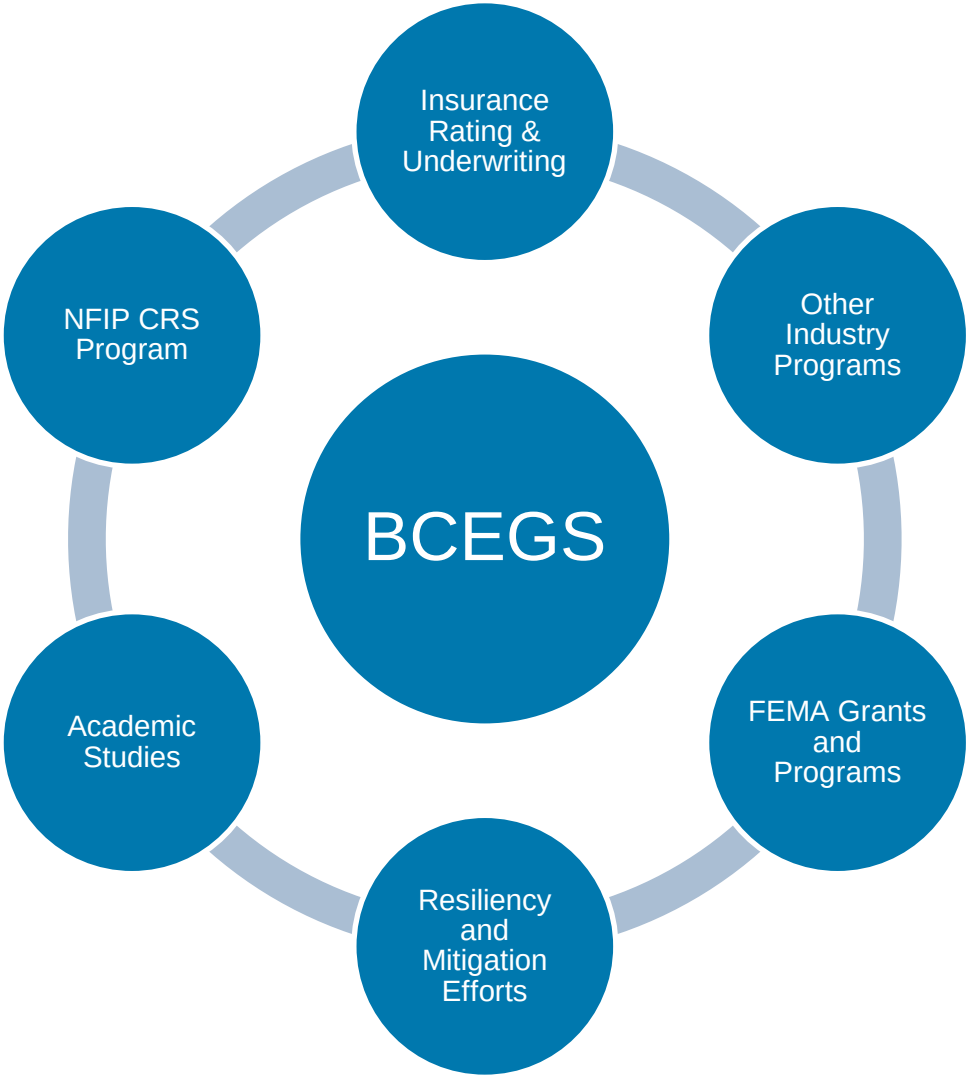
Chart 4-2 Comparison of average hours of training

SECTION 4 2/6

BCEGS: Value

The Value to Insurers	The Value to Communities
The ability to: **A**ssess—with reasonable assurance of accuracy—the dollar value of potential losses within communities **D**ecide—make informed underwriting decisions, selecting or rejecting risks based on potential loss and loss magnitude **P**rice—provide coverages at adequate premiums and determine credits or surcharges that address unique situations **M**arket—seek to meet insurance needs with the most appropriate programs at the most reasonable cost **R**eview—regularly look at books of business and conduct portfolio analyses	The ability to: **A**ssess—review the community's readiness (its strengths and weaknesses) to face catastrophes as well as everyday perils **A**nticipate—estimate the costs to implement programs that would mitigate loss if a catastrophe should occur **R**ecommend—develop mitigation programs and support those recommendations with solid estimates of potential losses and costs **C**ontinually improve—implement mitigation programs and develop long-range plans to steadily and constantly improve **M**anage risk—reduce risk to public properties and services to businesses and to all citizens

BCEGS Data Applicability



BCEGS and PPC

Is there any connection between the BCEGS classification and the PPC classification of my community? **YES!**

There are direct impacts of the performance of your building code department upon the PPC classification that your community may receive due to the Needed Fire Flow (NFF) calculations in the PPC program and activities recognized in the Community Risk Reduction (CRR) section of the PPC Schedule.

- NFF calculations determine the amount of fire department resources that are required for a protection class.
  - If the building code department is enforcing the building code provisions of automatic sprinkler systems in commercial buildings, then the NFF is reduced. Thereby, requiring a department to expend less resources to achieve a favorable classification.
- Additionally, community planning efforts and land-use regulations can also have an impact upon NFF due to the distance between buildings.
- Additional credit is given in the PPC classification (CRR) for risk reduction efforts in the jurisdiction.
  - Annual Inspection Programs
  - Fire Prevention Code Adoption / Enforcement

BCEGS and PPC: Equipment Required Based on NFF

Building NFF based on:

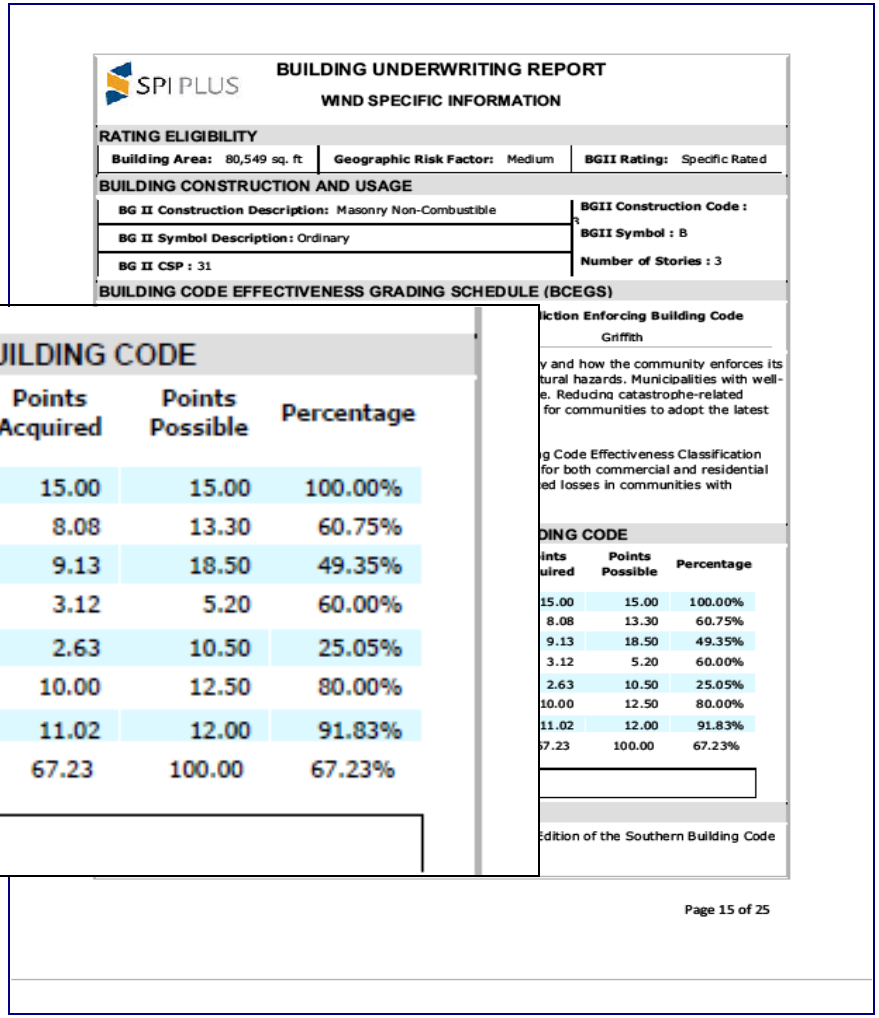
- Effective area
- Construction Factor
- Occupancy Factor
- Exposure Factor
- Needed Fire Flow Reports
- Sprinklered - NFF = 0 gpm

Basic Fire Flow	Needed Engines
500 – 1000 gpm	1
1250 – 2500 gpm	2
3000 – 3500 gpm	3

Additional engines may be needed by operations

BCEGS Data Application

- Building Underwriting Reports (BUR)



SPI PLUS

BUILDING UNDERWRITING REPORT

WIND SPECIFIC INFORMATION

RATING ELIGIBILITY

Building Area: 80,549 sq. ft	Geographic Risk Factor: Medium	BGII Rating: Specific Rated

BUILDING CONSTRUCTION AND USAGE

BG II Construction Description: Masonry Non-Combustible	BGII Construction Code :
BG II Symbol Description: Ordinary	BGII Symbol : B
BG II CSP : 31	Number of Stories : 3

BUILDING CODE EFFECTIVENESS GRADING SCHEDULE (BCEGS)

BCEGS SCORING FOR JURISDICTION ENFORCING BUILDING CODE

	Section	Points Acquired	Points Possible	Percentage
Section I – Administration of Codes	Code Adoption	15.00	15.00	100.00%
	Training	8.08	13.30	60.75%
	Certificate and Experience	9.13	18.50	49.35%
	Code Administration	3.12	5.20	60.00%
Section II –Plan Review	Plan Review Staffing	2.63	10.50	25.05%
	Plan Review Detail	10.00	12.50	80.00%
Section III –Field	Field Inspection Staffing	11.02	12.00	91.83%
	TOTAL	67.23	100.00	67.23%

BCEGS Commercial Classification: 05

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BCEGS Data Application

BCEGS in BG II Loss Cost

- *Advisory Loss Cost* is a projection of an insurer's average future loss and loss adjustment expenses
  - Our most comprehensive analytic for the industry!
- Delivered for both BG I (fire) and BG II (wind)
- Based on Construction, Occupancy, Protection and Exposure (COPE) information published by Verisk
- Developed using field-verified property information as well as historical premium and claims data
- BCEGS factor can be used by insurers to adjust the BG II loss Cost
- Utilizes ISO's 3 rating schedules – SCOPES, FSRS and BCEGS
- Loss Cost + Expense Load + Profit Load = Rate

BCEGS Data Application

BCEGS in BG II Loss Cost

ProMetrix | Verisk Insurance Solutions™ Commercial Property

LOSS COST QUOTE

Policy# /Insured: P234333

1000 TURNPIKE WEST
WINTER GARDEN, FLORIDA 34787
County : ORANGE

ISO Risk ID: 09 FL99 244707
On-Site Survey Date: 09/2013
Schedule Applied Date: 09/06/2013
File: FL60003

Building Rating Details for Basic Group I (BG I) and Basic Group II (BG II)

Building - SMITHEE VOCATIONAL (2S)		**CSP Class: 0921**	**Line #: 010**
BG I Loss Cost-Specific	**ELA Factor**	**BG II Loss Cost-Class**	
.023	.317	.040	
Enhanced Wind Basic Group II Loss Cost Information (more info)			
BG II Enhanced Loss Cost-Specific	**Wind Factor Indicated**	**Wind Factor Applied**	**BCEGS Factor**
.037	.925	.925	.910

Occupant - VOCATIONAL TRADE SCHOOL		**CSP Class: 0921**	**Line #: 015**
BG I Loss Cost-Specific	**ELA Factor**	**BG II Loss Cost-Class**	
.035	.317	.023	
Enhanced Wind Basic Group II Loss Cost Information (more info)			
BG II Enhanced Loss Cost-Specific	**Wind Factor Indicated**	**Wind Factor Applied**	**BCEGS Factor**
.021	.925	.925	.910

m installed

-Combustible With
Roof

Limit of Insurance Applicable more info
No

010
t-Class

BG II Enhanced Loss Cost-Specific	Wind Factor Indicated	Wind Factor Applied	BCEGS Factor
.037	.925	.925	.910

Occupant - VOCATIONAL TRADE SCHOOL CSP Class: 0921 Line #: 015

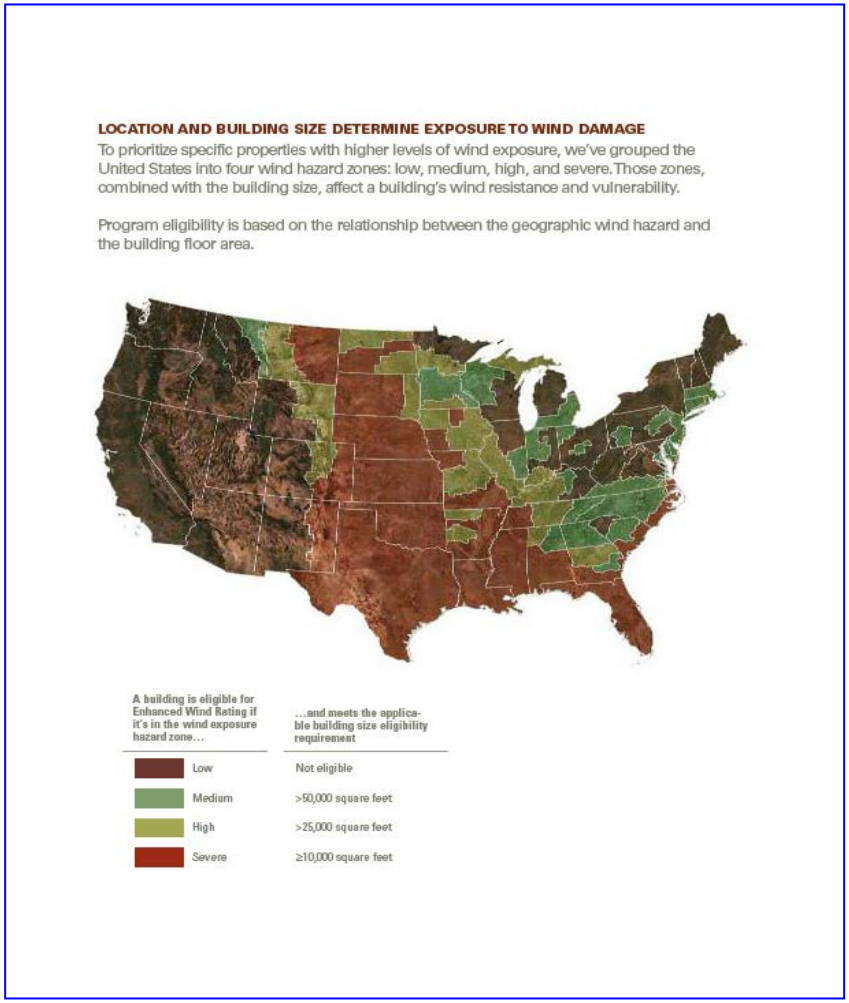
BG I Loss Cost-Specific	ELA Factor	BG II Loss Cost-Class
.035	.317	.023

Enhanced Wind Basic Group II Loss Cost Information (more info)

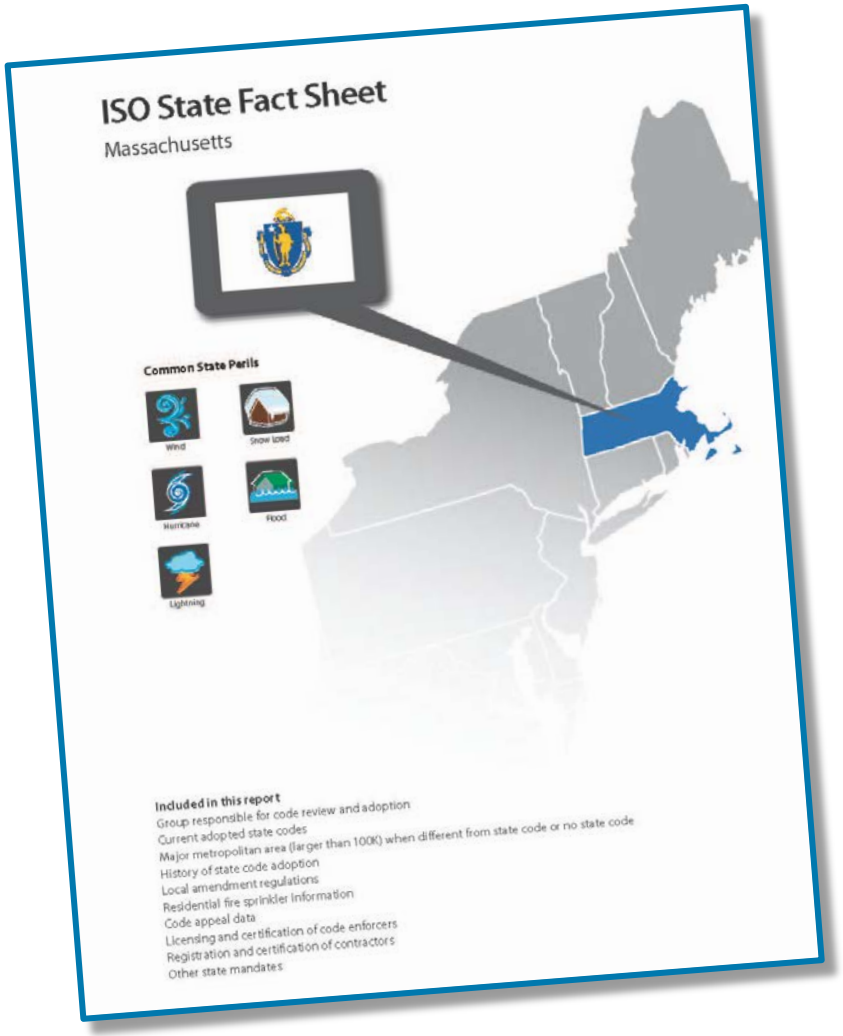
BG II Enhanced Loss Cost-Specific	Wind Factor Indicated	Wind Factor Applied	BCEGS Factor
.021	.925	.925	.910

BCEGS Data Application

- Enhanced Wind Rating Program
  - Modification to Loss-Cost based on details specific to a building



BCEGS Data Application
State Fact Sheets



- Over 200 data elements per state
- Includes Major Metropolitan Areas
- Includes Code Adoption History
- FEMA Use

BCEGS Data Application

- Community Rating System (CRS)

432.h BC2 credits the community's Building Code Effectiveness Grading Schedule (BCEGS) classification.

(2) BC2 = one of the following. These points are not cumulative.

(a) 10 points, for a BCEGS classification of 5/5, OR

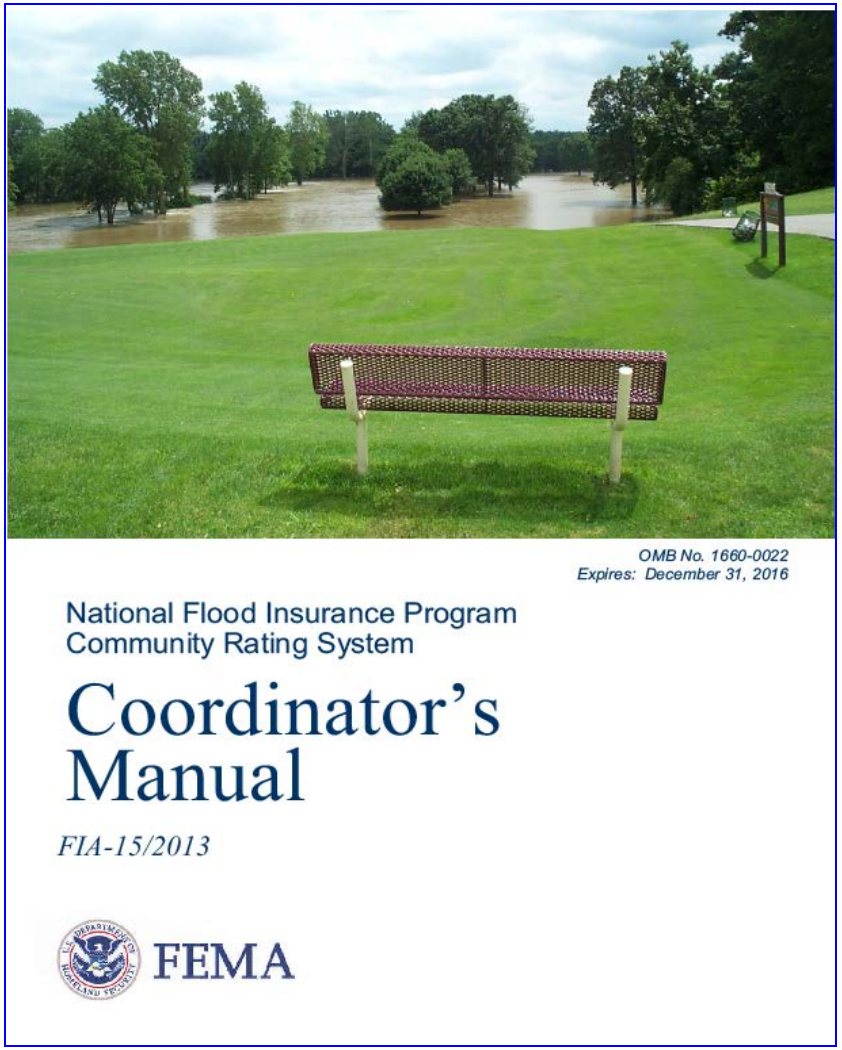
(b) 20 points, for a BCEGS classification of 4/4, OR

(c) 30 points, for a BCEGS classification of 3/3, OR

(d) 40 points, for a BCEGS classification of 2/2, OR

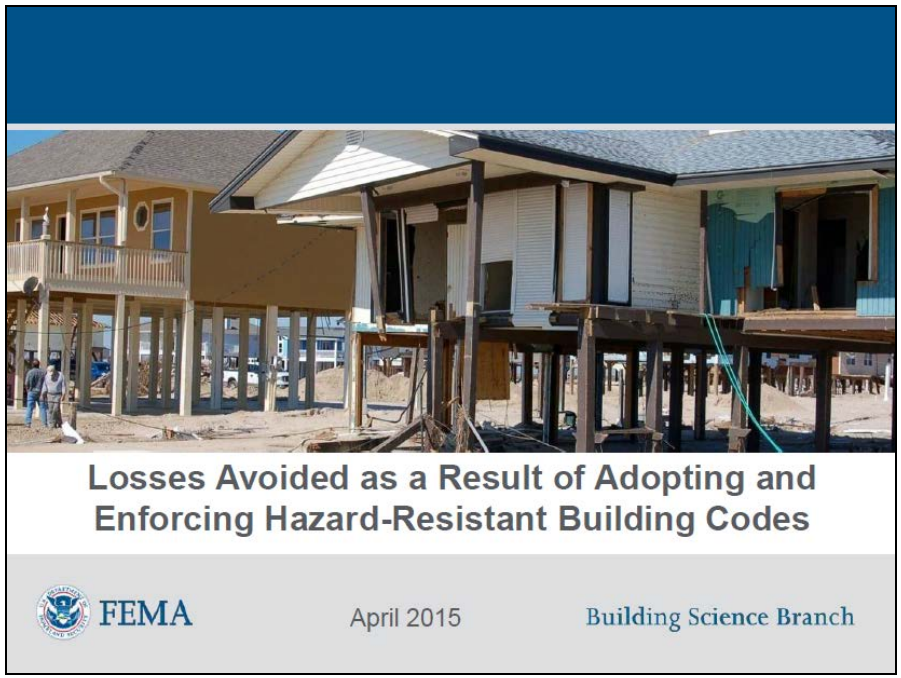
(e) 50 points, for a BCEGS classification of 1/1

b. **Class 6 Prerequisite:** To become a Class 6 or better community, a community must have received a classification of 5/5 or better under the Building Code Effectiveness Grading Schedule.



BCEGS Data Application

- FEMA
  - Loss Avoidance
  - Mitigation Planning



Building Codes in the New Madrid Seismic Zone (NMSZ)

FEMA
www.fema.gov

Building codes are the technical requirements for design and construction of buildings. In the U.S., State and local governments have jurisdiction over adoption and enforcement of local building codes. Since developing such highly technical documents involves extensive knowledge, skills, and resources, it is practical that the national model codes are adopted by the State and local jurisdictions. The national model building codes such as the *International Building Code®* (IBC®) and *International Residential Code®* (IRC®) have all included consensus-based minimum design requirements to resist seismic and other natural hazards. History has proven that communities that adopted and enforced building codes with full seismic provisions can significantly reduce loss of life and property in major earthquakes. FEMA under the National Earthquake Hazard Reduction Program (NEHRP) strongly encourages States and local communities to adopt and enforce the national model building codes with full seismic provisions.

The New Madrid Seismic Zone (NMSZ) stretches over 5000 square miles across seven States (Arkansas, Illinois, Indiana, Kentucky, Mississippi, Missouri, and Tennessee). Today over nine million people reside in this area. Approximately 200 years ago, three great earthquakes struck within a two-month period and caused extensive damage and casualties. Even though earthquakes have not occurred as frequently as in California, the area has long been recognized to be vulnerable if hit again by a great earthquake of similar magnitude. Despite the significant risk, many communities here have not taken sufficient earthquake protection, in particular, adoption and enforcement of building codes in the NMSZ is yet spotty at best.

Building Codes at State Level

To date, among the seven States in the NMSZ, four (Arkansas, Indiana, Kentucky, and Tennessee) have statewide building codes as minimum requirements, but three (Illinois, Mississippi, Missouri) do not and they pass the responsibility to the local jurisdictions to adopt the codes themselves under State guidance. While all the statewide building codes have adopted the national model codes, one State also adopted amendments that weakened the model codes. In the States where statewide building codes are mandatory, a local jurisdiction still has to introduce ordinances to adopt and enforce the State building codes for the jurisdiction. The following summarizes the building codes in each of the seven States.

The State of Arkansas has adopted the 2006 International Codes, including IBC and IRC, into its State code - the *Arkansas Fire Prevention Code*. The State code is mandatory and applicable to all buildings. It is required that local codes must be in accordance with the State code, and only more stringent amendments are allowed by local adoption. The State only oversees code enforcement for state capital investments. Local authorities have jurisdiction over private, district, municipal and county constructions.

The State of Illinois has no statewide mandatory building code in place. Building code adoption and enforcement is primarily the responsibility of local authority having jurisdiction. The Capital Development Board of the State government oversees design and construction of new buildings for schools, universities, and State-owned facilities. The seismic requirements of the standard for Illinois school constructions are based on 1994 Uniform Building Code.

The State of Indiana has statewide building and residential codes based on the 2006 IBC and 2003 IRC. The State requires mandatory enforcement of the codes and only allows more stringent amendments by local adoption. A State agency oversees code enforcement for public, commercial, industrialized buildings and mobile structures. Local jurisdictions are responsible for one- and two-family dwellings.

The State of Kentucky has adopted the 2006 IBC and IRC with specific Kentucky amendments. The amendments weakened the model building codes by downgrading the designated seismic design categories to lower levels. The Kentucky Building Code (KBC) is mandatory statewide. Local jurisdictions may not amend the State code. The codes are applicable to all buildings except farm dwellings and those manufactured home constructions following the Federal Housing and Urban Development (HUD) standards.

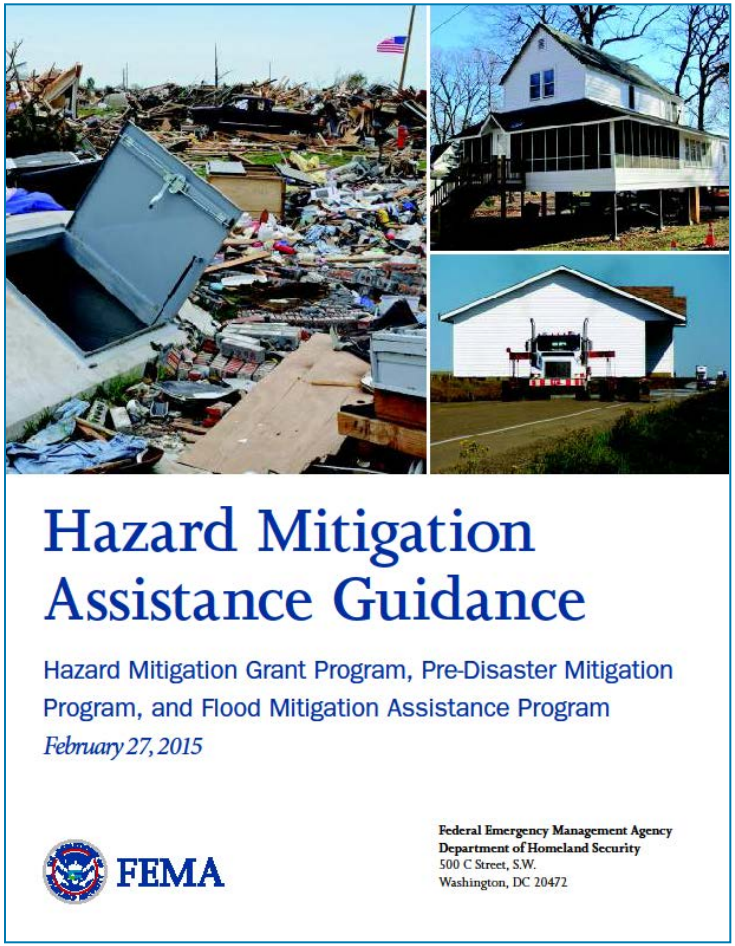
The State of Mississippi does not have statewide building codes. Building code adoption and enforcement is primarily the responsibility of local jurisdictions. Mississippi requires that all State buildings meet the requirements set forth in the 1997 Standard Building Code. In 2006, Bill 1406 created the Mississippi Building Code Council, and required five coastal counties (Hancock, Harrison, Jackson, Pearl River, and Stone) to enforce, on an emergency basis, all of the wind and flood mitigation requirements prescribed by the 2003 IBC and IRC.

1

BCEGS Data Application

FEMA Hazard Mitigation Grant Program

- Part of Hazard Mitigation Assistance (HMA)
- Additional 5% Initiative
  - 5% may be used to fund additional hazard mitigation measures
  - May increase up to 10% for additional activities that promote disaster-resistant codes
- Must adopt disaster-resistant codes or improve BCEGS score.



BCEGS Data Application
FEMA PDM Grant Programs

- Part of Hazard Mitigation Assistance (HMA)
- BCEGS Classifications used to prioritize applications.
- Introduced in 2015 Cycle

FEMA Fact Sheet

Key FY 2015 PDM Grant Program Changes

- FEMA revised the application limits from FY 2014 to allow a maximum of 3 project sub-applications out of 11 sub-applications per applicant: 10 for mitigation planning and projects, plus 1 management cost sub-application for applicant management costs up to 10% of the total of the planning and project sub-applications.
- FEMA will prioritize mitigation planning and project sub-applications from applicants without Hazard Mitigation Grant Program (HMGP) funds available before applications from applicants with HMGP funds available.
- FEMA will prioritize activities in communities with the highest assessed Building Code Effectiveness Grading Schedule rating from a grade of 1 to 10.

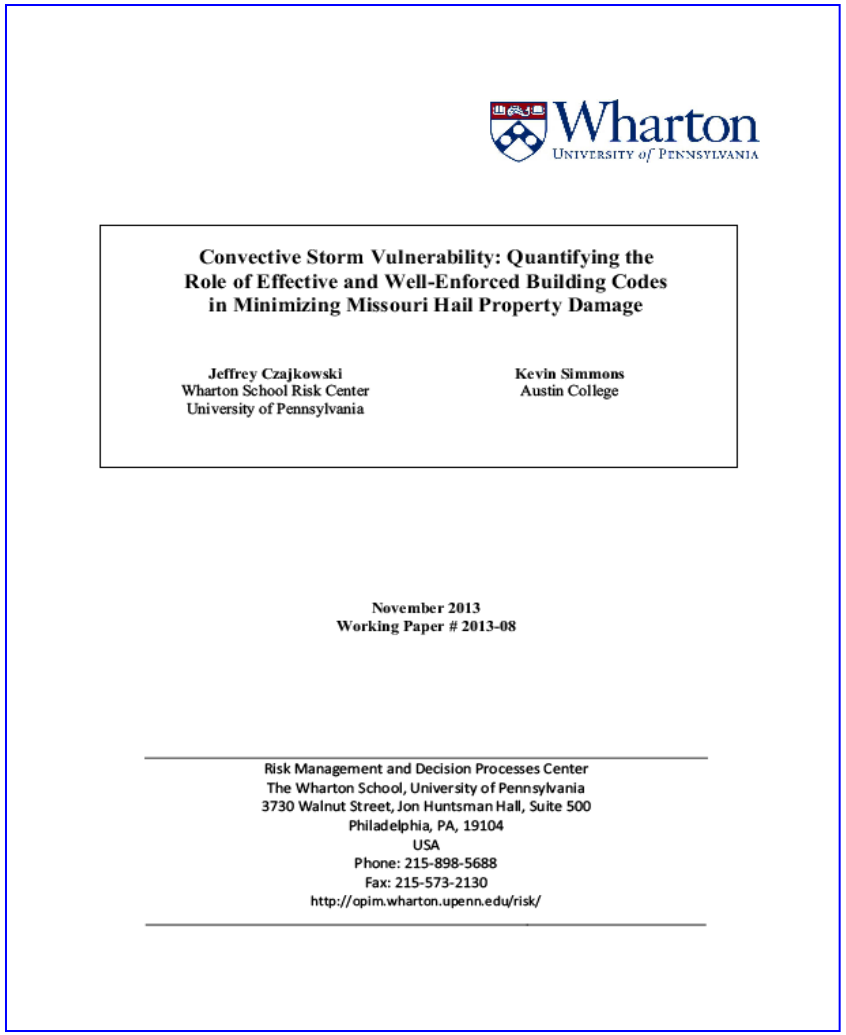
state/territory. Either the state Emergency Management Agency (EMA) or the office that has primary emergency management responsibility is eligible to apply directly to FEMA for PDM Grant Program funds as an applicant; however, only one application will be accepted from each state, tribe or territory.

FEMA

500 C Street, S.W.
Washington, DC 20472

BCEGS Data Application

- Academic, Government and Insurance Industry Studies
  - Wharton School
  - Internal ISO Studies



Wharton
University of Pennsylvania

Convective Storm Vulnerability: Quantifying the Role of Effective and Well-Enforced Building Codes in Minimizing Missouri Hail Property Damage

Jeffrey Czajkowski
Wharton School Risk Center
University of Pennsylvania

Kevin Simmons
Austin College

November 2013
Working Paper # 2013-08

Risk Management and Decision Processes Center
The Wharton School, University of Pennsylvania
3730 Walnut Street, Jon Huntsman Hall, Suite 500
Philadelphia, PA, 19104
USA
Phone: 215-898-5688
Fax: 215-573-2130
http://opim.wharton.upenn.edu/risk/

Wharton Study – Validation of BCEGS

Wharton
University of Pennsylvania

ISSUE BRIEF Fall 2013

Informed Decisions on Catastrophe Risk

Quantifying the Role of Effective and Well-Enforced Building Codes

"A midsize community of 50,000 people that experiences a moderate hail storm could expect to reduce losses by approximately $4 to $8 million by adopting and enforcing appropriate building codes."

"Communities with a favorable BCEGS score can expect a 12 – 18% reduction in damage as compared to less favorable scores."

expect to reduce losses by approximately $4 to $8 million by adopting and enforcing appropriate building codes.

from 12% to 28% on average, as compared to less favorably and unclassified rated ZIP codes.

- Highlighting this type of substantial savings is critical for decision makers weighing the costs and benefits of implementing more effective and well-enforced building standards.

Figure 1 shows the location of each of the 532 unique ZIP codes in MO with a hail loss in at least one of the three years from 2008 to 2010, overlaid with their determined average BCEGS rating. Among the 532 unique ZIP codes with at least one claim, 59 percent have a BCEGS rating – either more favorable (19%), or less favorable (40%). Thus, for our analysis, conditional upon the occurrence of the hazard, only 41 percent of ZIP codes in Missouri used in the loss analysis have an unclassified 99 BCEGS rating. The more heavily populated areas of the state such as Kansas City, St. Louis, Joplin, Springfield, etc., have BCEGS ratings in place.

amages across . For example, his figure also or all hail sizes.

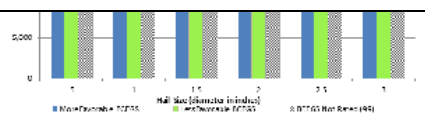


Figure 2. Expected Hail Damage by Hail Size and BCEGS Ratings

Wharton Study of Wind-Driven Losses

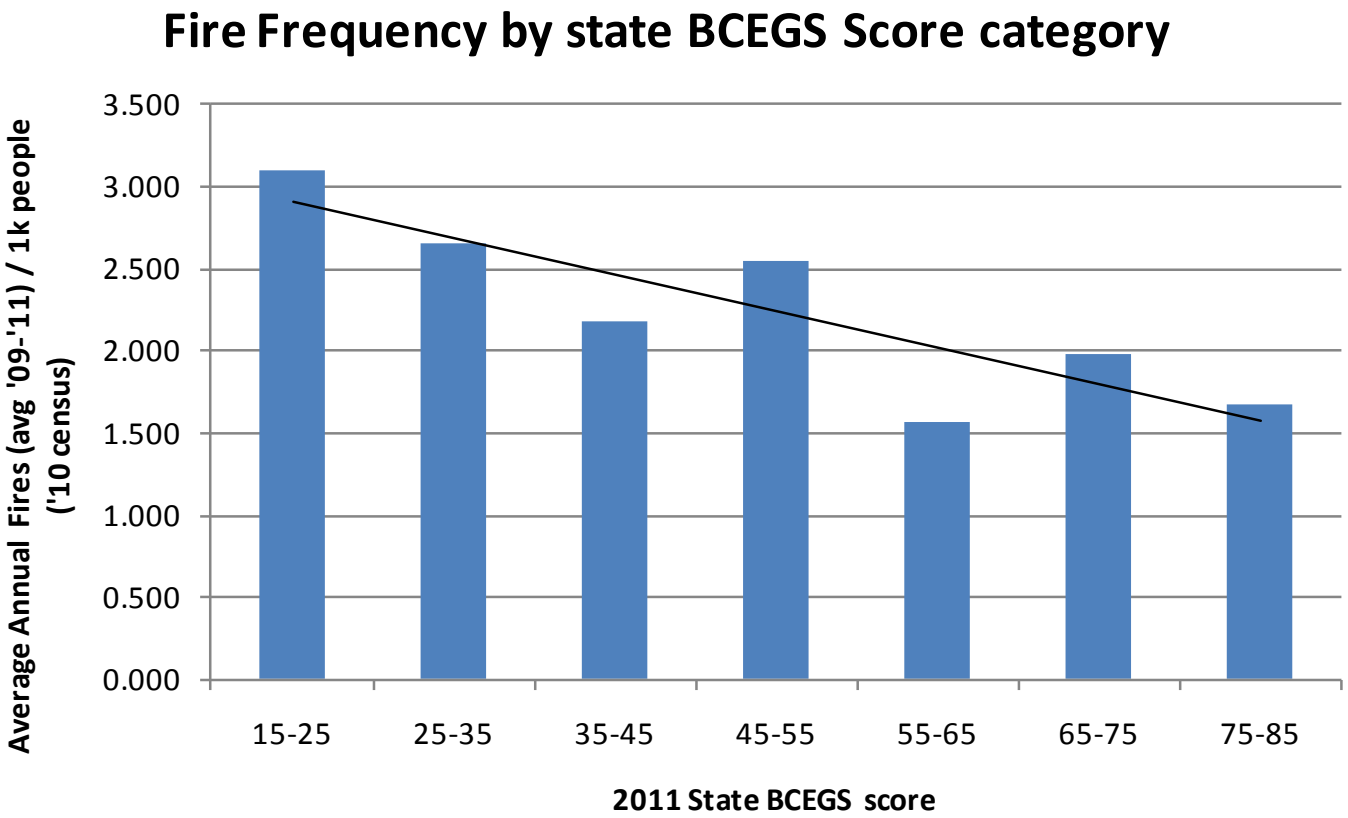
Empirical Results Verify the Benefits of Effective and Well-Enforced Building Codes

- Results show the strong effect that the statewide FBC had on losses from wind storms during this timeframe.
  - ***Windstorm losses are shown to be reduced by as much as 72 percent due to the implementation of the FL statewide codes, consistent with other previous findings***
- BCEGS ratings perform as expected, i.e., better ratings translate into lower losses
  - ***compared to FL zip codes with low and missing BCEGS ratings, FL zip codes with more favorable BCEGS ratings reduce losses by 15 percent***
  - ***higher BCEGS strength ratings in particular reduce windstorm losses on the order of 42 to 55 percent when combined with newer construction***
- Results control for other exposure and vulnerability factors and are robust to a number of additional analyses

7

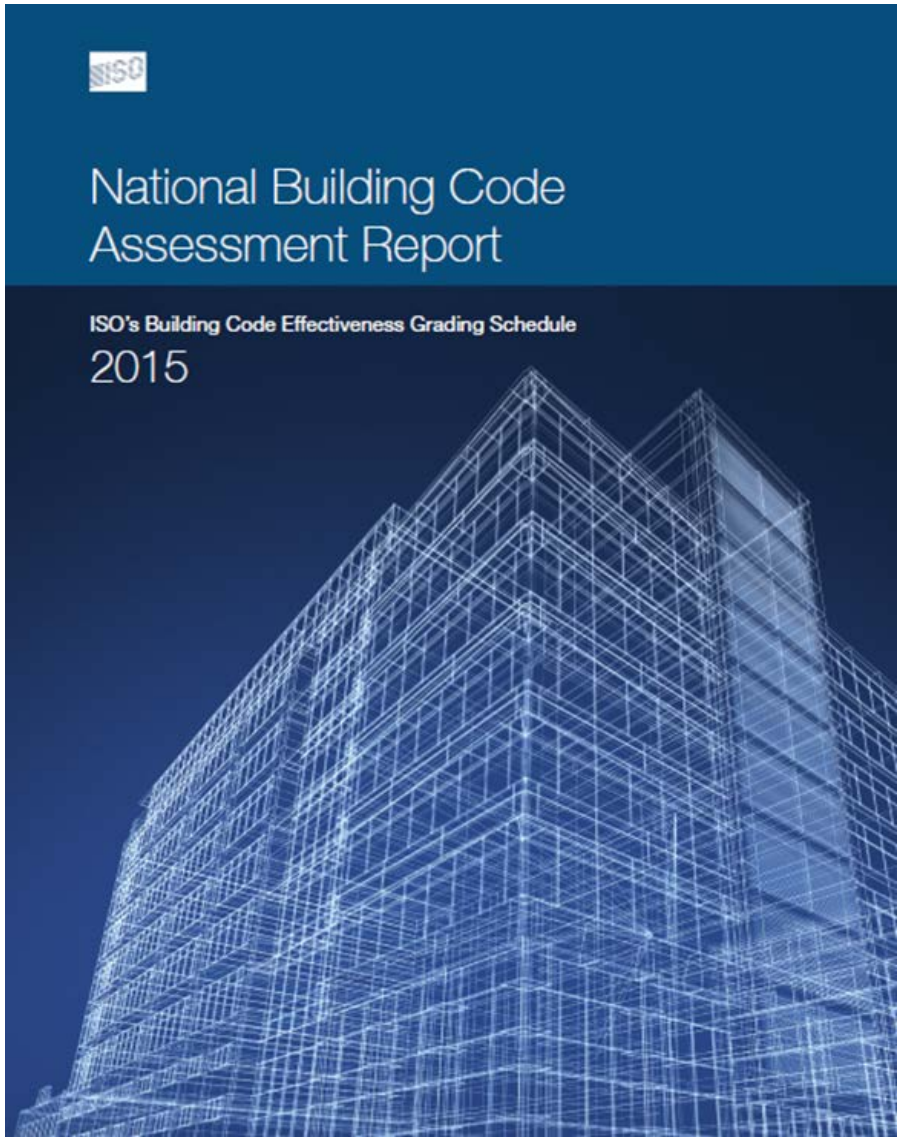
Credit: J.Czajkowski

ISO Fire Frequency Study



Sources:
- 2010 Census
- NFIRS
- BCEGS database

First Ever National Report From ISO



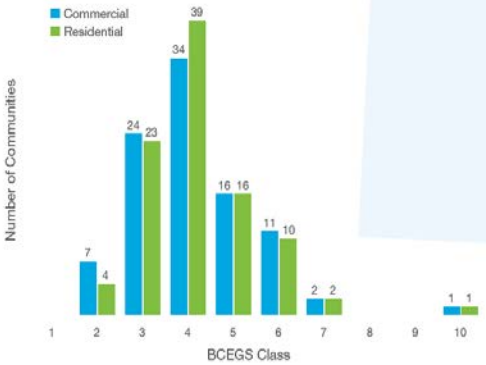
Colorado

BCEGS State Averages

	Score	Class
Commercial	69	4
Residential	69	4

The BCEGS 1–10 classification is based on a 1-to-100 point score. For complete details on the scoring process, see page 9, "BCEGS Grading Process" and "Determining a BCEGS Classification."

BCEGS Community Class Count



By the Numbers

46	FEMA/National Flood Insurance Program Community Rating System (CRS) communities in the state
4,055	Average population serviced per certified building code official in the state

Top Natural Hazards

State Facts

1,006,758	Acres burned by more than 13,000 wildfires in Colorado over the past 10 years (NICC)

Building Code Adoption History (as of 6/30/15)

ICC Code Release	Commercial Date Adopted	Residential Date Adopted
2003	7/1/05	Not adopted
2006	Not adopted	Not adopted
2009	7/1/10	Not adopted
2012	Not adopted	Not adopted
2015	Not adopted	Not adopted

Building Code Trend Analysis

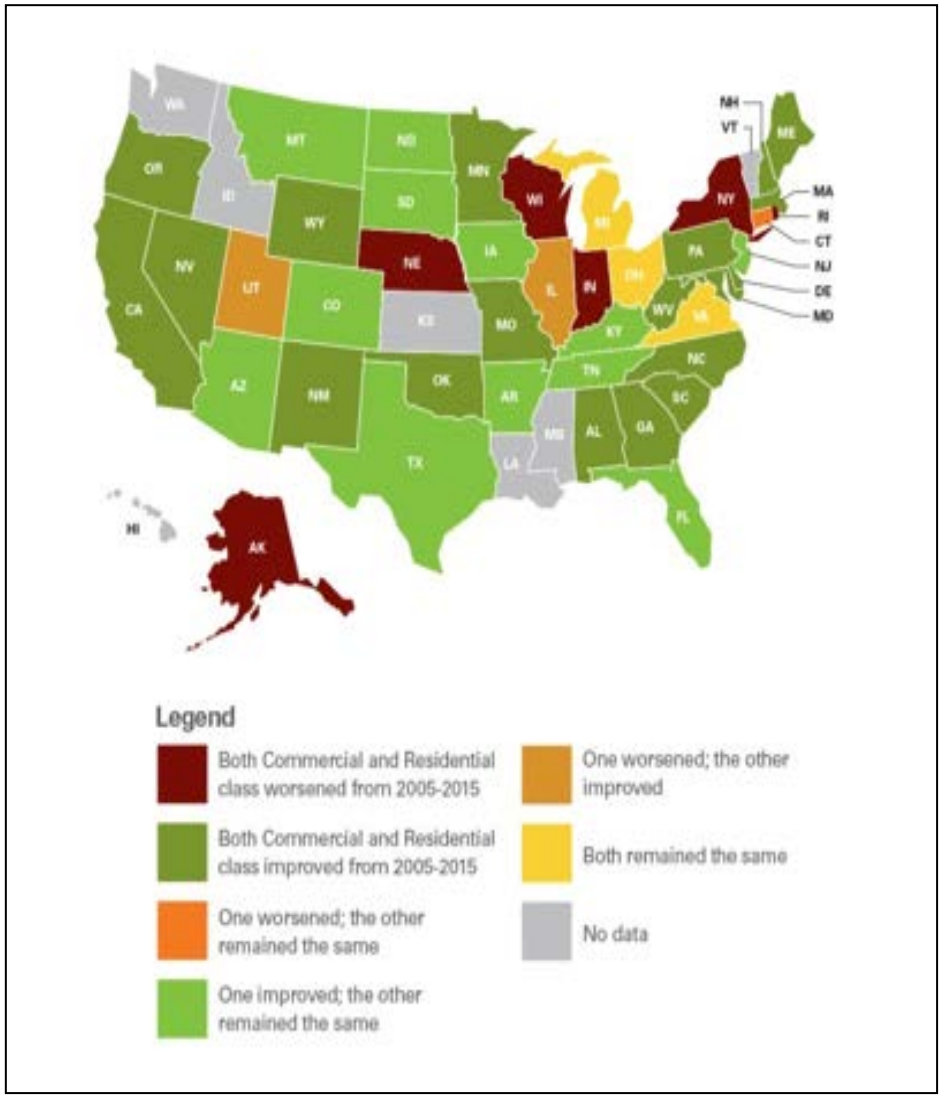
10 Years of BCEGS data utilized in the review of trends in enforcement

70 Percent of states had improved classifications between 2005 and 2015

30 states with improved average classifications

3 states maintained their average classification

8 states had average classifications become less favorable over the term

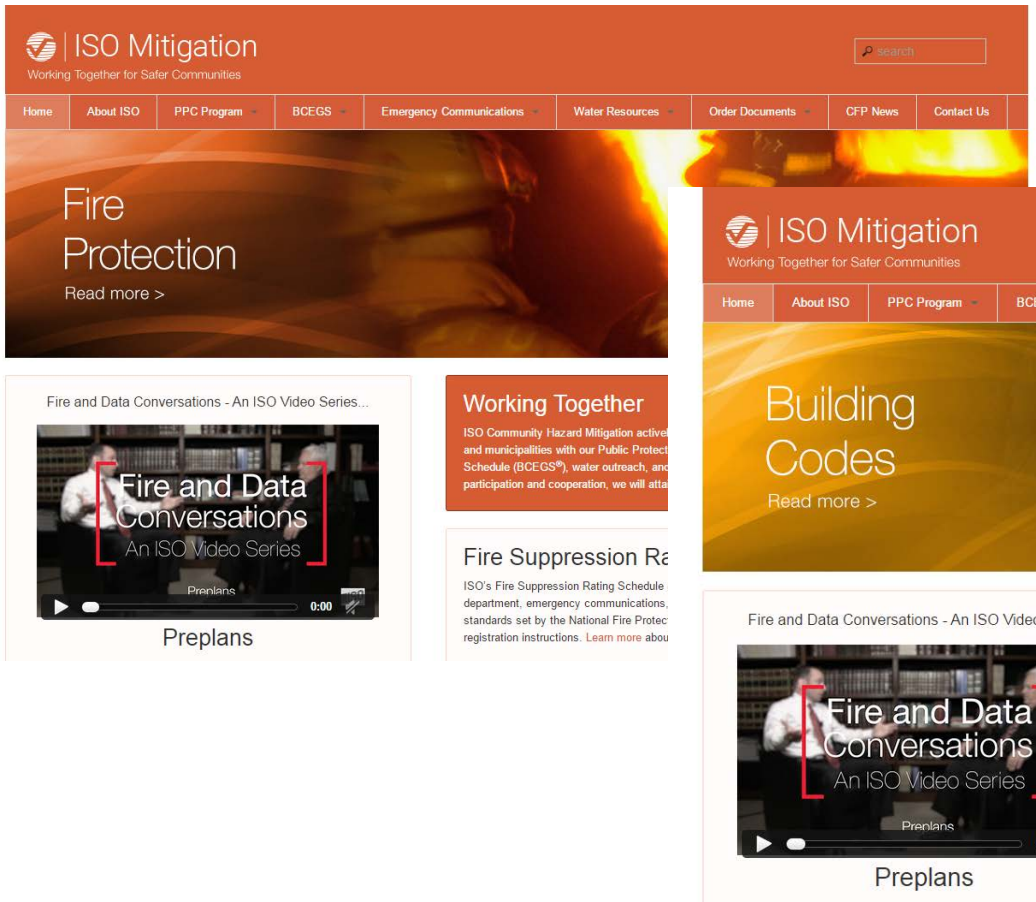


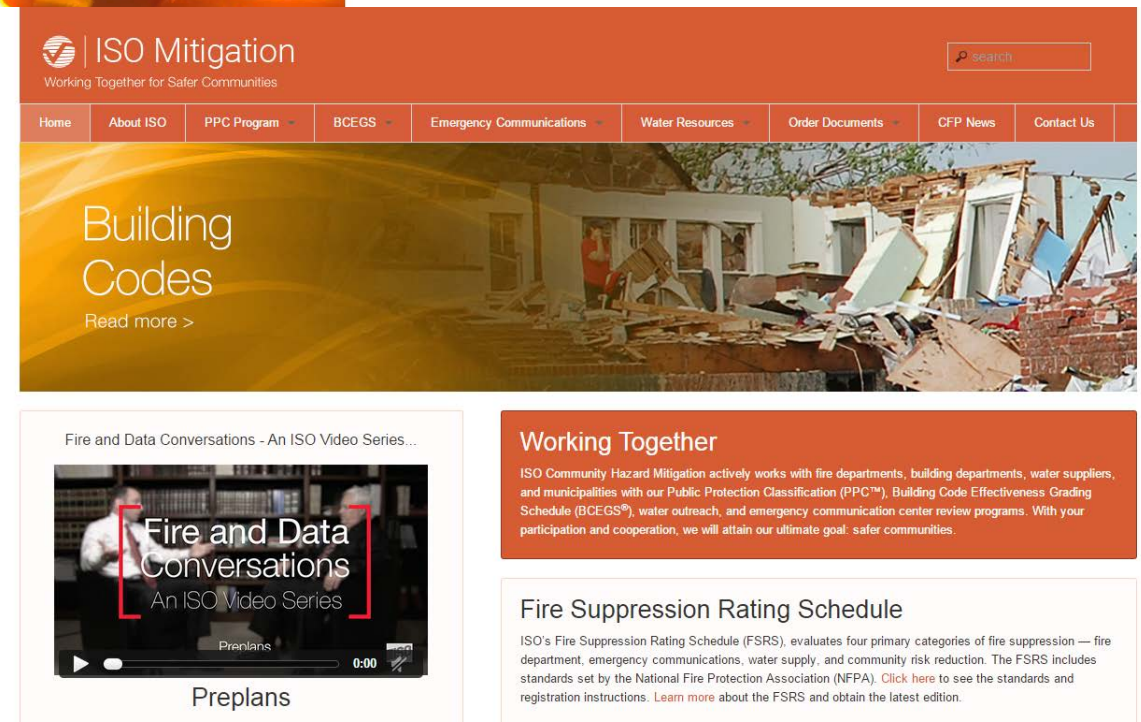
The Future of BCEGS
Schedule 2016 - 2017

- First Draft Completed
- Risk Engineering
- Testing
- Stakeholder Panels
- Items to Consider:
  - Modified emphasis on model code age
  - Increased emphasis of enforcement and certification
  - Credit / debit filing
  - Multi-peril focus
  - How to deal with existing buildings?

Resources - ISOMitigation.com

- Provides ready access to all pertinent information about our Community Loss Mitigation programs, ranging from background information of a general nature through highly technical resources, responses to frequently asked questions, and ways to contact us directly and quickly.





Thank you !

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